NSW GOVERNMENT

NSW Resources Regulator

GUIDELINE

REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

NSW Resources Regulator

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AMENDMENT SCHEDULE		
Date	Version	Amendment
2 July 2021	1	First published
31 January 2023	2	Clarification that rehabilitation objectives and rehabilitation completion criteria are to be submitted online via the Regulator Portal. Additional guidance provided in Explanatory note 1 dealing with cases when a rehabilitation completion criteria statement is lodged for approval and it is determined that some rehabilitation completion criteria can be approved but that others require further refinement over time. New 'Spatial reference field' section and additional guidance regarding how each final land use and mining domain must be

		given an alphanumeric code used for spatially linking rehabilitation objectives/rehabilitation completion criteria with the final land use polygon(s) that forms part of the 'final landform and rehabilitation plan'. New 'Explanatory note 3: Underground mining areas and final land use domains'. Inclusion of advice that ecological rehabilitation objectives should comprise three separate objectives dealing with 'vegetation composition', 'vegetation structure' and 'ecosystem function'. Inclusion of advice that lease holders are strongly encouraged to utilise the example rehabilitation objectives and consider the example rehabilitation completion criteria provided in Tables 1 and 2. Table 1 updated to include separate columns for 'spatial reference field' and 'rehabilitation objective category' (to better align with the table that needs to be completed in the Resources Regulator Portal when lodging a rehabilitation objectives statement for approval).
5 April 2023	3	Added BSAL (Biophysical Strategic Agricultural Land) to the Glossary. Table 1 updated to provide additional examples for the 'ecological rehabilitation' rehabilitation objective category where there may not be a target vegetation community / target Plant Community Type (PCT). Table 2 updated to include Agricultural Revegetation as a rehabilitation objective category.
14 Dec 2023	4	Inclusion of definition of final void in the Glossary and new *Explanatory note 4: Spatial reference code for final voids*.

Contents

Purpose of this guideline

Conditions of a mining lease granted under the *Mining Act 1992* require the lease holder to:

- prepare a rehabilitation objectives statement and a rehabilitation completion criteria statement in the form and way[1] approved by the Secretary
- submit the rehabilitation objectives statement, rehabilitation completion criteria statement and the final landform and rehabilitation plan (large mines only) to the Secretary for approval (collectively referred to as the "rehabilitation outcome documents")
- prepare a rehabilitation management plan (which includes the rehabilitation outcome documents) in the form and way[2] approved by the Secretary (large mines only)
- implement the rehabilitation management plan (large mines only)
- achieve the final land use as stated in the approved rehabilitation objectives statement, rehabilitation completion criteria statement and the final landform and rehabilitation plan (large mines only).

The purpose of this guideline is to assist lease holders with the preparation of the rehabilitation objectives statement and the rehabilitation completion criteria statement.

Our role

In accordance with the provisions of the *Mining Act 1992* and the conditions of a mining lease, we are required to:

- assess and determine the rehabilitation outcome documents
- ensure that rehabilitation achieves the final land use.

The rehabilitation outcome documents comprise the following:

- **rehabilitation objectives statement** that describes the rehabilitation outcomes required to attain the final land use for the mining area

[1] Lease holders should refer to the following documents, as relevant:
- *Form and way: Rehabilitation objectives and rehabilitation completion criteria for small mines*
- *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines*

[2] Lease holders should refer to *Form and way: Rehabilitation management plan for large mines*

- **rehabilitation completion criteria statement** that expands on rehabilitation objectives to define the key criteria, and 'benchmark values' for each criterion to be achieved, the attainment of which will demonstrate rehabilitation has been achieved
- **final landform and rehabilitation plan** (for large mines only) which is a spatial plan depicting the final land use and detailing the final landform topography and location of rehabilitation features.

Rehabilitation outcomes are initially developed as part of the mine design and then refined at the development application stage under the *Environmental Planning and Assessment Act 1979*. The rehabilitation objectives and the final land use, which includes the final landforms and rehabilitation requirements, are typically assessed and approved as part of the development consent granted pursuant to the *Environmental Planning and Assessment Act 1979*.

We are responsible for assessing and determining whether to approve the rehabilitation objectives statement, the rehabilitation completion criteria statement and the final landform and rehabilitation plan (large mines).

In determining whether to approve the rehabilitation outcome documents, we must take into account the extent to which the outcomes are consistent with the final land use for the mining area. We will not approve rehabilitation completion criteria when further refinement is required to ensure the benchmark values adequately reflect the final land use. Where we do not approve a rehabilitation outcome document, we will provide notification to the lease holder which includes reasons for the refusal and the time within which a revised document must be submitted.

When assessing and determining the rehabilitation outcome documents, we may engage with a range of stakeholders, including relevant government agencies, specific subject matter experts (e.g. ecologists, agronomists, geotechnical engineers) and affected land holders.

Role of the lease holder

This section sets out the requirements for preparing and submitting (for the approval of the Secretary) the rehabilitation objectives statement and rehabilitation completion criteria statement. To comply with mining lease conditions, the lease holder is required to:

1. prepare a rehabilitation objectives statement and submit it to us for approval in the form and way[3] approved by the Secretary (clauses 9, 12 and 15(b) of Schedule 8A of the Mining Regulation

[3] Refer to *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines* and *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for small mines* at www.resourcesregulator.nsw.gov.au

2016). This is submitted via the NSW Resources Regulator Portal in a table format similar to that provided in **Table 1** (large mines) and **Table 2** (small mines)

2. prepare a rehabilitation completion criteria statement in the form and way approved by the Secretary (clauses 9 and 12 of Schedule 8A of the Mining Regulation 2016)
3. submit the rehabilitation completion criteria statement to us for approval (in the form and way approved by the Secretary) no later than when a forward program is submitted to us which relates to completion of rehabilitation during the period covered by that forward program[4] (clause 15(3) of Schedule 8A of the Mining Regulation 2016) (refer Explanatory note 1). This is submitted via the NSW Resources Regulator Portal in a table format similar to that provided in **Table 1** (large mines) and **Table 2** (small mines)
4. re-submit the rehabilitation objectives statement and rehabilitation completion criteria statement to us for approval whenever an amendment is made (clause 15 of Schedule 8A of the Mining Regulation 2016) (refer Explanatory note 2)
5. prepare a rehabilitation management plan (large mines only) which includes a copy of the approved or, if not yet approved, the proposed rehabilitation objectives statement and rehabilitation completion criteria statement. The rehabilitation management plan is to also include a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored (clause 10(1) of Schedule 8A of the Mining Regulation 2016)
6. implement the matters set out in the rehabilitation management plan (large mines only) (clause 15(4) of Schedule 8A of the Mining Regulation 2016)
7. ensure that rehabilitation of the mining area achieves the final land use as stated in the approved rehabilitation objectives statement, rehabilitation completion criteria statement and the final landform and rehabilitation Plan (large mines only) (clause 6 of Schedule 8A of the Mining Regulation 2016).

The lease holder is required to rehabilitate, as soon as reasonably practicable, after the disturbance occurs (clause 5 of Schedule 8A of the Mining Regulation 2016). As such, where rehabilitation completion criteria have not been approved and are considered preliminary, it is the expectation that the lease holder needs to demonstrate that they are actively taking the necessary steps to refine these criteria in preparation for submission to us for approval. This may include:

[4] The intention is for lease holders to submit final rehabilitation completion criteria to us for approval no later than three years before rehabilitation of the whole (or an identified part) of the mining area is proposed to be completed.

- undertaking rehabilitation monitoring utilising the associated performance indices (refer to the example rehabilitation objectives and rehabilitation completion criteria in Tables 1 and 2)
- undertaking research to address knowledge gaps
- consulting with and seeking feedback from key stakeholders (e.g. government agencies, land holders, subject matter experts) to ensure there is sufficient specificity and detail in the rehabilitation completion criteria to define the benchmark required for rehabilitation to meet the approved final land use(s).

Explanatory note 1: Lodgement and approval of rehabilitation completion criteria statement

Lease holders can submit a rehabilitation completion criteria statement for approval at any time. However, we recognise that in many cases rehabilitation completion criteria are required to be refined over an extended period of time to ensure the benchmark values adequately reflect the final land use.

To facilitate this, lease holders are required to submit final rehabilitation completion criteria to us for approval no later than three years before rehabilitation of the whole (or an identified part) of the mining area is proposed to be completed (i.e. at the time when a forward program is submitted to us which relates to completion of rehabilitation during the period covered by that forward program – refer clause 15(3) of Schedule 8A of the Mining Regulation 2016).

We will not approve rehabilitation completion criteria when further refinement is required to ensure the benchmark values adequately reflect the final land use. It may be the case that when a rehabilitation completion criteria statement is lodged for approval it is determined that some rehabilitation completion criteria can be approved but that others require further refinement over time. In such cases we will:

- refuse the rehabilitation completion criteria statement and provide reasons outlining which rehabilitation completion criteria can be approved and which cannot be approved / require further refinement,
- require the re-submission of an amended rehabilitation completion criteria statement which clearly specifies which rehabilitation completion criteria are ready to be approved and which rehabilitation completion criteria require further refinement (i.e. addresses the reasons for refusal provided by the Resources Regulator). Where the amended rehabilitation completion criteria statement includes rehabilitation

completion criteria that requires further refinement, the lease holder must include the following text for each respective criteria:

Further refinement of this rehabilitation completion criteria is required before an amended rehabilitation completion criteria statement can be approved.

- then approve the amended rehabilitation completion criteria statement.

This approach will ensure that:

- progressive (and partial) rehabilitation completion and sign off by the Regulator can occur across relevant parts of a mine site, and
- further research / monitoring / refinement of rehabilitation completion criteria for other parts of the mine site can continue until the criteria are ready to be finalised and approved.

Lease holders can re-submit an updated rehabilitation completion criteria statement to us for approval when the previously refused rehabilitation completion criteria are considered to be ready for approval (see Explanatory note 2 below).

Explanatory note 2: Amending rehabilitation outcome documents

Lease holders are required to re-submit the rehabilitation objectives statement, rehabilitation completion criteria statement and final landform and rehabilitation plan (large mines only) to us for approval whenever an amendment is made (clause 15(4) of Schedule 8A of the Mining Regulation 2016). Amendments may be required due to a number of factors, including when:

- rehabilitation outcome documents are refused by the Resources Regulator and revised documents are required to be lodged (clause 2(2) of Schedule 8A of the Mining Regulation 2016)
- there are changes to the final land use, such as when a development consent is modified
- there are changes to a development consent that include changes to rehabilitation obligations

- a hazard has been identified that presents a risk to achieving the final land use and requires a change to completion criteria (e.g. timeframes) (clauses 6(3) and 7(3) of Schedule 8A of the Mining Regulation 2016)
- a written direction has been issued by the Secretary (clause 14(2) of Schedule 8A of the Mining Regulation 2016)

Final land use and mining domains

Final land use domains and mining domains, that are specific to each mining operation, are to be nominated and included as part of the submission of rehabilitation objectives and rehabilitation completion criteria statements. The range of rehabilitation objectives and rehabilitation completion criteria must be specific to the final land use domain and underlying mining domain(s) as explained further below.

Each final land use and mining domain has been given an alphanumeric code used for spatially linking rehabilitation objectives/rehabilitation completion criteria with the final land use polygon(s) that forms part of the 'final landform and rehabilitation plan'[5]. The spatial reference is created by combining the code of the final land use domain and mining domains for each final land use polygon submitted via the Mine Rehabilitation Portal[6] (i.e. the submission of the final landform and rehabilitation plan). Lease holders are required to enter this spatial reference code when lodging rehabilitation objectives and rehabilitation criteria statements via the NSW Resources Regulator Portal.

Final land use domains

Mining leases may have one final land use (e.g. returning the entire mining lease to native vegetation) or several final land use units (e.g. a mix of pasture areas and native ecosystems). Each final land use unit represents a separate final land use domain which will require specific rehabilitation objectives.

The list of nominated final land use domain(s) that may be applicable to a mining operation, including the spatial reference codes, are provided in the table below.

[5] A 'final landform and rehabilitation plan' is required pursuant to clause 12(1)(c) in Schedule 8A of Mining Regulation 2016.
[6] Refer to *Guideline: Mine Rehabilitation Portal*

FINAL LAND USE DOMAIN	CODE FOR SPATIAL REFERENCE FIELD
Native ecosystem [for some projects this may require further specification and/or identification of Plant Community Types or vegetation specific community(s) as nominated in a development consent. Where there are multiple vegetation community types to be achieved as a final land use, each community type represents a different final land use that is to be delineated as a separate 'Final Land Use' polygon when submitting the 'final landform and rehabilitation plan']	A
Agricultural – grazing	B
Agricultural – cropping	C
Rehabilitation biodiversity offset area (including remnant vegetation or rehabilitation areas proposed to be subject to a biodiversity offset application under the Biodiversity Conservation Act 2016)	D
Industrial	E
Water management areas (such as creek realignments, constructed wetlands, significant final landform drainage features)	F
Water storage (includes dams retained for the final land use, but excludes any anticipated permanent water body in the final void)	G
Heritage area	H
Infrastructure (includes built infrastructure proposed to be retained for future use)	I
Final void (the extent is defined by an area that does not free drain to the surrounding surface environment – refer to Glossary and Explanatory note 4)	J
Other (only use in exceptional circumstances. The domain lists above must be used as far as reasonably possible).	K

Explanatory note 3: Underground mining areas and final land use domains

When a mining operation includes underground mining areas, the final land use domain(s) should only spatially define the areas where there has been surface disturbance that requires rehabilitation (e.g. sinkholes, major subsidence cracking, gas drainage boreholes, etc). It should not include the entire underground mining area.

The use of 'Other' as a final land use domain must also be avoided. The final land use domain should be selected on the basis of what subsidence remediation is required to be achieved. For example, if subsidence impacts have occurred in a native vegetation area, then the final land use should be listed as "Native ecosystem".

Surface infrastructure associated with underground mining operations (such as ventilation shafts, gas drainage infrastructure, etc) must fall within the 'Infrastructure area' mining domain (spatial reference code '1') – see table below.

Mining domains

A final land use domain(s), as described above, may cover a number of different mining domains. Mining domains are defined in the glossary and are the footprint of areas disturbed for discrete mining related activities. They have discrete geophysical and geochemical characteristics that will require specific rehabilitation treatments to achieve the final land use(s).

The list of nominated mining domains that may be applicable to a mining operation, including the spatial reference codes, are provided in the table below.

MINING DOMAIN	CODE FOR SPATIAL REFERENCE FIELD
Infrastructure area (such as administration facilities, workshops, access roads, material stockpile areas, portals, ventilation shafts)	1
Tailings storage facility	2
Water management area (excludes final void but may include any operational sediment dams, temporary creek diversions and other significant constructed drainage features)	3

MINING DOMAIN	CODE FOR SPATIAL REFERENCE FIELD
Overburden emplacement area (includes waste rock emplacement areas, potentially acid forming materials, etc)	4
Active mining area (open cut void) – refer to Glossary and Explanatory note 4	5
Underground mining area (SMP) (the area to be managed for subsidence impacts, for example subsidence management area in accordance with an extraction plan. Excludes 'Infrastructure areas' such as ventilation shafts and other surface infrastructure associated with underground mining)	6
Beneficiation facility (includes plant used for the processing of minerals such as cyanidation plant, concentrators, thickeners, crushers, separators, etc)	7
Other (other ancillary infrastructure areas such as temporary waste rock emplacement areas, topsoil stockpile areas, or on-lease exploration areas. Only use 'other' in exceptional circumstances. The domain lists above must be used as far as reasonably possible)	8

Rehabilitation objectives, and the associated rehabilitation completion criteria for each mining domain, will nominate the specific benchmarks that must be achieved in order to meet the land use capability as nominated by the final land use domain. For example, an infrastructure mining domain overlain by a native vegetation final land use domain is likely to have a different range of rehabilitation objectives and rehabilitation completion criteria when compared with a tailings storage facility domain overlain by a native vegetation final land use domain. Whilst both these mining domains may have the same ecological rehabilitation objectives and rehabilitation completion criteria, the rehabilitation objectives and rehabilitation completion criteria in relation to infrastructure, heritage management, land contamination, landform stability and groundwater are likely to be different and unique to the geophysical and geochemical characteristics of each mining domain.

Spatial reference field

Each final land use and mining domain has been given an alphanumeric code used for spatially linking rehabilitation objectives/rehabilitation completion criteria with the final land use polygon(s) that forms part of the 'final landform and rehabilitation plan'. The spatial reference is created by combining the code of the final land use domain and mining domains for each final land use polygon submitted via the

Mine Rehabilitation Portal[7] (i.e. the submission of the final landform and rehabilitation plan). Further details are also provided in Guideline: Mine rehabilitation portal.

For example 'A2' would be the spatial reference for a final land use of native ecosystem that has a mining domain of tailings storage facility. Every final land use polygon must have a spatial reference code.

Where there are multiple vegetation community types to be achieved as a final land use, each community type represents a different final land use that is to be delineated as a separate 'Final Land Use' polygon when submitting the 'final landform and rehabilitation plan'.

Explanatory note 4: Spatial reference codes for final voids

The table below provides further guidance about the spatial reference codes that need to be used for both the underlying mining domain and the final land use domain where there is a final void as part of the final land use.

Final land use rehabilitation outcome for void (or portion of)	**Final land use domain (and Code)**	**Mining domain (and Code)**	**Comments**
Portion of a final void predicted to be filled with surface / groundwater	Final void (J)	Active mining area (open cut void) (5)	Type of vegetative growth (e.g. native grasses or pasture) to be noted in 'vegetation community' column with purpose of providing erosion protection for the period until submerged by water. A polygon depicting the area of the final void 'pit lake' is to also be included in the final landform features theme
High walls	Final void (J)	Active mining area (open cut void) (5)	

[7] Refer to *Guideline: Mine Rehabilitation Portal*

Final land use rehabilitation outcome for void (or portion of)	Final land use domain (and Code)	Mining domain (and Code)	Comments
Low wall where sustainable agricultural grazing can be established	Agricultural – grazing (B)	Active mining area (open cut void) (5)	Final land use of Agricultural – grazing (code B) cannot be used where: • Grazing may increase the risks of slope stability and erosion due to the profile and or geochemical risks associated with the low wall of the void. • The slope angle precludes the use of standard agricultural equipment • Area of the low wall will be submerged by the predicted final water level within the void.
Low wall where sustainable native vegetation can be established	Native ecosystem (A)	Active mining area (open cut void) (5)	Final land use code of Native ecosystem (code A) cannot be used where the area of the low wall will be submerged by the predicted final water level within the void and revegetation is for temporary stabilisation only until equilibrium occurs.
Low wall where a native and or pasture grass is not a final land use option given the slope profile / constraints	Final void (J)	Active mining area (open cut void) (5)	Type of vegetative growth to manage slope stability (e.g. Native grasses or pasture) to be noted in the 'vegetation community' column.
Tailings disposal in final void that is not completely filled	Final void (J)	Tailings storage facility (2)	
Final void created over a block-caving zone	Final void (J)	Underground mining area (6)	This assumes that no sustainable vegetation can be established and / or the area is an exclusion zone.

The spatial referencing of final voids in accordance with the above scenarios will ensure:

- that the appropriate suite of rehabilitation objectives and rehabilitation completion criteria are developed to address the unique range of risks that are specific to the final voids (e.g. high wall and low wall instability, exposed problematic geochemical materials, public safety, groundwater and surface water impacts etc.);
- the location of final voids is accurately depicted to determine compliance against the original development consent (e.g. size, depth, location and shape);
- a proponent is able to demonstrate that they have either minimised the size of the final void(s) and or areas draining to the final void as far as reasonably practicable / feasible in accordance with development consent conditions; and
- the beneficial reuse of voids is demonstrated where sustainable post mining land use outcomes can be established.

Preparing rehabilitation objectives and rehabilitation completion criteria statements

Rehabilitation objectives must (as a minimum) demonstrate that each final land use domain will be returned to a condition capable of achieving the final land use.

Rehabilitation completion criteria set the benchmark values for key attributes (indicators) proposed to demonstrate that the rehabilitation objectives have been met.

Use of analogue sites

Rehabilitation objectives and rehabilitation completion criteria for final land use domains should be based on the defining characteristics of any appropriate analogue sites. Appropriate analogue sites are areas that represent the values and characteristics of the final land use. Appropriate analogue sites and their key defining characteristics should be identified for each intended final land use. Rehabilitation objectives and rehabilitation completion criteria must identify the analogue vegetation community which is the target for the final land use.

Where lease holders have limited access to appropriate analogue sites, alternative methodologies such as literature reviews, research programs or rehabilitation trials should be adopted to develop scientifically robust rehabilitation completion criteria. In these circumstances it is expected lease holders

will refine rehabilitation completion criteria through the life of mine based on the outcomes of rehabilitation trials and/or research programs.

Consistency with the development consent

In many cases, particularly State significant developments, the final land use(s) and associated rehabilitation objectives are approved in the development consent granted under the *Environmental Planning and Assessment Act 1979.* The development consent may also include a conceptual final landform and revegetation plan (or similar) that provides a spatial depiction of the approved final land use(s).

The rehabilitation objectives and rehabilitation completion criteria statements submitted to us for approval (clause 12 of Schedule 8A to the Mining Regulation 2016) must be consistent with any final land use(s) and associated rehabilitation objectives approved in the development consent and or associated environmental assessment (e.g. Environmental Impact Statement).

If rehabilitation objectives approved in the development consent are broad, non-specific, or non-existent, lease holders must develop specific rehabilitation objectives and rehabilitation completion criteria to demonstrate that each final land use domain will be returned to a condition capable of achieving the final land use. In such cases lease holders are strongly encouraged to utilise the example rehabilitation objectives and rehabilitation completion criteria provided in **Table 1** and **Table 2** (as relevant).

Rehabilitation completion criteria may also be refined as mining operations (including rehabilitation) progress through the life of the mine, however, they must remain consistent with the relevant development consent.

Stakeholder consultation

The development of rehabilitation objectives and rehabilitation completion criteria must be informed by consultation with relevant stakeholders.

Relevant stakeholders will include anyone who may be affected by the mining operations, including rehabilitation, carried out on the lease land such as:

- the relevant development consent authority or local council
- the relevant landholder
- community consultative committee (if required under the development consent) or equivalent consultative group
- affected landholders

- government agencies relevant to the final land use (noting that the lodgement of rehabilitation objectives and rehabilitation completion criteria statements with us for determination constitutes satisfactory consultation with the Resources Regulator)
- affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities)
- local Aboriginal communities
- any other person determined by the Minister to be a relevant stakeholder in relation to a mining lease.

In many cases, particularly for State significant developments, consultation with stakeholders would have already occurred prior to the approval of rehabilitation objectives as part of the development consent process. Additional consultation (as relevant) should occur with relevant stakeholders if rehabilitation objectives and/or rehabilitation completion criteria are substituted, amended or refined during the life of the mine in a manner that would materially alter rehabilitation outcomes.

Example rehabilitation objectives and rehabilitation completion criteria for large mines

Example rehabilitation objectives and rehabilitation completion criteria for a range of final land uses associated with large mines is presented in **Table 1**. It is the intent that the examples provided should be adopted and/or refined accordingly to ensure they have the specificity and detail required to adequately define the benchmark required for rehabilitation to have met the approved final land use(s).

Lease holders are strongly encouraged to utilise the example rehabilitation objectives and consider the example rehabilitation completion criteria provided in **Table 1**.

Notably, rehabilitation completion criteria associated with the following rehabilitation objectives may require further refinement by industry in consultation with relevant stakeholders:

- ecological rehabilitation objectives – rehabilitation completion criteria will need to indicate the values of the nominated indicators that must be met in order to demonstrate recognisability and self-sustainability of vegetation communities specified in the development consent, including:
  - the **vegetation composition** of the rehabilitation is recognisable as the target vegetation community,
  - the **vegetation structure** of the rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community, and

- levels of **ecosystem function** have been established that demonstrate the rehabilitation is self-sustainable.

This may include the development of rehabilitation completion criteria in consideration of data generated from suitable analogue sites that have been nominated by a development consent.

- agricultural rehabilitation objectives – rehabilitation completion criteria will need to indicate the values of the nominated indicators that must be met in order to demonstrate that:
  - revegetation is sustainable for the long-term (i.e. only requires maintenance that is consistent with the intended final land use), and
  - land use capability is capable of supporting the target agricultural land use.

It will be the intent that as rehabilitation completion criteria become more refined across the mining industry, we will update this guideline to provide further advice to industry regarding acceptable rehabilitation outcomes.

Example rehabilitation objectives and rehabilitation completion criteria for small mines

Example rehabilitation objectives and rehabilitation completion criteria for a range of final land uses associated with small mines is presented in **Table 2**. It is the intent that the examples provided should be adopted and/or refined accordingly to ensure they are relevant and adequately define the benchmark required for rehabilitation to have met the approved final land use(s) for the specific mining operation.

Lease holders are strongly encouraged to utilise the example rehabilitation objectives and rehabilitation completion criteria provided in **Table 2**.

Glossary

TERM	DEFINITION
Active	In the context of rehabilitation, land associated with mining domains is considered 'active' for the period following disturbance until the commencement of rehabilitation.
Active mining phase of rehabilitation	In the context of rehabilitation, the active mining phase of rehabilitation constitutes the rehabilitation activities undertaken during mining operations such as land clearing, salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes such as selective handling of waste rock and management of tailings emplacements.
Analogue site	An area of land and/or water that is a 'reference site' that represents an example of the defining values and characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. An analogue site is a selected location surrounding or within a proposed/existing mine site. The location is usually an undisturbed area or a self-sustaining vegetation community that demonstrates the existing environment without any impact of disturbance (e.g. acts as a baseline for the surrounding undisturbed environment). Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and rehabilitation completion criteria for final land use domains.
BSAL	Biophysical Strategic Agricultural Land as defined in *State Environmental Planning Policy (Resources and Energy) 2021*.
Decommissioning	The process of removing mining infrastructure and removing contaminants and hazardous materials.
Decommissioning phase of rehabilitation	Activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the rehabilitation management plan (for large mines only) this phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or 'fit for purpose' built infrastructure to be retained for future use(s) following lease relinquishment.
Department	Department of Regional NSW.

TERM	DEFINITION
Disturbance	See Surface Disturbance.
Domain	An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use.
Ecosystem and land use development	This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved or, if not yet approved, the proposed: ■ rehabilitation objectives, and ■ rehabilitation completion criteria, and ■ for large mines – final landform and rehabilitation plan. For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile. This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.
Ecosystem and land use establishment	This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform (as per the approved final landform and rehabilitation plan for large mines). For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.
Exploration	Has the same meaning as that term under the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.
Final landform and rehabilitation plan	As defined in the Mining Regulation 2016.
Final land use	As defined in the Mining Regulation 2016.
Final land use domain	A land management unit with a final land use. A mining lease may have one final land use (e.g. returning the entire mining lease to native vegetation) or

TERM	DEFINITION
	several final land use units (e.g. a mix of pasture areas and native ecosystems). Each final land use unit represents a separate final land use domain.
Final void	A final void is demarcated by the extent of an area that does not free drain to the surrounding surface environment. In other words the void's planar extent is defined by the lowest point of the voids crest, often referred to as the spill point level (or spill level). The spill level is the elevation in the void, which if filled with water, water would spill into the surrounding landscape. A final void typically comprises the following: • an area whereby material was extracted as a result of mining and a void remains after mining is complete; and or • highwalls; and or • low walls; and or • ramps.
Form and way	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website.
Forward program	As defined in the Mining Regulation 2016.
Growth medium development	This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short-lived pioneer species) to ensure achievement of the approved or, if not yet approved, the proposed: ■ rehabilitation objectives, and ■ rehabilitation completion criteria, and ■ for large mines – final landform and rehabilitation plan. This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.
Habitat	Has the same meaning as that term under the *Biodiversity Conservation Act 2016* and the *Fisheries Management Act 1994* (as relevant).
Indicator	An attribute of the biophysical environment (for example, pH, topsoil depth, biomass) that can be used to approximate the progression of a biophysical

TERM	DEFINITION
	process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion (defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.
Land	As defined in the *Mining Act 1992.*
Landform establishment	This phase of rehabilitation consists of the processes and activities required to construct the approved final landform (as per the development consent and, for large mines, the approved final landform and rehabilitation plan). In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (that is, rock raking or ameliorating sodic materials).
Large mine	As defined in the Mining Regulation 2016.
Lease holder	The holder of a mining lease.
Life of mine	The timeframe of how long a mine is approved to mine, from commencement to closure.
Mine rehabilitation portal	Means the NSW Resources Regulator's online portal that leaseholders must use (via a registered account) to: ■ upload rehabilitation geographical information system (GIS) spatial data ■ develop rehabilitation GIS spatial data (using online tracing functions) ■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities. Data submitted to the mine rehabilitation portal is collated in a centralised geodatabase for use by the NSW Resources Regulator to regulate rehabilitation performance of leaseholders.
Mining area	As defined in the *Mining Act 1992*.
Mining domain	A land management unit with a discrete operational function (for example, overburden emplacement), and therefore similar geophysical

TERM	DEFINITION
	characteristics, that will require specific rehabilitation treatments to achieve the final land use(s).
Mining lease	As defined in the *Mining Act 1992*.
Native vegetation	Has the same meaning as that term under the *Local Land Services Act 2013.*
Overburden	Material overlying coal or a mineral deposit.
Phases of rehabilitation	The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are: ■ active mining ■ decommissioning ■ landform establishment ■ growth medium development ■ ecosystem and land use establishment ■ ecosystem and land use development ■ rehabilitation completion (sign-off).
Progressive rehabilitation	The progress of rehabilitation towards achieving the approved or, if not yet approved, the proposed: ■ rehabilitation objectives, and ■ rehabilitation completion criteria, and ■ for large mines – final landform and rehabilitation plan. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.
Rehabilitation	As defined in the *Mining Act 1992*.
Rehabilitation biodiversity offset area	Land previously disturbed by mining activities that is rehabilitated, secured and managed for the protection and enhancement of biodiversity values. The biodiversity offsets scheme is set out in the *Biodiversity Conservation Act 2016*. It includes remnant vegetation or rehabilitation areas proposed to be subject to a biodiversity offset application under the *Biodiversity Conservation Act 2016*.

TERM	DEFINITION
Rehabilitation completion	The final phase of rehabilitation when a rehabilitation area has achieved the final land use for the mining area: ■ as stated in the approved rehabilitation objectives and the approved rehabilitation completion criteria, and ■ for large mines – as spatially depicted in the approved final landform and rehabilitation plan. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that rehabilitation has achieved the final land use following submission of the relevant application by the lease holder.
Rehabilitation completion criteria	Rehabilitation completion criteria set out the criteria the achievement of which will demonstrate the achievement of the rehabilitation objectives.
Rehabilitation cost estimate	As defined in the Mining Regulation 2016.
Rehabilitation management plan	As defined in the Mining Regulation 2016.
Rehabilitation objectives	Means the rehabilitation objectives required to achieve the final land use for the mining area.
Rehabilitation outcomes	Means the final land use for the mining area as stated in the approved rehabilitation objectives, the approved rehabilitation completion criteria and (for large mines only) the approved final landform and rehabilitation plan.
Rehabilitation outcome documents	As defined in the Mining Regulation 2016.
Relevant stakeholders	Means any persons or bodies who may be affected by the mining operations, including rehabilitation, carried out on the lease land, and includes: a. the relevant development consent authority b. the local council c. the relevant landholder(s)

TERM	DEFINITION
	d. community consultative committee (if required under the development consent) or equivalent consultative group e. affected land holder(s) f. government agencies relevant to the final land use g. affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities) h. local Aboriginal communities i. any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.
Risk	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2018).
Secretary	The Secretary of the Department.
Small mine	As defined in the Mining Regulation 2016.
State significant development (SSD)	Has the same meaning as that term under the *Environmental Planning and Assessment Act 1979*. Note: Schedules 1 and 2 of *State Environmental Planning Policy (State and Regional Development) 2011* provide a full list of SSD types and identified sites. Large mining and extraction operations (including all coal mines) are identified as SSD.
Surface disturbance	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
Tailings	A combination of the fine-grained (typically silt-sized, in the range from 0.001 to 0.6 mm) solid materials remaining after the recoverable metals and minerals have been extracted from mined ore, together with the water used in the recovery process[8].

[8] *Tailings Management: Leading Practice Sustainable Development Program for the Mining Industry*, Commonwealth of Australia (2016).

Department guidance

- Form and way: Rehabilitation objectives and rehabilitation completion criteria for small mines
- Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines
- Form and way: Rehabilitation management plan for large mines
- Form and way: Annual rehabilitation report and forward program for small mines
- Form and way: Annual rehabilitation report and forward program for large mines
- Guideline: Rehabilitation risk assessment
- Guideline: Rehabilitation records
- Guideline: Rehabilitation controls
- Guideline: Mine rehabilitation portal
- Guideline: Rehabilitation objectives and rehabilitation completion criteria
- Guideline: Achieving rehabilitation completion (sign-off)

The above resources are located on our website.

Table 1: Example rehabilitation objectives and rehabilitation completion criteria for **large mines**

FINAL LAND USE DOMAIN	MINING DOMAIN	SPATIAL REFERENCE FIELD[9]	REHABILITATION OBJECTIVE CATEGORY	REHABILITATION OBJECTIVES *(describe the desired features and/or characteristics of the final land use domain)*	INDICATOR *(specific attribute associated with the objective)*	REHABILITATION COMPLETION CRITERIA *(benchmark for the indicator, based on analogue data where appropriate)*	EXAMPLE JUSTIFICATION/ VALIDATION METHODS[10] *(evidence that the benchmark has been achieved)*
Native Ecosystem, or Agricultural Land Use, or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use)	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'A2' - which would be the spatial reference for a final land use of 'native ecosystem' that has a mining domain of 'tailings storage facility')	Removal of Infrastructure	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.	Removal of all services (power, water, communications) that have been connected on the site as part of the operation.	All utility infrastructure removed.	Statement provided, utility service disconnection record / notification.
					Heritage obligations (e.g. development consent under the *Environmental Planning and Assessment Act 1979,* approvals under the *Heritage Act 1977,* etc.) have been met (e.g. archival recording, building retention or building demolition with footings preserved).	Permits and approval documents issued. All archival reports required are complete and submitted.	Copy of any relevant approval documentation and archival reports/records.
					Removal of all plant, equipment and associated infrastructure including processing facilities,	Infrastructure removed.	As-constructed final landform plan, photos,

[9] The spatial reference is an alphanumeric code used for spatially linking rehabilitation objectives/rehabilitation completion criteria with the final land use polygon(s) that forms part of the 'final landform and rehabilitation plan'. The spatial reference is created by combining the code of the final land use domain and mining domains for each final land use polygon submitted via the Mine Rehabilitation Portal (i.e. the submission of the final landform and rehabilitation plan). For example 'A2' would be the spatial reference for a final land use of native ecosystem that has a mining domain of tailings storage facility. Every final land use polygon must have a spatial reference code.

[10] It is the expectation that the relevant justification/validation sources will be collated and presented in the Rehabilitation Completion application to the Resources Regulator when rehabilitation 'sign-off' is required.

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					stockpile areas, rail infrastructure and loading facilities, underground hydrocarbon storage tanks, office complex, portable offices, exploration core samples, camp facilities, storage racks, samples.		decommissioning reports etc.
					Removal of all footings or removal to a certain depth (e.g. X metres).	Footings removed and or removed to specified depths to avoid exposure pathways to subsequent final land use.	Surveyed and marked on the as-constructed final landform plan.
					Removal of all water management infrastructure (including pumps, pipes and power).	Infrastructure removed.	Statement provided and before/after photos.
					All drill cores have been removed and taken either to an authorised storage or a disposal location.	Cores removed and relocated.	Statement provided, receipt records from storage or disposal location.
					Surveying and sealing of all drill holes, boreholes and gas wells in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement, plug and abandonment log, photos, as-constructed drawings, records of fill materials and concrete plugs, filling methods etc.
					Surveying and sealing of all underground mine entries in accordance with departmental guidelines and relevant standards.	Sealing completed and verified by suitably qualified engineer.	Engineering report/statement, plug and abandonment log, photos, as-constructed drawings, records of fill materials and concrete

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							plugs, filling methods etc.
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use)	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'B4' - which would be the spatial reference for a final land use of 'agricultural -grazing' that has a mining domain of 'overburden emplacement area')	Retention of Infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)	Potential hazards (e.g. electrical, mechanical) have been effectively isolated and secured.	Hazards isolated and secured.	Statement provided by suitably qualified engineer.
					Damage to access tracks has been repaired and stabilised.	Repairs complete.	As-constructed final landform plan, photos etc.
					Where applicable, necessary approvals are in place (e.g. development consent under the *Environmental Planning and Assessment Act 1979*) where buildings and infrastructure are to be retained as part of final land use.	Permits and approval documents issued.	Copy of any relevant approvals.
					Heritage obligations as required under the *Environmental Planning and Assessment Act 1979*, *Heritage Act 1977,* etc. have been met (e.g.	Permits and approval documents issued; archival reports (where required) complete and submitted.	Copy of any relevant approvals.

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					archival recording, building retention and restoration).		
					The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	Engineering report/statement, photos, risk assessment verifying modes of failure are adequately addressed to minimise risks to public safety or the environment.
					Infrastructure is in a condition (e.g. structural, electrical, other hazards) that is suitable for the intended final land use.	Formal acceptance from the subsequent landowner that infrastructure is in a condition that is suitable for the intended final land use in accordance with formal agreement.	Formal acceptance from landowner.
					If any underground pipelines or other infrastructure are to remain in situ, they do not pose a hazard for the intended final land use. Note: If any underground pipelines or other infrastructure are to remain in situ in areas to be returned for Agriculture – cropping they are at a depth Xm nominated depth (e.g. >1m).	The location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig. Formal acceptance from the subsequent landowner that underground infrastructure has been left in a condition that is suitable for the intended final land use in accordance with formal agreement.	Surveyed and marked on the as-constructed final landform plan. Copy of notification to local Council and Dial Before You Dig Formal acceptance from landowner. Identified on an appropriate legal instrument associated with the land title.

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					Heritage obligations as required under the *Environmental Planning and Assessment Act 1979*, *Heritage Act 1977,* etc. have been met (e.g. archival recording, building retention and restoration).	Permits and approval documents issued; archival reports (where required) complete and submitted.	Copy of any relevant approvals and associated reports.
					The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	Engineering report/statement, photos, risk assessment report validating modes of failure have been addressed to minimise risks to public safety and the environment etc.
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'B4' - which would be the spatial reference for a final land use of 'agricultural -grazing' that has a mining domain of 'overburden emplacement area')	Land Contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Waste material and/or visible contamination areas on site surface.	There are no visible signs of contamination following the removal of plant, equipment and materials. All rubbish/ waste materials removed from site.	Statement provided and before/after photos.
					Soil testing for contaminants of concern as listed by Health Investigation Level of the National	Contamination will be appropriately remediated so that appropriate guidelines for land use are met, e.g.	Contamination Remediation Report prepared by Land

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					Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to land use type.	Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999). Excess sludge/material has been removed from surface water dams.	Contamination Consultant Site Contamination Audit Report and Site Audit Statement prepared by EPA Accredited Auditor (where required).
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'B2' - which would be the spatial reference for a final land use of 'agricultural -grazing' that has a mining domain of 'tailings storage facility')	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained / encapsulated so it does not pose any hazards or constraints for intended final land use.	Visual –capping material placement, type across emplacement Visual – indication of capping performance on final landform – vegetation health Visual – emplacement seepage and other indicators of groundwater issues – wet spots etc. Measured - survey of emplacement capping to verify construction and to monitor settlement. Quality assurance records for the construction of the emplacement material including (where relevant) capping material, liner system, seepage control etc Measured- surface and groundwater levels to verify water balance modeling and capping function Measured – contamination levels in surface and groundwater surrounding emplacement for	Visual – verification that capping, type and placement consistent with design Visual – no signs of compromised capping performance indicated by vegetation health – such as tree death (deeper root systems) Visual – no areas of unexpected seepage Survey verifies that capping placement consistent with design and settlement and/or material loss is within predicted limits and will not compromise final landform drainage via differential settlement. Quality assurance records verify capping constructed and in accordance with design specifications relevant to site risks and target final land use. For example: • Capping depth – X metres • Capping material type • Capillary breaks	Photos, rehabilitation monitoring reports, as-constructed surveys, quality assurance records for construction, erosion surveys, independent geotechnical reports (where required), groundwater/surface water monitoring reports. The structural integrity of the infrastructure and capping has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use and water material adequately contained.

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					contaminants of concern associated with waste material emplaced.	• Seepage control. Groundwater and surface monitoring verify capping function e.g. 'store and release' and design performance permeability/seepage. Groundwater and surface water monitoring verify adequate containment of waste materials and seepage/leachate is not contributing to land/groundwater contamination.	
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'B4' - which would be the spatial reference for a final land use of 'agricultural -grazing' that has a mining domain of 'overburden emplacement area')	Landform Stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna. Landform that is commensurate with surrounding natural landform and where appropriate, incorporates geomorphic design principles.	Visual - indicators of erosion and land instability. Visual - indicators that surface water management structure are functioning as designed. Measured – erosion rates from field trials and or surveys on both target analogue sites (representative of final land use) and rehabilitated profiles (tonnes / ha). Measured - Survey of rehabilitated landform to verify final landform construction in accordance with Final Landform and Rehabilitation Plan[6]. Measured - survey of rehabilitated landform to specifically monitor settlement and/or material loss via erosion. Modelled – long term erosional stability (e.g. Landform Evolution	Visual- minimal erosion that would not require moderate to significant ongoing management and maintenance works. Visual – no signs of land instability such as mass movement. Visual - no areas of active gully erosion. Visual - no evidence of tunnel erosion. Visual – no evidence of active scour likely to compromise surface water management structure. Survey verifies final landform complies with final landform construction in accordance with Final Landform and Rehabilitation Plan.[6] Survey verifies that settlement and/or material loss is within predicted limits and will not	Before and after photos, rehabilitation monitoring reports, as-constructed surveys, erosion surveys, independent geotechnical reports (where required) and or erosion modelling reports (where required) that indicate long-term stability of rehabilitated landform. Depending on the nature, scale and risks associated with a specific site, stability will need to be evaluated over a number of years (e.g. 5 years).

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					Modelling) to verify the long-term stability of rehabilitated landform. Modelled – long term geotechnical stability (e.g. stability analysis) to verify the long-term stability of rehabilitated landform.	compromise final landform drainage via differential settlement. Erosion rate monitoring verifies that erosion levels are within the range of target analogue sites representative of final land use.	
						Significant surface water management structures (e.g. spillways, drop structures, major drains and creek diversions) have been constructed in accordance with hydrological design.	An engineering assessment undertaken by a suitably qualified person concludes that significant surface water management structures (e.g. spillways, drop structures, major drains and creek diversions) have been constructed in accordance with hydrological design.
						High risk landforms (such as steep slopes, high walls) have been constructed in accordance with geotechnical design.	An engineering assessment undertaken by a suitably qualified person concludes that high risk landforms (such as steep slopes, high walls) have been constructed in accordance with geotechnical design.
Native Ecosystem or Agricultural Land Use	Infrastructure Area; Tailings Storage Facility;	(e.g. 'C1' - which would be the spatial	Bushfire	The risk of bushfire and impacts to the community,	Appropriate bushfire hazard controls (where required) have	Bushfire controls implemented.	Statement provided and before/after photos.

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or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	reference for a final land use of 'agricultural -cropping' that has a mining domain of 'infrastructure area')		environment and infrastructure has been addressed as part of rehabilitation.	been implemented on the advice from the NSW Rural Fire Service.		
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Must be applied to all domains	(e.g. 'B1' - which would be the spatial reference for a final land use of 'agricultural -grazing' that has a mining domain of 'infrastructure area')	Surface Water	Runoff water quality from mine site meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm. Or (where there are limited or no requirements in a development consent) Runoff water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.	Water quality parameters selected from Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 and or Environment Protection Licence (further guidance available on NSW Environment Protection Authority website).	Water quality discharged from rehabilitated mining operation meet specifications in Environment Protection Licence and or ANZECC guidelines for specific environment.	Water quality monitoring reports. Environment Protection Licence relinquished by Environment Protection Authority. Independent hydrological assessment report. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).

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Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'G3' - which would be the spatial reference for a final land use of 'water storage' that has a mining domain of 'water management area')	Water Approvals	Structures that take or divert water such as final voids, dams, levees etc. are appropriately licensed (e.g. under the *Water Management Act 2000*) and where required ensure sufficient licence shares are held in the water source(s) to account for water take.	Final landform considers advice from relevant Government Agency whether sufficient licence shares are available in the water source to account for water stored in voids and dams in the proposed final landform.	Water approvals / licences are granted by relevant NSW Government Agency.	Confirmation from relevant Government Agency that relevant water approvals / licences are able to be granted.
					Indicators as specified by Australian River Assessment System (AUSRIVAS).	Assessment of biological health in accordance with Australian River Assessment System (AUSRIVAS).	Independent biological health assessment report. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area;	(e.g. 'A2' - which would be the spatial reference for a final land use of 'native ecosystem' that has a	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	Water quality parameters selected from Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 and or Environment Protection Licence (further guidance available on the NSW Environment Protection Authority website).	Water quality discharged from rehabilitated mining operation meet specifications in Environment Protection Licence and or ANZECC guidelines for specific environment.	Independent hydrological assessment report. Depending on the nature, scale and risks associated with a specific site, achievement of criteria

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uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	mining domain of 'tailings storage facility')		Or (where there are limited or no requirements in a development consent) Groundwater quality is similar to, or better than the pre-disturbance water quality.			may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
Native Ecosystem or Agricultural Land Use or Another final land use (Note: where there are multiple land uses, a set of rehabilitation objectives and rehabilitation completion criteria will need to be developed for each land use).	Infrastructure Area; Tailings Storage Facility; Water Management Area; Overburden Emplacement Area; Active Mining Area (open cut void); Underground Mining Area (subsidence management); or Beneficiation Facility. (only use 'Other' in exceptional circumstances).	(e.g. 'A5' - which would be the spatial reference for a final land use of 'native ecosystem' that has a mining domain of 'active mining area')	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment. Or (where there are limited or no requirements in a development consent) Impacts to groundwater are similar to the pre-mining environment.	Groundwater quality both on and off a mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater flow.	Water quality monitoring reports. Environment Protection Licence relinquished by Environment Protection Authority. Independent hydrological assessment report. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
Native Ecosystem (range of rehabilitation objectives and rehabilitation completion criteria	All domains	(e.g. 'A4' - which would be the spatial reference for a final land use of 'native	Ecological rehabilitation	Ecological rehabilitation objective 1: The **vegetation composition** of the rehabilitation is recognisable as the	Native plant species recorded from 0.04 hectare fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	Native plant species are characteristic of the target vegetation community(s) when compared to analogue sites.	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate

FINAL LAND USE DOMAIN	MINING DOMAIN	SPATIAL REFERENCE FIELD[9]	REHABILITATION OBJECTIVE CATEGORY	REHABILITATION OBJECTIVES *(describe the desired features and/or characteristics of the final land use domain)*	INDICATOR *(specific attribute associated with the objective)*	REHABILITATION COMPLETION CRITERIA *(benchmark for the indicator, based on analogue data where appropriate)*	EXAMPLE JUSTIFICATION/ VALIDATION METHODS[10] *(evidence that the benchmark has been achieved)*
will be dependent upon commitments in development consent).		ecosystem' that has a mining domain of 'overburden emplacement area')		target vegetation community (e.g. Plant Community Type [11](PCT) contained within the BioNet Vegetation Classification). Or The **vegetation composition** of the rehabilitation contains species that are commensurate with native vegetation communities of X / Y / Z found in the local area.		Or for more specific target PCTs: Using the PCT Assignment Tool [12](or an analogous method agreed by the consent authority in consultation with DPIE-EES[13]), the distance to centroid value(s) when comparing the ecological rehabilitation site and target PCT is within the specified threshold range set by the development consent as described in the online PCT assignment tool (and supporting technical report and guidance)	rehabilitation completion criteria have been met. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
				Ecological rehabilitation objective 2: The **vegetation structure** of the rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community (e.g. plant community type contained within the	Cover and abundance of plant growth forms recorded from 0.04 hectare fixed monitoring plots are characteristic of the target vegetation community (e.g. PCT), or an ongoing trend toward becoming characteristic is evident from the monitoring data	Cover, abundance and height range of native plant growth forms are characteristic of, or trending towards, the target vegetation community type(s). Or for more specific target PCTs: Foliage cover of species allocated to the 3 dominant growth form groups for the target PCT as identified by BAM[14] is within the 10^{th}-90^{th} percentile variation range of the	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate rehabilitation completion criteria have been met. Depending on the nature, scale and risks associated with a specific site,

[11] Plant Community Type: further information is included on the NSW Government's website: https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/bionet/user-manuals-and-quick-guides/plant-community-type-data
[12] PCT Assignment Tool: further information is included on the NSW Government's website: https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/BioNet/bionet-system-enhancements-release-notes-190708.pdf
[13] DPIE-EES: means the Biodiversity Conservation Division of the Environment, Energy & Science Group, which is part of the Department of Planning, Industry and Environment
[14] Biodiversity Assessment Methodology: further information is included in the NSW Government's website: https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/accredited-assessors/biodiversity-assessment-method-2020

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				BioNet Vegetation Classification). Or The **vegetation structure** of the rehabilitation is similar to that of native vegetation communities of X / Y / Z found in the local area.		specified reference sites/data approved by the consent authority; and For wooded target PCT(s) only: Stem abundance and diameter at breast height for trees in size classes <5cm, 5-10, 10-20 and 20-30cm is within the 10^{th}-90^{th} percentile variation range of the specified reference sites/data approved by the consent authority	achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
				Ecological rehabilitation objective 3: Levels of **ecosystem function** have been established that demonstrate the rehabilitation is self-sustainable. Or Levels of **ecosystem function** have been established that demonstrate the rehabilitation is self-sustainable. (Note: Separate and more specific objectives will be required for areas such as wildlife / habitat corridors and/or specific habitat creation	Indicators of nutrient cycling are suitable for sustaining the target vegetation community (e.g. PCT(s))	Litter cover is within 10^{th}-90^{th} percentile variation range of reference sites/data	Rehabilitation monitoring reports, independent soil reports (where required) that demonstrate long-term function of rehabilitated landform. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).

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				areas). In addition, separate rehabilitation objectives will be required where a quantum (e.g. X hectares) of a certain native vegetation community has to be established as part of the final land use.			
					Evidence of plant regeneration from 0.04 hectare fixed monitoring plots or a walk over of the ecological rehabilitation area	Second generation individuals of trees are within the 10^{th}-90^{th} percentile variation range of reference sites/data approved by the consent authority	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate rehabilitation completion criteria have been met. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
					Cover of exotic species within 0.04 hectare fixed monitoring plots is low	Foliage cover of 'high threat exotic' (HTE) weeds is within 10^{th}-90^{th} percentile variation range of reference sites/data or at a level that does not cause significant risk to rehabilitation.	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that

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							demonstrate long-term stability of rehabilitated landform. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
					Soil health is suitable to sustain the target vegetation community(s) (e.g. PCT)	Total organic carbon is within 10^{th}-90^{th} percentile variation range of reference sites/data; and Total microbial biomass is within 10^{th}-90^{th} percentile variation range of reference sites/data approved by the consent authority; and The ratio of fungus to bacteria (fungal:bacterial) biomass is within 10^{th}-90^{th} percentile variation range of reference sites/data	Rehabilitation monitoring reports, independent soil reports (where required) that demonstrate long-term function of rehabilitated landform. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
					Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	Rehabilitation monitoring reports, environmental monitoring records.

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					Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	Rehabilitation monitoring reports.
Agricultural Land Use	All domains	(e.g. 'B4' - which would be the spatial reference for a final land use of 'agricultural -grazing' that has a mining domain of 'overburden emplacement area')	Agricultural Revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use. Land use capability is capable of supporting the target agricultural land use. In addition, separate rehabilitation objectives will be required where a quantum (e.g. X hectares) of a certain agricultural outcome has to be established as part of the final land use.	Routine Soil Test (bulked soil cores 0-10 cm) –Includes: Total Carbon (TC), Total Nitrogen (TN), Organic Matter, TC/TN Ratio; Bray I and II Phosphorus; Colwell Phosphorus; Available cations (Calcium, Magnesium, Potassium, Ammonium, Nitrate, Phosphate, Sulfur); Available Micronutrients (Zinc, Manganese, Iron, Copper, Boron, Silicon); Exchangeable (Sodium, Potassium, Calcium, Magnesium, Hydrogen, Aluminium, Cation Exchange Capacity); pH and EC (1:5 water); Basic Colour, Basic Texture. Commodity data (e.g. stocking rates, livestock weights, crop yields, pasture composition). Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes of pasture and cropping lands.	Land and Soil Capability classification or Agricultural Land Classification criteria met. The re-established topsoil / subsoil substrate is capable of supporting the targeted pasture / cropping regime on a sustained basis. Cropping / Pasture establishment is consistent with the range of species utilised within the region. Cropping / Pasture establishment is in good health and provides adequate cover. Cropping yields from rehabilitated areas are similar to adjacent cropping land. Appropriate and reliable access to water for livestock. Appropriate animal refuge areas for livestock (e.g. wooded/treed areas) during extreme weather conditions. Resilience to drought and fire. Detail on reinstatement of BSAL like soils to be provided by proponent.	Rehabilitation monitoring reports, independent soil reports, environmental monitoring records, independent agronomist reports. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).

Table 2: Example rehabilitation objectives and rehabilitation completion criteria for **small mines**

FINAL LAND USE	REHABILITATION OBJECTIVE CATEGORY	REHABILITATION OBJECTIVES *(describe the desired features and/or characteristics of the final land use)*	REHABILITATION COMPLETION CRITERIA *(an attribute of rehabilitation and the benchmark value for the attribute that will demonstrate that the rehabilitation objective has been met)*	RECORD *(evidence that the benchmark has been achieved)*
Native Ecosystem or Agricultural Land Use or Another final land use Note: Where there are multiple final land uses, a set of rehabilitation objectives and completion criteria will need to be developed for each final land use.	Removal of infrastructure	All infrastructure that is not required for the final land use is to be removed and the land left safe and free of hazardous materials.	Removal of all services (power, water, communications) that have been connected on the land as part of the exploration program. Removal of all mining plant, equipment and associated infrastructure (including portable offices, ablution facilities, footings and slabs). Removal of all water management infrastructure (including pumps, pipes and power).	Written statements. Photographs.
	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community. All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and/or licence/lease/binding agreement, etc).	Potential hazards (e.g. electrical, mechanical) have been effectively isolated. If any underground pipelines are to remain in situ, the location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig. All retained structures are accepted by the landowner as fit for the approved final land use	Surveyed and marked on the as-constructed final landform plan. Copy of notification to local council and Dial Before You Dig. Landholder acceptance letter.
	Land and water contamination	There is no residual soil contamination on site that is incompatible with intended final land use or that poses a threat of environmental harm.	There are no visible signs of contamination following the removal of plant, equipment and materials. Any contamination has been appropriately remediated in accordance with legislative requirements for the intended final land use. Retained dams are decontaminated in accordance with regulatory requirements	Contamination reports. Written statement. Photographic records Waste facility receipts.

FINAL LAND USE	REHABILITATION OBJECTIVE CATEGORY	REHABILITATION OBJECTIVES *(describe the desired features and/or characteristics of the final land use)*	REHABILITATION COMPLETION CRITERIA *(an attribute of rehabilitation and the benchmark value for the attribute that will demonstrate that the rehabilitation objective has been met)*	RECORD *(evidence that the benchmark has been achieved)*
			Surface layer is free of any hazardous materials.	
	Landform stability	The final landform is stable and does not present a risk of environmental harm downstream of the site or a safety risk to the public/stock/native fauna.	Any erosion is minimal with no ongoing management and maintenance works. No evidence of active gully erosion. No evidence of excessive sediment build-up at the toe of slopes. No evidence of tunnel erosion. No active rilling. No evidence of active scouring where the runoff from rehabilitation areas discharges into natural channels. Any boreholes on the mining lease have been sealed in accordance with the Department's guidelines and verified by a suitably qualified person.	Visual inspection records. Photograph series from photo points. Erosion surveys. Specialist consultant assessment reports. Borehole sealing records.
	Water quality	Runoff water quality meets the requirements of the relevant development consent(s) and does not present a risk of environmental harm. Or (where there are limited or no requirements in a development consent) Runoff water quality is similar to, or better than, the pre-disturbance runoff quality.	Runoff water quality from rehabilitation areas represents an acceptable level of change from a defined reference condition (refer to *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000*). Water quality in retained dams and/or voids is suitable for the final land use.	Upstream and downstream water quality monitoring records. Water quality monitoring records.
	Native revegetation	Revegetation is sustainable for the long-term, and only requires maintenance that is consistent with the intended final land use.	Topsoil or (a suitable soil substitute) has been applied to rehabilitation areas in a manner that is suitable for the final land use. Native vegetation areas contain flora species assemblages characteristic of species found within the region and will provide fauna habitat value in the future. Monitoring demonstrates that trees are healthy and growing. Monitoring demonstrates that vegetation and/or leaf litter cover is adequate to minimise soil erosion. Weeds do not comprise a significant proportion of species in any stratum.	Written statements. Before/after photographs. Rehabilitation monitoring reports.
	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use. Land use capability is capable of supporting the target agricultural land use.	Land and Soil Capability classification or Agricultural Land Classification criteria met. The re-established topsoil / subsoil substrate is capable of supporting the targeted pasture / cropping regime on a sustained basis. Cropping / Pasture establishment is consistent with the range of species utilised within the region. Cropping / Pasture establishment is in good health and provides adequate cover.	Before and after photos. Independent soil reports. Independent agronomist reports.

FINAL LAND USE	REHABILITATION OBJECTIVE CATEGORY	REHABILITATION OBJECTIVES *(describe the desired features and/or characteristics of the final land use)*	REHABILITATION COMPLETION CRITERIA *(an attribute of rehabilitation and the benchmark value for the attribute that will demonstrate that the rehabilitation objective has been met)*	RECORD *(evidence that the benchmark has been achieved)*
			Cropping yields from rehabilitated areas are similar to adjacent cropping land. Appropriate and reliable access to water for livestock. Appropriate animal refuge areas for livestock (e.g. wooded/treed areas) during extreme weather conditions. Resilience to drought and fire.	