

# Appendix I

Rehabilitation Plan

# Rehabilitation Plan

## For

# Tumblin Quarry



## Disclaimer

This document has been produced referencing documents relating to the guidelines, policies and procedures associated with the best practice quarry management for the proposed Tumblin Quarry, Kingaroy, Queensland. The currency of these documents was assessed at the time of compiling this plan and only relevant information was referred to.

Information gathered from site visits to the proposed quarry was also used in compiling this plan. This information was gathered from the activity areas and surrounds of the quarry during a visit in 2025 and many of the recommendations are based on these findings. Further development of the quarry may expose features that have not been addressed in this plan.

### Document Control

Version	Date	Author	Signature
1.0	7/06/2025	Michael O'Sullivan	

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## 1.0 Introduction

Tumblin Quarry is within the upper reaches of the catchment of the Stuart River catchment, 28.5 kilometres northwest of Kingaroy. The quarry site will cover 83.34 hectares of Lot 6 on Plan BO76 by the end of its life expectancy with the first stage covering 16.00 hectares. The development is a staged development which will rehabilitate areas where extraction has been completed prior to developing new area for extraction. The disturbed extraction area will be maintained at 12 hectares or less with a permeant processing and stockpiling area of 2.6 hectares and haul road to access the Pedersen's Road of 1.6 hectares. During the life of the development, the disturbed area will remain at approximately 16 hectares.

The standard conditions relating to rehabilitation include: -

- 1) Condition L2 *“As soon as practicable after completion of operational works, land disturbed by activity must be rehabilitated to achieve the following: -*
  - i) The land is safe for humans and fauna*
  - ii) The land has no subsidence or erosion gullies following completion of rehabilitation*
  - iii) There is no ongoing contamination to waters*

The site is a new site that has been identified through exploration for sand suitable for the production of bedding sand, selected backfill and sand used in concrete production. The land is currently use for beef cattle production and the rehabilitation program will be based on returning the area to beef cattle production.

The development is within a defined Category X zone under the Vegetation Management Act 1999. These areas were cleared of vegetation to improve the native and introduced grass species for beef cattle breeding and fattening production.

The rehabilitation plan will include stabilisation of areas that are required for current development activities and areas no longer required for quarry activities.

The plan will cover all the activities associated with rehabilitation of a quarry site including: -

- Progressive rehabilitation
- Earthworks including landscaping
- Permanent erosion and sediment control measures
- Topsoil management
- Weed management
- Vegetation Propagation
- Monitoring and maintenance
- Site security

## 2.0 Environmental Values

The rehabilitation plan will establish the steps required to reinstate the environmental values of the area to a level compatible with the surrounding landscape and aligned with the values prior to quarrying activities at the site.

The principal environmental value affected by the quarry operations will be the on-site and released water quality. The rehabilitation plan will address, through the stormwater management plan and the erosion and sediment control plan, the actions and procedures that are required to stabilise the water quality at a level acceptable to local and state government agencies and does not cause environmental harm downstream of the site.

The environmental values associated with emissions into the local atmosphere will return to background levels once activities at the site cease.

The site will be revegetated using species common to the site as the site is in a medium rainfall area with a defined wet and dry season. Rapid growth of native species will take place during the wet season, which will require a high percentage of any planned rehabilitation to be conducted prior to the wet season.

The revegetation of the site will include landscaping, topsoil spreading activities and planting of selected native vegetation.

A weed management plan will ensure that the native vegetation growth is maximised and that the site does not harbour noxious or invasive plants.

### **3.0 Final Landform**

The final landform in the extraction areas will consist of: -

1. Areas of up to 4 hectares
2. Areas that drain to a common point
3. Diversion drains that channel runoff around the extraction area.
4. Maximum batters of 10% (1:10) around the edges of the extraction areas
5. Maximum slopes of 6.5% within the extraction areas (average slope of the undisturbed areas is 5.0%)
6. Top-dressed and grassed batters and floor of extraction areas.
7. Sediment pond with maximum of 1 in 4 batters and capacity when constructed to capture a 1 in 5-year, 24-hour weather event 20% (AEP)
8. Release structure that directs releases over grassed areas prior to entering a drainage line.
9. Unused haul roads will be ripped, top-dressed and grassed with diversion banks to prevent flow concentrations resulting in erosion.

As the final use of the site is for beef cattle production, the stockpile pads and process areas will be contoured and/or contoured tined to 300 millimetres, lightly topsoiled, and planted with native grasses to stabilise the disturbed areas and to promote the growth of grasses. Where the landholder requires access, the width of the haul-roads will be reduced to 4 metres and treated with a similar process to the stockpile pads. Any areas where contours are required will be protected by contours.

## 4.0 Earthworks

Any earthworks required as part of the rehabilitation plan will be conducted while the stormwater management system is fully operational due to the potential for erosion during and immediately after the earthworks.

Earthworks will include: -

- levelling and contouring areas around the perimeter of the extraction area
- treating areas adjacent to access roads no longer required for haulage purposes, so that rehabilitation can commence
- treating area around the perimeter of the stockpile pad and any other areas not used for the current activities, so that rehabilitation can commence
- profiling drainage lines to ensure flows are dispersed not concentrated.

## 5.0 Erosion Prevention

Erosion and sediment control structures, around the processing area, will be designed and constructed as permanent structures.

Any areas showing signs of erosion will be treated as per the sediment and erosion control plan.

Temporary (First flush) sediment ponds will be utilised when rehabilitating larger areas of the site such as processing area. This will protect the existing stormwater management system from an intake of runoff with excessive amounts of topsoil in the sediment load.

## 6.0 Topsoil Management

Topsoil removed as part of the development phases at the site will be stockpiled and stored on the eastern side of the processing area and allowed to naturally regenerate until required for rehabilitation, which may be upwards of 20 years after development commences. The topsoil will be stockpiled to a maximum height of 2.4 metres with 45° batters with rock sediment traps at the base of the stockpiles.

Topsoil used in the rehabilitation process will be spread in areas where vegetation regrowth can be promoted. Prior to spreading topsoil, the areas with slope of greater than 6% will be contoured and contoured shallow ripper, if possible, to produce a surface that has resistance to erosion and has the potential to the capture topsoil.

Placement of the topsoil will occur during September to November when seed germination and plant growth is most active and the likely hood of severe weather events is low. The topsoil will be placed at a depth of 100 millimetres in flat areas and 150 millimetres on slopes greater than 6°.

The extraction areas, where extraction has been completed will be covered with 100 millimetres of topsoil. The floor of these areas will be lightly ripper, on a 10 metres contour, prior to placement of the topsoil. This ripping will assist in topsoil entrapment when heavy rainfall occurs.

Fencing off areas or destocking the area may be required to promote grass growth during the wet season.

## 7.0 Vegetation

The area around the processing and extraction sites are classified as predominantly Category X under the Vegetation Management Act 1999. The Development will be restricted to Category X areas only.

The original vegetation on the ridges was previously mapped as Regional Ecosystem 11.7.6 and 11.8.8. The timbered vegetation previously consisted of lemon scented gum (*Corymbia citriodora*), narrow-leaf ironbark (*Eucalyptus crebra*) and minor stands of white box (*Eucalyptus albens*) with a ground cover of perennial grasses and sedges.

The low-lying areas, covered by alluvium, along the drainage lines were mapped as Regional Ecosystem 11.8.8. The timber consisted of white box (*Eucalyptus albens*) with minor narrow-leaf ironbark (*Eucalyptus crebra*) with a ground cover of perennial grasses and sedges.

These native grasses are difficult to establish in disturbed areas as several introduced species are more competitive and more responsive to rain than the native grasses.

## 8.0 Maintenance

As the rehabilitation and regeneration of vegetation at the site progresses, the requirement for maintenance will decrease. During the early stages of rehabilitation, the stormwater management system will require continued maintenance and some re-design to prevent erosion of the rehabilitated areas due to an increase risk of erosion around disturbed and exposed areas.

Maintenance of the access roads will be required to allow access to the various locations around the site, while repairs and maintenance at the site may be required.

Maintenance of the sediment ponds that service the processing area will also be required until the stability of the site has reached an acceptable level. This acceptable level will be via an agreement between the Department of Environment and Heritage Protection, landholder and the operator.

## 9.0 Monitoring

Monitoring at the site will include: -

- Stability of the extraction areas and processing area
- Vegetation growth
- Water quality
- Stormwater management system
- declared and invasive flora species
- Security of the site

Monitoring will be conducted using the checklist in Appendix A and photographs to support as support evidence.

The monitoring process will be based on the following time frames for the first year: -

- After each rainfall event greater than 24.0 millimetres
- 1 November (beginning of the wet season)
- 1 March (end of the wet season)

If there are no breaches of the conditions of the Environmental Authority and no actions taken resulting from a compliant in the first year, the monitoring will then be carried out once per year on or about 1 November. If there are any non-compliance issues during the first year, then the monitoring will remain on the time frames as set out for the first year until there is a one (1) year period with full compliance.

Monitoring of the extraction areas will include inspections of the diversion drains surrounding the disturbed areas, sediment ponds release points and erosion within the extraction area. If any potentially problem areas are detected remedial action will be taken within one (1) month.

The vegetation growth is expected to be rapid during the wet season. Areas where rehabilitation and regeneration of vegetation has failed or has performed poorly (less than 50% ground cover) within the first 12 months will be noted as non-compliance.

Water quality at the site is expected to improve as the site stabilises and the majority of the site is covered by vegetation. Monitoring will include physical aspects of the water that define water quality on the site.

Documentation of the following characteristics will determine water quality improvements: -

- Lower sediment loads
- Turbidity appearance in the ponds
- Vegetation growth in the waterways
- No complaints
- Testing for pH, turbidity and conductivity, if required, under the Environmental Authority.

The stormwater management system will require maintenance and cleaning out until the sediment load and erosion at the site is such that there are minor amounts of sediment captured in the system each year. Once the water quality within the stormwater management system is similar to the water quality of the surrounding runoff, there is no further requirement for the system to be fully operational.

Monitoring of the sediment ponds for the processing area will be required until the sediment load in the runoff has reached minimal levels and the Department of Environment and Heritage Protection has allowed the cancellation of the Environmental Authority for the site.

The declared and invasive species threat will decrease as the natural vegetation regenerates and access to the site is restricted. Monitoring and preventive measures will be important during the first 12 months after rehabilitation of the site is completed.

Security at the site will include restrictive access to the site including measures to prevent illegal and unauthorised access to the site. Measures to ensure compliance will include: -

- Signage
- Fencing
- Lockable gates
- Barriers constructed of soil.

# Appendix A

## Rehabilitation Monitoring Checklist

**Table 1.1 Rehabilitation Monitoring Checklist**

Inspection Date:	Inspection by:			Tumblin Quarry	
Structure	Status W - Working R - Requires repairs M - Requires maintenance D - Requires redesign N - Not applicable	Urgency U - Urgent M - Maintenance Y - Year shutdown	Action required	Completed	
<b>Catchment No 1 – Weathered (Deco) granite extraction area</b>					
Main Sediment Pond					
Primary Sediment trap					
Diversion banks around the extraction area.					
Roll over banks on the access road to the pit and benches.					
Drainage off the floor of the pits into sediment ponds a) scouring b) excessive vegetation build-up c) sediment traps working					

<b>Damage to the rehabilitated areas</b>					
<b>Vegetation growth:</b> a) No of shrubs per 10 m <sup>2</sup> b) Percentage of grass cover. c) Noxious or non-native plant species					
<b>Sand Extraction Areas</b>					
<b>Main Sediment Pond</b>					
<b>Primary Sediment trap</b>					
<b>Diversion banks around the extraction area.</b>					
<b>Roll over banks on the access road to the pit and benches.</b>					

<p><b>Drainage off the floor of the pits into sediment ponds</b>  a) scouring  b) excessive vegetation build-up  c) sediment traps working</p>					
<p><b>Damage to the rehabilitated areas</b></p>					
<p><b>Processing and stockpile pad</b></p>					
<p><b>Main Sediment Pond including release structure (spillway)</b></p>					
<p><b>Primary Sediment Trap</b></p>					
<p><b>Diversion banks around the processing and stockpiling area.</b></p>					
<p><b>Erosion on processing Pad</b></p>					

<b>Damage to the rehabilitated areas</b>					
<b>Vegetation growth:</b> d) No of shrubs per 10 m <sup>2</sup> e) Percentage of grass cover. f) Noxious or non-native plant species					
<b>General</b>					
<b>Weeds infestations or unidentified plants.</b>					
<b>Evidence of unauthorised entry onto site</b>					
<b>Signage at entrance to quarry site</b>					
<b>Other comments:</b>					