



Broken Head Quarry

Enforceable Undertaking Progress Report

Report #1 – August 2018

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1 Introduction

This Report is the monthly report required to be given under clause 4.4(a) (“Reporting”) of the Enforceable Undertaking given by Leadshine Pty Limited on 20 August 2018 (“**Enforceable Undertaking**”). The Enforceable Undertaking commenced operation Tuesday 28 August 2018, the date of receipt of the withdrawal on that date of the Order 15 issued by the Department of Planning and Environment.

This is the first progress report under clause 4.4(a) of the Enforceable Undertaking. It relates to the period from Tuesday 28 August 2018 until Friday 31 August 2018.

The report describes works undertaken on the following aspects:

- Planning for the undertaking of rehabilitation works;
- Landforming Works carried out in August 2018;
- Vegetation Work carried out in August 2018; and
- Other rehabilitation related activities carried out in August 2018.

2 Rehabilitation Planning

The director of Leadshine Pty Limited (Stuart Dixon-Smith) attended at the Quarry all day on 24 August 2018 to meet with Quarry staff (John Ward, Quarry general manager and Leonie Rowe, Quarry bookkeeper and office administration manager) to undertake a full briefing of the contents and requirements of the Enforceable Undertaking. This included a full tour of 3 hours duration by Stuart Dixon-Smith and John Ward around the disturbed area of the Quarry with the plans and notes (the “**Rehabilitation Works Plans and Specifications**”) in Appendix 1 and Appendix 2 of the Enforceable Undertaking, discussing each of the notes at the location to which they relate to ensure a detailed plan was agreed to implement each of the actions required by the Enforceable Undertaking.

In addition to the above, the following tasks were undertaken on site on 24 August 2018:

- An order was placed for 100 lineal metres of “concrete canvas” drain lining material to enable urgent drain formation and lining of the new east side drain (located between areas 2 and 5a on the Rehabilitation Works Plans and Specifications) in anticipation of heavy rainfall in the forthcoming week. Arrangements made for additional staff and equipment to be on hand to apply the product. This product was installed on 31 August and is reported on below.
- Stuart Dixon-Smith met on site with Rob Mitchell of ENV Solutions, the operator of the Quarry’s dams and stormwater treatment and dosing plant, to inform him of the contents of the Enforceable Undertaking and to discuss:
 - equipment orders for pipes, valves and dosing equipment for the installation and operation of the new central dam of the Quarry Westside;
 - supply and application of hydromulch and seed mixtures for the vegetation required under the Enforceable Undertaking;
 - sourcing of equipment for depositing fill and topsoil on batter areas that are hard to access (particularly in area 5a on the Rehabilitation Works Plans and Specifications).

- Contact was made with the Quarry's electrical contractor, Peter Kendall to arrange for electrical disconnection of the Quarry washplant and weighbridge in anticipation of them being decommissioned and removed from site.
- Contact was made with the parties responsible for the decommissioning of the washplant and weighbridge to make arrangements for removal from site.
- Contract was made with J&M Bashford and Sons, earthworks contractors, to seek prices for wet hire of equipment to undertake various landforming tasks required under the Enforceable Undertaking, particularly the re-grading of the roads and batters in areas numbered 1 and 2 of the Rehabilitation Works Plans and Specifications and emplacement of removed material in area numbered 4.

Contact was also made during the month of August in anticipation of the Enforceable Undertaking commencing operations with the following persons:

- Andrew Norris of Martens and Associates, the Quarry's erosion and sediment control consultant, to arrange for the preparation of detailed design of various drains and other works required under the Rehabilitation Works Plans and Specifications.
- Mark Free of Blackwood Ecology to:
 - follow up on the preparation of the Quarry's 6 monthly rehabilitation monitoring report; and
 - to organise the inventory of plantings required under clause 4.1(f) of the Enforceable Undertaking; and
 - to prepare recommendations for species to be planted in area E3 as required by clause 4.2(f) of the Enforceable Undertaking; and
 - to prepare general recommendations for species for planting under the Enforceable Undertaking.
- Ross Faithfull of East Coast Bush Regeneration to prepare to undertake plantings required under the Enforceable Undertaking.

Further contact with each of these contractors was undertaken in the first week of September and will be reported on in the September 2018 progress report.

The site work inspection for the 6 monthly rehabilitation monitoring report was undertaken in August 2018 and the report, dated 27 August 2018 was received on 6 September 2018. A copy is attached. Further details of action taken in September in furtherance of recommendations in the report will be contained in the September 2018 progress report.

3 Landforming Works Progress

During July and August 2018 the Quarry's landforming activities included:

- Finalisation of batter placement, topsoiling and track rolling in the following area on the Eastside:



Figure 1 - Eastside Batters

- finalisation of batter reshaping and topsoiling and drain formation in the following area on the Eastside:



Figure 2 - Eastside Batters and Drain

- batter reshaping and placement in Area 2 on the Rehabilitation Works Plans and Specifications as shown below:



Figure 3 - Eastside Reshaped Batter

- rebuilding of the drain crossing the road east of Sediment Pond No 1 on the Eastside to channel runoff into Sediment Pond No 1 without erosion of the road, and some re-profiling of the road (in the area below that shown in Figure 2 - Eastside Batters and Drain:
- removal of material stockpiles formerly located in the following areas on the Eastside:



Figure 4 - Stockpile Removal

- receipt of clean fill and temporary placement in the large fill receipt areas in the following location on the Westside:



Figure 5 - Westside Fill Area

- receipt of clay material for the purpose of construction of the new central dam wall and temporary storage in the stockpile holding area adjacent to the washplant on the Westside; and
- screening and stockpiling of topsoil in the stockpile holding area adjacent to the washplant from the Quarry's topsoil store on the Eastside.

- On 31 August 2018 a new drain in the following location of the eastside was installed:



Figure 6 - Eastside Drain Location



Figure 7 - Eastside Drain Installation

4 Vegetation Works Progress

The following areas shown in Figure 1 - Eastside Batters, Figure 2 - Eastside Batters and Drain and Figure 3 - Eastside Reshaped Batter were hand seeded with grass following completion of the final landform and water cart irrigated.

Following rains which fell on 31 August and in the first week of September this grass has germinated and shoots have begun to appear.

5 Other Works

Arrangements were made for the decommissioning and removal of the Quarry washplant and weighbridge facilities. These items are expected to be removed by September or October.

Upgrades and repairs were undertaken to the water treatment and dosing plant equipment.

6 Glossary, Definitions and Locations of Features

6.1 Features at Broken Head Quarry

The following plan identifies key areas at Broken Head Quarry and names used to define those areas in this and other Report.



The following waterbodies are contained at Broken Head Quarry:

- Sediment Pond No. 2 – this is the lower dam on the East Pit which has formed part of the Quarry for most of its operation.
- Sediment Pond No. 1 – this is the upper dam on the East Pit, constructed in 2014 with dam wall alterations undertaken in 2017.
- North No 1 Sediment Pond – this is the small pond on the West Pit at the north eastern edge of the limit of extraction.
- Temporary West Sediment Pond – or Central West Dam – this is the pond in the centre of the West Pit which collects stormwater runoff from most of the West Pit and feeds the cut off drain.
- Process Pond – this is the main working waterbody for the Quarry, located north of the Maintenance Sheds on the West Pit. It supplied water for the sand and gravel washing plant.
- Upper Lilypond – This is a dam on the edge of the West Pit which collects natural waterflows from west and north of the Quarry and overflows from the Process Pond.
- Lower Lilypond – This is a dam on the edge of the West Pit which is downstream of the Upper Lilypond and collects natural waterflows from the Upper Lilypond.

6.2 Other Defined Terms

Broken Head Quarry means the former sand and gravel quarry operated on the land comprised in the Eastside Land and the Westside Land and consists of the following parcels of land:

- Lot 2, Deposited Plan (“**DP**”) 700806;
- Lot 1, DP 123302;
- Lot 1, DP 184443;
- Lot 1, DP 245836;
- Lot 1, DP 245605; and
- Auto Consol 12993-34.

Department means the NSW Department of Planning and Environment.

Eastside Land means the land comprised in titles:

- Lot 1, DP 184443;
- Auto Consol 12993-34; and
- Lot 1, DP 245605.

Enforceable Undertaking means the enforceable undertaking given by Leadshine to the Department dated 20 August 2018 accepted by the Secretary of the Department on 27 August 2018.

Leadshine means Leadshine Pty Limited (ABN 21 102 229 943).

Order means the Order 15 order issued by the Department to Leadshine under section 121B of the Environment Planning and assessment Act 1979 on 11 August 2017.

Rehabilitation Works Plans and Specifications means the plans and notes in in Appendix 1 and Appendix 2 of the Enforceable Undertaking.

Westside Land means the land comprised in titles:

- Lot 1, DP 123302;
- Lot 1, DP 245836; and
- Lot 2, DP 700806.

Terms defined in the Enforceable Undertaking and not defined in this Report have the same meaning as defined in the Enforceable Undertaking.

Annexure A Blackwood Ecology Environmental Monitoring Report August 2018



Environmental Monitoring Report

Broken Head Quarry

Suffolk Park NSW

August 2018

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Blackwood Ecological Services
PO Box 336
BANGALOW NSW 2479
www.blackwoodecology.com.au

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1 INTRODUCTION

1.1 Background

Blackwood Ecological Services have been engaged by Broken Head Quarry Pty. Ltd. (BHQ) to undertake an environmental monitoring program and complete regular Environmental Monitoring Reports for the Broken Head Quarry at Suffolk Park, NSW.

A Species Impact Statement (SIS) was prepared for the site by Greenloaning Biostudies in 1997 for the then owners, Batson Sand & Gravel Pty. Ltd. The Conditions of Consent for the Quarry operations required that a Flora and Fauna Management Plan be prepared for the Quarry. Flora and Fauna Management Plans were produced by Greenloaning Biostudies for the Eastern Quarry Sector (EQS) in October 1999 and for the Western Quarry Sector (WQS) in April 2000.

These Management Plans detailed a series of monitoring actions related largely to:

- monitoring of Threatened flora and fauna species known from the site;
- monitoring of rehabilitation areas, and
- reporting of vegetation clearing operations within the Quarry area.

Monitoring actions required have since been revised based on discussions with Byron Shire Council, as detailed in the Environmental Management Report (Blackwood Ecological Services 2007). The Environmental Management Report requires an Environmental Monitoring Report to be produced every 6 months.

The previous Environmental Monitoring Report was submitted in January 2018.

Broken Head Quarry wound down the majority of quarry operations at the end of 2014 with ongoing work at the Quarry including the sale of stockpiles of sand and gravel and the reprofiling of worked quarry areas in the EQS and WQS.

Weed control and environmental management works have been ongoing with weed control undertaken regularly in both rehabilitation and bushland areas.

This monitoring report describes monitoring works undertaken in August 2018.

1.2 Aims and objectives

This monitoring report provides details on:

- The health of significant flora species recorded on the property.
- The condition and progress of vegetation rehabilitation areas.
- The fauna nestbox program.
- Weed control activities.
- Cane Toad control activities.
- The condition of regrowth in cleared areas.
- Any additional environmental management practices which have been undertaken at the quarry since the previous monitoring event.

1.3 Recent environmental works and surveys

The weed control program has continued with regular weed control and assisted natural regeneration being undertaken throughout bushland and restoration areas in the EQS and WQS by qualified bush regenerators. Bush regenerators have monitored the results of the weed control program through daily record sheets.

Since the previous monitoring event additional reprofiling has been undertaken in some areas with steep quarry faces reshaped to form gentler, albeit still relatively steep, slopes. The majority of exposed unvegetated areas on both sides of the quarry were recently hydromulched with a grass seed mix to stabilise soils and provide vegetative cover.



PLATE 1 RECENTLY HYDROMULCHED HILLSLOPE IN THE EQS

2 SIGNIFICANT FLORA

2.1 Introduction

The location of Significant flora on the Quarry property is shown in **FIGURE 1**.

Significant trees were inspected in August 2018 with general notes made on their apparent health, progress of buffer plantings (if any), any significant weed infestation and/or any other factors that may threaten the good health of the trees.

2.2 Durobby (*Syzygium moorei*)

The Durobby in the WQS remains in healthy condition and has continued to develop. Buffer plantings of Hard corkwood, Brown bolly gum, Mock olive and Tuckeroo to the east of the Durobby are healthy. Other natural regeneration is occurring around the Durobby which is assisting with buffering.

A Durobby sapling has become established about 1.5m to the SE of the main stem and has reached a height of about 35cm.

Any smothering native vines, such as Wait-a-while vine, should be trimmed around the Durobby, as part of upcoming weed control activities, to prevent overburdening the tree. At present, vine growth is not prolific and does not need controlling.

2.3 Rusty plum (*Niemeyera whitei*)

The Rusty plum is in good condition and is not under threat from any disturbance. This tree is now monitored on an annual basis and will be addressed in the next monitoring report.

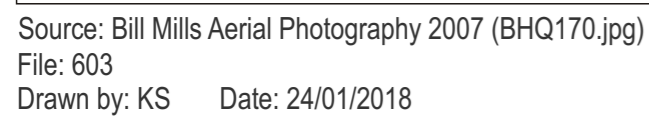


FIGURE 1

LOCATION OF REHABILITATION AREAS, SIGNIFICANT PLANTS AND FAUNA NESTBOXES

3 FAUNA NESTBOX PROGRAM

3.1 Introduction

In October 2014, ten additional nest-boxes, including five bat boxes and 5 glider/possum boxes, were sourced from Wildlife Relocation and Management Services to replace those nest-boxes at the quarry which had fallen or were in a state of disrepair. The new boxes are made from modified hollow branches from trees removed at development sites in the region. These types of boxes are considered to be more robust and long-lasting compared with the marine plywood style boxes.

The dimensions of the nest-boxes vary somewhat as they are made from natural hollows of varying sizes and shapes. Some variation also in the dimension and location of entrances (rear/front/bottom) was considered appropriate in order to target a wider range of native fauna species. All nestboxes were inspected in August 2018 with a ladder and with the aid of a burrowscope lipstick camera.

3.2 Location of fauna nest-boxes

TABLE 1 provides GPS co-ordinates for the fauna nest-boxes installed on the property and **FIGURE 1** provides their location on an aerial photograph. Photos of each box following installation are provided in **APPENDIX A**.

TABLE 1
RESULTS OF FAUNA NESTBOX MONITORING

Ref Number	GPS Location*		Box Type	Notes
	Easting	Northing		
EQS				
1A	559015	6825757	Glider	Unidentified leaf nest
1B	559005	6825745	Glider	Native bees occupying nest
1C	558985	6825745	Glider	No nesting activity evident Box had fallen and was reattached
2A	558797	6825388	Bat	No nesting activity evident
2B	558787	6825367	Bat	Unidentified leaf nest
3A	558827	6825372	Bat	Native bees occupying nest
3B	558809	6825361	Bat	Unidentified leaf nest
6A	558860	6825358	Bat	No nesting activity evident
8A	559196	6825640	Bat	No nesting activity evident
8B	559196	6825640	Bat	No nesting activity evident
8C	559196	6825640	Glider	Unidentified leaf nest
WQS				
4A	558454	6825723	Bat	No nesting activity evident
4B	558454	6825723	Bat	No nesting activity evident
4C	558454	6825750	Glider	No nesting activity evident
5A	558534	6825400	Bat	No nesting activity evident
5B	558534	6825400	Bat	Native bees occupying nest
5C	558519	6825402	Possum	Native bees occupying nest
7A	558470	6825305	Bat	No nesting activity evident
7B	558470	6825305	Bat	No nesting activity evident
7C	558470	6825305	Glider	Unidentified leaf nest Base needs repairing
9A	558720	6825615	Possum	Unidentified leaf nest with antechinus scat

Note: GPS locations in GDA94 datum



Monitoring of nestboxes indicates that there has been some uptake of artificial roost hollows in recent years. Leaf nests formed in artificial hollows may belong to nesting *Antechinus* but identification was not possible without substantially disturbing the nest. Microchiropteran bats were not recorded roosting during this survey. It should be noted that use of the hanging type boxes as well as most of the open bottom boxes on the site would not be evident unless bats were actually roosting at the time of inspection.

Some boxes are providing habitat for native bees which is considered a successful component of the program.

The majority of boxes monitored were in good condition. One box had fallen and was reattached. Box 7C required repair to the base of the box.

4 VEGETATION REHABILITATION AREAS

4.1 Introduction

This section includes the results of site assessments and photo-monitoring comparisons of each of the established Vegetation Rehabilitation Areas. The location of these areas is shown in **FIGURE 1**.

4.2 Area RE1

4.2.1 Photo comparisons



PLATE 2:
Rehabilitation area
RE1, January 2007



PLATE 3:
Rehabilitation area
RE1, August 2018



PLATE 4: Vegetation cover on exposed stony hillside, Area RE1, April 2010



PLATE 5: Development of vegetation cover on exposed stony hillside, Area RE1, Aug 2018

4.2.2 Assessment & recommendations

Area: RE1

Native vegetation cover has continued to develop with minimal weed presence. Along the hillslope planted eucalypts and Coast banksia have grown to form a closed canopy with large tree ferns and other species including Acacias and Cheese tree. Broad-leaved paperbark and Leptospermum species form a dense cover over the lower slopes with what was previously the perimeter track now largely grown over with paperbark saplings and sedges.

Exotic grasses, primarily Whisky grass, Paspalum and Setaria have occurred in recent years throughout this area but are now largely controlled and outcompeted. In wetter areas, Coral fern, Frogsmouth, Bats wing fern and Lygodium grow densely.

Very dry conditions have resulted in some die off of sedges, Frogsmouth and Coastal cypress along the banks.

Area: Exposed Stony Hillside

Plantings on the stony hillside continue to develop slowly and there is some leaf litter buildup. Although there is little natural recruitment in these difficult conditions, a number of planted trees are very well established with Blackbutt, Turpentine, Coast banksia and Blackwood wattle forming an open canopy. Conditions will improve as leaf litter and organic material continues to build up.

4.3 Area RE2

4.3.1 Photo comparisons



PLATE 6:
Rehabilitation
area RE2,
January 2007



PLATE 7:
Rehabilitation
area RE2,
Aug 2018

4.3.2 Assessment & recommendations

Eucalypts and other trees on the upper bank are sparse and are growing well. The majority of Coast wattles in this area have died off and have not naturally recolonised. Control of vigorous grasses and herbaceous weeds has been undertaken since the last monitoring report and spraying of this area should continue as part of upcoming weed control works. Planted and naturally occurring saplings on the lower banks are sparse but well established and are growing well.

Gaps should be planted with suitable species able to cope with harsh conditions which this slope is exposed to. Suitable species include Sweet pittosporum, Cheese tree, Coast banksia, Persoonia, Narrow-leaved wattle, eucalypts and Brush box.

4.4 Area RE3

4.4.1 Photo comparisons



PLATE 8 REHABILITATION AREA RE3, JANUARY 2007



PLATE 9 REHABILITATION AREA RE3, AUG 2018

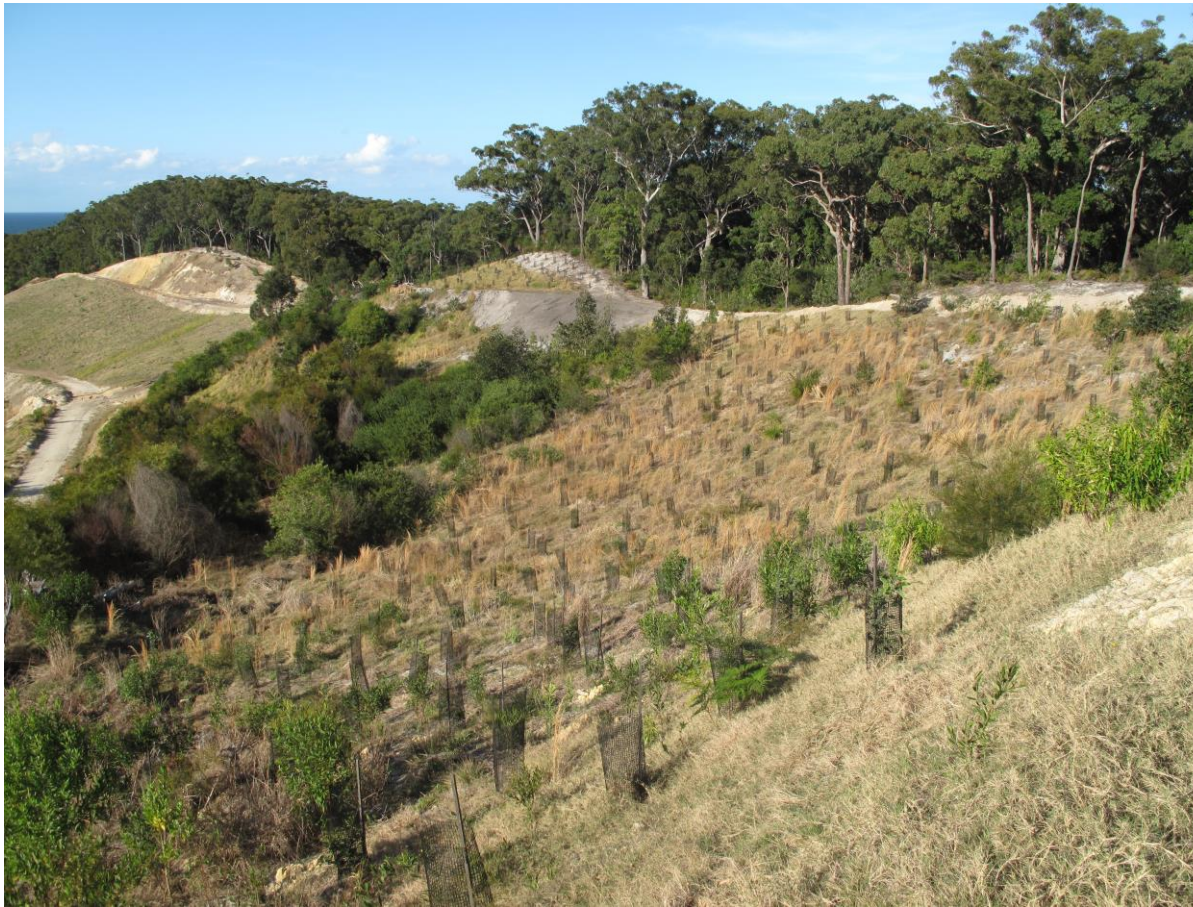


PLATE 10: Area RE3, August 2018

4.4.2 Assessment & recommendations

Works have progressed in this area since the last monitoring report with a further section of hillside along the north-eastern edge reshaped and hydromulched.

Acacia species planted on the upper slopes in January 2018 have generally become established although there have been some losses in the dry conditions. The majority of planted specimens were alive at the time of monitoring with an estimated survival rate of about 90%. Natural recruitment has been good with Hopbush plentiful as well as Prickly moses, Narrow-leaved acacia, Satinash and Swamp hibiscus. Couch cover is helping to minimise erosion and Whiskey grass is only occasional.

Weed and grass control has been undertaken throughout RE3 with some patches of grass left in situ to reduce erosion. Growth along the lower slopes and north-eastern section (Formerly R3d) has been excellent with a dense growth of native vegetation including Brushbox, Narrow-leaved acacia, Coast banksia, Brown kurrajong, Blackbutt, Red bloodwood and other eucalypts.

4.6 Area RE4

4.6.1 Photo comparison



PLATE 11 REHABILITATION AREA RE4, AUGUST 2018

4.6.2 Assessment & recommendations

RE4 is a newly planted area above the access track in the south-eastern corner. Weeds have been controlled in this area and Acacias have been planted throughout. Acacias along some of the higher sections have died off although the survival rate is better further down the slopes. There is little natural recruitment evident at this stage.

4.8 Area RW1

4.8.1 Photo comparisons



PLATE 12: Rehabilitation area RW1, January 2007



PLATE 13: Rehabilitation area RW1, August 2018

4.8.2 Assessment & recommendations

Vegetation across the lower and mid slopes is well established and continues to develop well with weeds controlled in these areas. Brown kurrajong is common and Narrow-leaved acacia, Blackbutt, Duboisia, Bleeding heart and Cheese tree present. Brushbox occurs in the canopy to about 10m with Blackbutt to 8m further down the slope.

A nearby Cockspur coral tree along the road edge requires control.

4.9 Sedimentation pond rehabilitation area

4.9.1 Photo comparisons



PLATE 14:
Southern bank
of
sedimentation
pond,
November
2007



PLATE 15:
Southern bank
of
sedimentation
pond, July
2017

4.9.2 Assessment and recommendations

Broad-leaved paperbark dominates the banks of the pond and development of vegetation along the banks of the sedimentation pond has continued to develop rapidly.

Native Swamp rice grass and other native fringing wetland species that had become well established have died off somewhat following a recent dry spell and lowering of water level.



Exotic grasses along the banks should be controlled, particularly where they occur adjacent to areas containing native sedges and rushes that could extend into grassed sections.

5 WEED CONTROL

5.1 Introduction

A team of experienced and qualified Bush regenerators led by Ross Faithfull of East Coast Bush Regeneration has been engaged to undertake regular weed control on the property. In accordance with the Weed control strategy detailed in the Environmental Management Report, weed control is undertaken within Rehabilitation areas and throughout bushland areas.

5.2 Daily record sheets

TABLE 1 contains a summary of information supplied by Ross Faithfull in his daily record sheets documenting weed control actions at the Quarry. Detailed daily record sheets are included in **APPENDIX A**.

TABLE 1
FEBRUARY 2018 TO AUGUST 2018

Date/ Hours	Area worked and weed control actions	Notes
18/04/18 24 hours	Recently planted areas of RE3 Spot spraying of planting and regen areas	Couch only treated where necessary around plantings as grass cover is encouraged to minimise erosion.
13/06/18 24 hours	Recently planted and regenerating areas of RE3 and RE2 Spot spraying of planting and regen areas	Spot spraying of vigorous grasses and woody weeds. Couch only treated where necessary around plantings as grass cover is encouraged to minimise erosion.
10/07/18 24 hours	Bushland areas of western side south of the weighbridge and in SW sector	

5.3 Assessment and recommendations

Weed control has continued to be undertaken with regularity over the last six months. Weeds have been well controlled in rehabilitation areas and in bushland. Growth of planted seedlings and natural regeneration in rehabilitation areas is largely uninhibited by exotic weeds. Couch grass has been allowed to develop on steeper slopes with the aim of minimising erosion.

Weeds are now present only in very low numbers in bushland areas with infestations of Fishbone fern, Morning glory, Umbrella tree and other species eradicated.

Within the former area of slash pine infestation in the WQS slash pine has been largely eradicated with good development of tree ferns, Hoop pine, Brown kurrajong, Sweet pittosporum and Pink Euodia.

It is recommended that the weed control program be continued, incorporating the recommendations of this monitoring report. Follow-up weed control work in targeted areas should be carried out as recommended in the daily record sheets.

6 CANE TOAD CONTROL

6.1 Introduction

The sedimentation pond in the Eastern Quarry Sector has been identified in the past as a significant breeding area for Cane toads. Fauna surveys identified high numbers of Cane toads throughout the EQS, particularly in the vicinity of the pond. These Cane toads spread into neighbouring bushland areas and may outcompete and forage on native frogs as well as represent a threat to native fauna feeding on Cane toads.

6.2 Cane toad control strategy

The Cane toad control strategy for the sedimentation pond involved the erection of a Cane toad control fence and the progressive planting out of the pond perimeter with native sedges and rushes to reduce the habitat value for Cane toads and improve habitat values for native frogs.

6.3 Cane toad control fence

The Cane toad fence as well as the development of dense fringing vegetation around the sedimentation pond has apparently reduced the population of Cane toads which was prevalent in this area. However sections of the fence require replacement and/or repair in order to ensure the continued suppression of Cane toads at the site.



PLATE 16
Cane toad
fence around
the
sedimentation
pond EQS
requires some
repair

Growth of Swamp rice grass, sedges and rushes around the northern sedimentation pond in the EQS has suffered as a result of recent dry weather and lower water levels. Sections of the Cane toad fence that have collapsed should be repaired.

7 SUMMARY OF REQUIRED ACTIONS

This section provides a summary of priority actions identified as a result of this monitoring event:

1. Maintenance of Cane toad control fence

Some sections of the Cane toad control fence are in disrepair and require replacement or maintenance.

2. Ongoing maintenance of plantings in RE3 and RE4

Recommendations from the previous monitoring report have been implemented. Maintenance of newly planted areas will need to be undertaken regularly over the next six months.

3. Continuation of weed control program

The weed control program should continue throughout the quarry.

4. Future ecological plantings

Hydromulched areas should be assessed following the establishment period and these areas assessed for their suitability for further plantings.

8 REFERENCES

Blackwood Ecological Services (2007) *Environmental Management Report*. A Report to Broken Head Quarry Pty. Ltd.

Byron Shire Council (Undated) *Excluding Cane toads from water bodies*. NSW Environmental Trust.

EMM (2014) *Ecological Assessment. Broken Head Quarry*. Prepared for Crisjoy Pty Ltd.

Greenloaning Biostudies (1997) *Species Impact Statement. Proposed Extensions to an Existing Sand/Gravel Extraction Site Suffolk Park*. A Report to Batson Sand & Gravel.

Greenloaning Biostudies (1999) *Flora and Fauna Management Plan. Eastern Quarry Sector*. A Report to Batson Sand & Gravel.

Greenloaning Biostudies (2000) *Flora and Fauna Management Plan. Western Quarry Sector*. A Report to Batson Sand & Gravel.



APPENDIX A
BUSH REGENERATION DAILY WORK RECORD SHEETS

EAST COAST BUSH REGENERATION P/L

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DAILY WORK RECORD SHEET

Site/Project name: Broken Head Quarry

Date: 18.04.18

Regeneration team: A Folster and ECBR team

Hours worked: 24

Weather conditions: Cloudy. Wind ESE @ approx. 10km/h

Temperature: Approx. 26°C

Work location and description of restoration actions:

Spot spraying of planting and regen areas (refer to attached site map below), particularly targeting invasive vigorous grasses and woody weeds to prevent future infestation. Couch grass only treated around plantings and preserved elsewhere to prevent erosion.

Weeds treated & techniques: CSP- cut scrape paint, SP-scrape & paint, SS- spot spray, OS – over spray, CB – cut back & SR – spray regrowth, SI-stem inject - drill, hatchet, chainsaw, HW-hand weed, CO- crown out, WW- wick-wipe, BS-bag seeds, BB– Basal Bark			
Species	Technique	Species	Technique
Molasses Grass	SS		
Whisky Grass	SS		
Broad Leaf Paspalum	SS		
Tobacco	SS		
Fleabanes	SS		
Lantana	SS		
Blue Billy Goat Weed	SS		
Inkweed	SS		
Cobblers Pegs	SS		
Corky Passion Vine	SS		
Couch	SS		

If spray used, time spraying occurred: 7:00am – 3:30pm

Herbicide & Volume:					
Herbicide product	Batch no.	Concentration	Application method	Initials	Volume
Weedmaster Duo	227162-0533	1:75	Spraypack (14 x 10L)	AF	1,866mL
Ken Met	20160510QR	1.5g/10L	Spraypack	AF	21g
Penetra	1691134	15mL/10L	Spraypack	AF	210mL
Red Biodye	16308-45	40mL/10L	Spraypack	AF	560mL
Biosafe oil	N1505087				
Access	C781F64001				

Follow-up timeframe & comments on previous work:

Further follow up spot spraying will be required within the work zone to control re-emerging grasses and broadleaf weeds, but also targeting any occurrences of invasive forbs, woody weeds and vines that may threaten the establishment of the plantings.

WH&S

Toolbox Talk	PPE Used	New Risks/Changes	Incidents
Yes	Yes	None	None



Approx. area worked on 18.04.18

EAST COAST BUSH REGENERATION P/L

*

DAILY WORK RECORD SHEET**Site/Project name:** Broken Head Quarry**Date:** 13.06.18**Regeneration team:** A Folster, N Brand, L Mcdonagh**Hours worked:** 24**Weather conditions:** Fine. Wind NE @ approx. 10km/h**Temperature:** Approx. 26°C**Work location and description of restoration actions:**

Spot spraying of planting and regen areas (refer to attached site map below), particularly targeting invasive vigorous grasses and woody weeds/forbs to prevent future infestation. Couch grass only treated around plantings and retained elsewhere to prevent topsoil erosion.

Weeds treated & techniques: CSP- cut scrape paint, SP-scrape & paint, SS- spot spray, OS – over spray, CB – cut back & SR – spray regrowth, SI-stem inject - drill, hatchet, chainsaw, HW-hand weed, CO- crown out, WW- wick-wipe, BS-bag seeds, BB– Basal Bark			
Species	Technique	Species	Technique
Molasses Grass	SS		
Whisky Grass	SS		
Broad Leaf Paspalum	SS		
Tobacco	SS		
Fleabanes	SS		
Lantana	SS		
Blue Billy Goat Weed	SS		
Inkweed	SS		
Cobblers Pegs	SS		
Corky Passion Vine	SS		
Couch	SS		

If spray used, time spraying occurred: 7am – 3:30pm

Herbicide & Volume:					
Herbicide product	Batch no.	Concentration	Application method	Initials	Volume
Weedmaster Duo	227162-0533	1:75	Spraypack (10 x 10L)	AF	1,333mL
Ken Met	20160510QR	1.5g/10L	Spraypack	AF	15g
Penetra	1691134	15mL/10L	Spraypack	AF	150mL
Red Biodye	16308-45	40mL/10L	Spraypack	AF	400mL
Biosafe oil	N1505087				
Access	C781F64001				

Follow-up timeframe & comments on previous work:

Further follow up spot spraying will be required within the work zone to control re-emerging grasses and broadleaf weeds, while also targeting any occurrences of invasive forbs, woody weeds and vines that may threaten the establishment of the plantings.

WH&S

Toolbox Talk	PPE Used	New Risks/Changes	Incidents
Yes	Yes	None	None



Approx. area worked on 13.06.18

EAST COAST BUSH REGENERATION P/L

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DAILY WORK RECORD SHEET**Site/Project name:** Broken Head Quarry**Date:** 10.7.18**Regeneration team:** A Folster L Mc Donagh S Ferguson**Hours worked:** 24**Weather conditions:** Cloudy. Wind SW @ approx. 10km/h**Temperature:** Approx. 20°C**Work location and description of restoration actions:**

Spot spraying of regen areas (refer to attached site map below)

Weeds treated & techniques: CSP- cut scrape paint, SP-scrape & paint, SS- spot spray, OS – over spray, CB – cut back & SR – spray regrowth, SI-stem inject - drill, hatchet, chainsaw, HW-hand weed, CO- crown out, WW- wick-wipe, BS-bag seeds, BB– Basal Bark			
Species	Technique	Species	Technique
Molasses Grass	SS	Senna	SS
Whisky Grass	SS	Camphor Laurel	SS
Broad Leaf Paspalum	SS	Edible Passionfruit Vine	SS
Tobacco	SS	Umbrella Tree	SS
Fleabanes	SS		
Lantana	SS		
Blue Billy Goat Weed	SS		
Ochna	SS		
Cobblers Pegs	SS		
Corky Passion Vine	SS		
Coral Berry	SS		
Cocos Palm	SS		
Crofton Weed	SS		
Mistflower	SS		

If spray used, time spraying occurred: 7am – 3:30pm

Herbicide & Volume:					
Herbicide product	Batch no.	Concentration	Application method	Initials	Volume
Weedmaster Duo	227162-0533	1:75	Spraypack (5 x 10L)	AF	666mL
Ken Met	20160510QR	1.5g/10L	Spraypack	AF	7.5g
Penetra	1691134	15mL/10L	Spraypack	AF	75mL
Red Biodye	16308-45	40mL/10L	Spraypack	AF	200mL
Biosafe oil	N1505087	-	-	-	-
Access	C781F64001	-	-	-	-

Follow-up timeframe & comments on previous work:

Follow up spot spraying will be required next year

WH&S

Toolbox Talk	PPE Used	New Risks/Changes	Incidents
Yes	Yes	None	None



Approx. area worked by ECBR on 10.07.18