

Appendix P

Austen Quarry Biodiversity Offset Management Plan

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Cover photograph: View north-west from the BOA

Executive summary

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by RW Corkery & Co Pty Ltd (RWC), on behalf of Hy-Tec, to deliver a Biodiversity Offset Management Plan (BOMP) for the Austen Quarry Stage 2 Extension as required for Commonwealth approval.

The BOMP will prescribe actions to manage the key ecological threats to the BOA, including weed incursion, feral animals and fire regime, and the conservation of a remnant population of silver-leaved mountain gum present within the BOA. The BOMP will target the management of the native vegetation and habitat of the BOA as a whole and prescribe performance and evaluation criteria on this basis.

The actions described in this document apply to the BOA in perpetuity, are complimentary with the objectives and targets of the *Landscape and Rehabilitation Plan* (RWC 2016) and the *Silver-leaved Mountain Gum Management Plan* (Niche 2016).

Key actions that will meet all the NSW and Commonwealth priorities will be implemented and include:

- Securing the BOA, including Conservation Area H (DA 103 194), under a Nature Conservation Trust agreement or other agreed arrangement;
- Maintenance of existing fences to exclude stock from the BOA;
- Permanent exclusion of stock, staff, contractors, plant and equipment from both the BOA and an associated replanting area except where required for maintenance and inspection requirements;
- Collection and propagation of locally native tubestock, focussing on the propagation of silver-leaved mountain gum;
- Planting within a replanting area to a defined specification (Section 4.6 and Appendix B), focussing in particular on the installation of silver-leaved mountain gum;
- On-going weed management targeting noxious weeds and exotic perennial grasses;
- Monitoring the BOA and replanting area for feral herbivores;
- Implementation of an ecological burning regime to suit the native vegetation of the site and the on-going conservation of silver-leaved mountain gum; and
- Monitoring of the health of the remnant core and non-core occurrences of silver-leaved mountain gum within the BOA.

A program to evaluate the performance of the management actions within the BOA against objectives, targets and responsibilities was formulated (Section 4.3). This incorporates a prescription of remedial actions to enable adaptive management should performance targets and objectives not be met.

Glossary and abbreviations

BIA	Biodiversity Impact Assessment
BOA	Biodiversity Offset Area
DoE	Commonwealth Department of Environment
DPE	NSW Department of Planning & Environment
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
KTP	Key threatening process as listed on the TSC and/or EPBC Acts
Local occurrence	Refers to the distribution of an ecological community within the study area and continuous with it
Local population	The population of a particular threatened species that occurs in the locality
Locality	The area within 10 km of the study area
Matters of NES	Matters of national environmental significance
NW Act	NSW <i>Noxious Weeds Act 1993</i>
OEH	NSW Office of Environment and Heritage
Threatened biodiversity	Threatened species, populations and ecological communities as listed on the TSC and/or EPBC Acts
TEC	Threatened Ecological Community, as listed on the TSC and/or EPBC Acts
TSC Act	NSW <i>Threatened Species Conservation Act 1995</i>

Table of contents

Executive summary	ii
Glossary and abbreviations	iii
1. Introduction	1
1.1 Aim of the Biodiversity Offset Management Plan	1
1.2 Compliance with conditions of approval	1
1.3 Site inspection	4
1.4 Site condition assessment methodology.....	5
2. Description of the site.....	7
2.1 Location	7
2.2 Offset site attributes.....	7
2.3 Physical environment	7
2.4 Size and connectivity	8
2.5 Vegetation and habitat condition.....	8
2.6 Threatened biodiversity	9
2.7 Key threatening processes.....	10
2.8 Noxious and environmental weeds	11
3. Management actions and specifications	13
3.1 Threats and management priorities.....	13
3.2 Security and tenure of the BOA.....	13
3.3 Fencing and stock exclusion	13
3.4 Track management.....	14
3.5 Collection and propagation of locally native seed	14
3.6 Replanting of rehabilitation areas	14
3.7 Weed management	16
3.8 Feral animal management.....	17
3.9 Management of habitat for native fauna	17
3.10 Fire regime.....	18
3.11 Exclusion zones and contractor awareness.....	19
3.12 Silver-leaved Mountain Gum Management Plan	19
3.13 Consistency with Landscape and Rehabilitation Management Plan.....	19
4. Monitoring and performance evaluation	20
4.1 Monitoring of silver-leaved mountain gum population within the BOA.....	20

4.2	Monitoring of replanted silver-leaved mountain gum.....	21
4.3	Performance evaluation and adaptive management.....	21
5.	Conclusion.....	26
	References.....	27
	Appendix A: Biodiversity Impact Assessment for the Austen Quarry Stage 2 Extension Project.....	35
	Appendix B: Planting schedule for rehabilitation areas.....	36
	Appendix C: Standard treatments for key target weed species	37
	Appendix D: Fauna species list (Niche 2014).....	38

List of Figures

Figure 1.	Location of Austen Quarry in a regional context.....	29
Figure 2.	Subject area and access.....	30
Figure 3:	Proposed silver-leaved mountain gum replanting (Schedule 2 from DoEE conditions)	31
Figure 4.	Remnant and planted silver-leaved mountain gum occurrences within the BOA and Quarry.....	32
Figure 5.	Native vegetation of Austen Quarry and the BOA	33

List of Tables

Table 1.	SSD-6084 Conditions relevant to BOMP (abridged)	2
Table 2.	Conditions of Approval relevant to BOMP	4
Table 3	Qualitative assessment of bushland condition.....	5
Table 4:	Offset site attributes.....	7
Table 5.	Vegetation communities within the BOA	8
Table 6.	Key Threatening Processes in operation at the site (terrestrial processes)	11
Table 7.	Noxious weeds recorded within the BIA study area.....	12
Table 8.	Performance evaluation criteria and targets.....	22

1. Introduction

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by RW Corkery & Co Pty Ltd (RWC), on behalf of Hy-Tec Industries Pty Ltd (Hy-Tec), to prepare a Biodiversity Offset Management Plan (BOMP) for the Austen Quarry Stage 2 Extension as required by approvals granted by the NSW Department of Planning & Environment (DPE) and Commonwealth Department of the Environment (DoE). Austen Quarry is operated by Hy-Tec Industries Pty Ltd (Hy-Tec) and is located approximately 3.5 km south of Hartley in NSW (Figure 1, Figure 2).

1.1 Aim of the Biodiversity Offset Management Plan

The aim of the BOMP is to provide a framework for the implementation of management actions that achieve an improvement in the condition of the native vegetation and habitats to offset disturbance associated with the Stage 2 Extension of the Austen Quarry. In particular, the BOMP provides for the conservation of a population of silver-leaved mountain gum (*Eucalyptus pulverulenta*), a threatened species listed under both the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The framework addresses the objectives of site management required to achieve the aims of the BOMP, specifically:

- Maintenance weed management within the Biodiversity Offset Area (BOA) and the rehabilitation areas on site;
- Collection, propagation and installation of locally native and provenance tube stock with focus on the installation of silver-leaved mountain gum;
- Management of ecological threats throughout the site such as weeds and feral animals;
- Management of threats to the site such as human access and wildfire; and
- Monitoring and performance evaluation measures that are practical.

1.2 Compliance with conditions of approval

As part of the *Environmental Impact Statement for the Austen Quarry Stage 2 Extension Project* (RWC 2014), Niche (2014) conducted a Biodiversity Impact Assessment (BIA) to assess impacts on terrestrial ecology as a result of the Stage 2 Extension. The BIA concluded that the proposed Stage 2 Extension would result in a residual and unavoidable impact to 29.0 hectares of native vegetation (direct removal of 26.5 hectares and edge effects to 2.5 hectares) which is habitat for a suite of threatened fauna. Furthermore, 721 individuals of the threatened silver-leaved mountain gum, which is listed as vulnerable on both the TSC and EPBC Acts, would be removed by the Stage 2 Extension (albeit that 631 of these specimens had been previously planted by Hy-Tec as part of previous rehabilitation).

The BOMP has been prepared to address specific requirements of Conditions 25, 26 and 29 of State Significant Development (SSD) 6084 issued by the DPE on 15 July 2015 and Condition 3 (and relevant components of Conditions 2 and 4) of EPBC Act Approval 2013/6967 (EPBC 2013/6967) issued by the DoE on 19 October 2015.

1.2.1 State Significant Development 6084

A Biodiversity Offset Area is to be established in accordance with Conditions 25 and 26 of SSD-6084. This BOMP has been prepared in accordance with Condition 29 of SSD-6084 (see **Table 1**).

Table 1. SSD-6084 Conditions relevant to BOMP (abridged)

Condition (NSW)		Section of BOMP
25.	The Applicant shall implement the Biodiversity Offset Strategy, described in the EIS and including Conservation Area H, shown conceptually in Appendix 6, to the satisfaction of the Secretary.	Biodiversity Offset Area to be established in accordance with this condition
26.	<p>Within 2 years of this consent, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the Biodiversity Offset Strategy, to the satisfaction of the Secretary.</p> <p>Note: Mechanisms to provide appropriate long term security to the land within the Biodiversity Offset Strategy in accordance with the NSW Biodiversity Offset Policy for Major Projects 2014, including a Biobanking Agreement, Voluntary Conservation Agreement or an alternative mechanism that provides for a similar conservation outcome. Any mechanism must remain in force in perpetuity.</p>	Biodiversity Offset Area to be established in accordance with this condition
29. c)	Describe how the implementation of the Biodiversity Offset Strategy would be integrated into the overall rehabilitation of the site	Refer to RWC (2016)
29. d)	Include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and rehabilitation of the site, including triggers for any necessary remedial action	Section 4 and RWC (2016)
29. e)	Describe the short, medium and long term measures that would be implemented to manage the remnant vegetation on the site, including within the Biodiversity Offset Strategy area.	Section 3
29. f)	Include a detailed description of the measures that would be implemented over the next 3 years, including procedures to be implemented to:	
	<ul style="list-style-type: none"> Maximise the salvage of environmental resources within the approved disturbance area 	Section 3.9
	<ul style="list-style-type: none"> Restore the quality of native vegetation and fauna habitat within the BOA and other areas within the quarry site 	Section 3
	<ul style="list-style-type: none"> Manage and replant silver-leaved mountain gum 	Section 3.6 and 3.12
	<ul style="list-style-type: none"> Minimise impacts on native fauna including pre-clearance surveys 	Section 3.9
	<ul style="list-style-type: none"> Establish vegetation screening to minimise visual impacts 	Not addressed. Refer to RWC (2016)
	<ul style="list-style-type: none"> Ensure minimal environmental consequences for threatened biodiversity 	Section 3
	<ul style="list-style-type: none"> Collect and propagate native seed 	Section 3.5 and 3.6
	<ul style="list-style-type: none"> Control weeds and feral pests 	Section 3.7 and 3.8
	<ul style="list-style-type: none"> Control erosion 	Not addressed. Refer to RWC (2016)
29. g)	<ul style="list-style-type: none"> Control access 	Section 3.3 and 3.10
	<ul style="list-style-type: none"> Manage bushfire risk 	Section 3.9
29. g)	Include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria	Section 4

Condition (NSW)		Section of BOMP
29. h)	Identify potential risks to the successful implementation of the Biodiversity Offset Strategy, and describe contingency measures that would be implemented to mitigate these risks	Section 4
29. j)	Include details of who would be responsible for monitoring, reviewing and implementing the plan	Section 4

1.2.2 EPBC Act Approval 2013/6967

This BOMP has been prepared in accordance with Condition 3 of EPBC 2013/6967 (**Table 2**). Condition 2 of EPBC 2013/6967 relates explicitly to the provision of a separate *Silver-leaved Mountain Gum Management Plan* (SLMGMP), which has been prepared by Niche (2016).

Table 2. Conditions of Approval relevant to BOMP

Condition (Commonwealth)		Section of BOMP
2.	<i>Condition 2 relates to the provision of a separate Silver-leaved Mountain Gum Management Plan (SLMGMP)</i>	<i>Refer to SLMGMP (Niche 2016)</i>
3. a)	Identify the land described as the Offset Area at Schedule 2 of this notice that is necessary to achieve the outcomes required by the Environmental Offsets Policy 2012. This must include offset attributes, shapefiles, textual descriptions and maps to clearly define the location and boundaries of the Offset Area.	Section 2 Figure 1, 2, 3 and 4
3. b)	Provide a survey and description of the current condition (prior to any management activities) of the Offset Area identified in Condition 3a.	Section 2.5
3. c)	Detail management actions and regeneration and revegetation strategies to be undertaken on the Offset Area to increase the population of silver-leaved mountain gum in this area, including:	
	i) a description and timeframe of measures that would be implemented to improve the condition of the ecological communities on the site;	Section 3
	ii) performance and completion criteria for evaluating the management of the Offset Area, and criteria for triggering remedial action;	Section 4
	iii) a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;	Section 4
	iv) a description of potential risks to the successful implementation of the plan, a description of the measures that will be implemented to mitigate against these risks and a description of the contingency measures that will be implemented if defined triggers arise; and	Section 4
	v) details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 4
4	To compensate for the loss of 721 individuals of Silver-leaved Mountain Gum, and ensure the ongoing conservation of a viable population of Silver-leaved Mountain Gum in the Offset Area, within 18 months of the date of this approval, the approval holder must secure the land(s) identified as the Offset Area as a biodiversity offset by a legal instrument under relevant nature conservation legislation on the title of the land. This instrument must: <ul style="list-style-type: none"> a. Provide enduring protection for the land that will survive transfer of ownership; b. Prevent any future development activities, including mining and mineral extraction; c. Ensure the active management of the land to achieve the outcomes identified; and d. Be provided to the Department within three (3) month of it being issued, as evidence of compliance with this condition. 	Biodiversity Offset Area to be established in accordance with this condition

1.3 Site inspection

Terrestrial ecological surveys were undertaken by Niche in February 2012 and June 2013 as part of the BIA (Niche 2014).

1.3.1 Flora and vegetation survey methodology

Vegetation was mapped in a GIS system, using interpretation of digital ortho-rectified aerial photography and GPS-located field vegetation observations, which was compared to existing vegetation mapping at appropriate scales. Field surveys consisted of random meander transects, rapid data points, floristic and BioBanking plots to classify and assess the condition of the vegetation.

1.3.2 Fauna survey methodology

Habitat assessments were conducted via BioBanking plots throughout the BIA study area and observations of important fauna habitat were made (e.g. tree hollows, logs, vegetation age structure). Targeted threatened fauna survey methods included arboreal Elliot trapping, infra-red camera trapping, hair tubes, ultrasonic bat detectors, trip lining, diurnal bird surveys, spotlighting, call playback and herpetological searches (Niche 2014).

1.4 Site condition assessment methodology

Vegetation condition was assessed using a modified version of Jones and Brodie (1999), which uses qualitative criteria to assign resilience classes to bushland areas. The strength of the method is in the fact that it uses biological factors (e.g. vegetation structure, composition and level of exotic invasion) and also the health of the soil profile, as distinct from other condition assessment methodologies which are almost always based on the level of weed invasion. This method is only used by Niche to assess the condition of dry sclerophyll forests and woodland as the resilience of rainforests, wetlands and natural grasslands is usually more complex and related to other factors such as vector dispersal, connectivity and flooding and regimes. The method is used to inform an appropriate suite of management actions and therefore decision-making in regards to management input and expenditure. The categories for condition as assessed during the field survey are provided in **Table 3**.

Table 3 Qualitative assessment of bushland condition

Soil profile	Resilience/Condition Class	DESCRIPTION
Resilient Areas <i>Soil profile intact. Natural regeneration pathways facilitated.</i>	Good	<ul style="list-style-type: none"> • Minor infestations of weeds or virtually weed free. • High species richness. • Low perimeter to core ratio and large adjacent patches. • All structural layers essentially intact or minor artificial modification has occurred but is not substantially impacting on ecological function. • Patch in benchmark condition or stable after disturbance. • Minimal input management required to facilitate regeneration
	Moderate	<ul style="list-style-type: none"> • Minor infestations of weeds. • Moderate species richness. • Moderate perimeter to core ratio, large adjacent patches. • Structural absence or strong decline in condition of at least one vegetation layer due to previous artificial disturbance (e.g. regrowth from recent clearing event and subsequent loss of hollow-bearing trees). • Patch approaching benchmark condition. • Minimal input management required to facilitate regeneration.
	Poor	<ul style="list-style-type: none"> • Moderate to severe infestations of weeds. • Low species richness. • High perimeter to core ratio. Patches isolated or adjacent native vegetation fragmented • Structural absence or strong decline in at least 2 vegetation layers (e.g. derived native pasture or grassland). Remaining native components under stress. • Original soil profile intact but patch well outside of benchmark condition. • Moderate levels of management required to facilitate regeneration.
Non-resilient Areas <i>Soil profile permanently altered. Natural regeneration pathways unlikely.</i>	Disturbed	<p><u>Rehabilitation or revegetation areas</u></p> <ul style="list-style-type: none"> • Moderate level of weed invasion. • Rehabilitation area – re-vegetation or previous soil translocation. • Soil profile may exhibit some regenerative potential though structure and composition unlikely to reach benchmark after treatment. • Limited natural regeneration capacity after treatment and high on-going inputs to achieve sustainable outcome.

		<p><u>Unmanaged space and degraded bushland</u></p> <ul style="list-style-type: none"> • Native vegetation almost totally replaced by weed species and, at best, a single structural layer intact (e.g. large trees in degraded riparian zone) • Soil profile disturbed and permanently altered resulting in loss of soil seed bank. • No regeneration capacity, natural regeneration pathways lost. • Management requires high input reconstruction and commitment to on-going maintenance. <p><u>Not bushland</u></p> <ul style="list-style-type: none"> • Potential regeneration suppressed by management practices (e.g. parkland, cropping or exotic pasture).
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2. Description of the site

2.1 Location

The BOA lies adjacent to the eastern boundary of the Austen Quarry Stage 2 Extension. Figure 1 and Figure 2 illustrate the location of Austen Quarry, approximately 3.5 kilometres south-southwest of the village of Hartley and 10 kilometres south of Lithgow within the Lithgow Local Government Area in NSW.

Initial extraction and processing operations at the Austen Quarry (Stage 1) were restricted to Lot 1, DP1005511. The Stage 2 Extension constitutes an extension onto Lot 2, DP1005511 and Lot 31, DP1009967. The Quarry Access Road is located predominantly on Lot 31, DP1009967 with a small section on Lot 4, DP876394 as it approaches Jenolan Caves Road (Figure 2). The BOA is located across parts of Lots 1 and 2, DP1005511 and Lot 31, DP1009967 and includes Conservation Area H (DA 103 194) (Figure 2).

Each of the four lots are owned by the Hartley Pastoral Corporation Pty Ltd (HPC), with whom Hy-Tec holds a lease for the purpose of the Austen Quarry.

2.2 Offset site attributes

As specified in the Approval (EPBC 2013/6967), the offset site attributes are detailed in **Table 4**.

Table 3: Offset site attributes

EPBC Act reference ID number	EPBC 2013/6967
Site address	Part Lot 1 and 2, DP1005511 and Lot 31, DP1009967, Hartley NSW 2790 (off Jenolan Caves Road)
Boundary co-ordinates (decimal degrees) (bounding rectangle)	150.15682569100, -33.56709462980
	150.16854459400, -33.57032444900
	150.16239669800, -33.58595572040
	150.15067599500, -33.58272522660
EPBC Protected matters offset site compensated for	<i>Eucalyptus pulverulenta</i>
Additional EPBC protected matters benefiting from offset	Large-eared Pied Bat recorded. Potential habitat for Grey-headed Flying-fox, Koala and <i>Eucalyptus aggregata</i> .
Site of offset site (ha)	94.3

2.3 Physical environment

The Austen Quarry, including the Stage 2 Extension, is situated within the Bathurst sub-region of the South-eastern Highlands Bioregion (IBRA7, Commonwealth of Australia 2012). The BOA comprises various gradients ranging from flat land (i.e., the ridges) to steep slopes of up to 30 degrees. Drainages are moderately steep and ephemeral in nature.

The BOA adjoins the eastern perimeter of the Stage 2 Extension and extends to the adjacent Coxs River, on the west fall of the Blue Mountains. Land to the south, east and west of the Austen Quarry consists mainly of wooded ridges and predominantly cleared valleys. Land to the north is mainly gently undulating grazing land. The native vegetation within the BOA forms part of a larger patch of adjacent remnant vegetation within the Blue Mountains Wilderness area to the east and partially fragmented vegetation in the Little Hartley area to the north.

The vegetated areas along the mid-upper slopes and ridges are in good condition with little evidence of significant past disturbance, except for some minor edge disturbances, timber harvesting and light grazing.

Fire seems to have been largely excluded. A high level of resilience is apparent throughout most of these areas, which is demonstrated by the diversity of native herbs and ground cover, negligible weed cover and an unaltered soil profile.

The typical climate of the area features warm summers with cool winters and steady precipitation year-round. Average maximum temperatures range from 10.4 to 25.5 degrees Celsius from July to January respectively (BOM 2016). Average annual rainfall is 861.8 millimetres, falling relatively consistently throughout the year though summer is the wettest season and winter the driest (BOM 2016).

2.4 Size and connectivity

The disturbance footprint of the Stage 2 Extension area of the Quarry covers 57.7 hectares and is located within the broader Quarry Site covering approximately 144 hectares (**Figure 4**). Of this 57.7 hectares, 26.5 hectares is native vegetation that would be removed. The BOA includes a significant amount of native vegetation to the immediate east of the Stage 2 Site and is 94.3 hectares in area. The Coxs River plays an important role within the region as a vegetated corridor promoting connectivity.

2.5 Vegetation and habitat condition

The vegetation communities within the BOA defined by Niche include:

- Brittle Gum - Broad-leaved Peppermint open forest;
- silver-leaved mountain gum mallee woodland;
- Forest Red Gum grassy open forest;
- Forest Red Gum native grassland;
- Forest Red Gum exotic grassland;
- River Oak riparian open forest; and
- Rough-barked Apple gully forest.

The distribution of these vegetation communities is illustrated in **Figure 5**. **Table 4** lists each of these vegetation types as defined by Niche, and also provides the area of each within the BOA.

Table 4. Vegetation communities within the BOA

Vegetation Community Unit (Niche)	Vegetation Type (Niche)	BOA (ha)
c1	Brittle Gum - Broad-leaved Peppermint open forest	46.3
c2	Silver-leaved Mountain Gum mallee woodland	1.9
c3	Forest Red Gum grassy open forest	22.8
c3a	Forest Red Gum native grassland	0.8
c3b	Forest Red Gum exotic grassland	9.7
c4	Rough-barked Apple gully forest	2.4
c6	River Oak riparian open forest	10.4
<i>Total native vegetation</i>		94.3

Brittle Gum – Broad-leaved Peppermint open forest is the most prominent vegetation type, accounting for approximately half of the BOA and occurs mostly on the higher slopes and ridgelines. A high level of resilience is apparent throughout most of these areas, demonstrated by the diversity of native herbs and ground cover, negligible weed cover and an unaltered soil profile.

Silver-leaved Mountain Gum mallee woodland occupies a patch on a north-facing slope within the BOA, containing the threatened *Eucalyptus pulverulenta*. The community was in good condition, with all layers intact and with minimal disturbance. Niche conducted an assessment of the adequacy of the BOA in relation to its provision of habitat for *Eucalyptus pulverulenta*. The BOA provides both core areas of natural

remnant habitat dominated by the species and non-core areas of natural remnant habitat where the species is common, but not dominant. Together, these core and non-core areas contain a population of 1,850 individuals of the species (Section 2.5.1).

Forest Red Gum grassy open forest occurs on the lower lying areas and gentle slopes of the BOA. The native grassland and exotic grassland variants (c3a and c3b respectively) contained a sparse canopy layer, mid and lower strata due to clearing. The main difference in the two variants is that the native grassland contains more than 50 % of native ground cover present.

Rough-barked Apple gully forest occurs in a steep gully towards the northern and central portion of the BOA.

River Oak riparian open forest occurs in a strip along the Coxs River within the BOA. The community does not occur in the impact area of the Stage 2 Extension. This community was in moderate to good condition but has been impacted by previous clearing, flooding and weed invasion. The Coxs River was found to be in good condition and plays an important role within the region as a vegetated corridor promoting connectivity.

2.6 Threatened biodiversity

The following information is drawn from the Biodiversity Impact Assessment for the Austen Quarry, Stage 2 Extension project which has been reproduced in **Appendix A**.

2.6.1 Threatened flora

Niche conducted targeted surveys for threatened biodiversity as listed on the TSC and/or EPBC Acts. A significant population of *Eucalyptus pulverulenta* (silver-leaved mountain gum), which is listed as vulnerable on both the TSC and EPBC Acts, was recorded within the BIA study area. No other threatened flora were recorded, although *Eucalyptus aggregata* (Black Gum) was considered to have a moderate likelihood of occurrence.

The total number of *Eucalyptus pulverulenta* within the Austen Quarry lease area is estimated at 3,815 individuals (2,283 core + 146 non-core + 1,386 planted). Of this, a maximum of 721 individuals (90 non-core + 631 planted) would be removed as a result of the Stage 2 Extension. The total number of individuals in the BOA is estimated at 1,850 (1,718 core + 132 non-core) (refer to *Section 3* of the Silver-leaved mountain gum Management Plan for further detail on species counts and estimates).

2.6.2 Threatened fauna

Five threatened fauna species listed on the TSC and/or EPBC Acts were recorded during the field survey; Gang-gang Cockatoo, Powerful Owl, Scarlet Robin, Eastern Bentwing-bat and Large-eared Pied Bat. Additional threatened fauna recorded during previous studies within the BIA study area include Hooded Robin, Flame Robin and Varied Sitella. In total, eight threatened fauna have been recorded within the BIA study area.

As a result of the field surveys a moderate to high likelihood of occurrence and potential habitat was considered to exist within the BIA study area for Grey-headed Flying-fox, Koala and an additional three threatened microbats (Eastern False Pipistrelle, Eastern Freetail-bat and Greater Broad-nosed Bat). The Assessments of Significance concluded that the Stage 2 Extension was unlikely to have a significant impact on any threatened fauna.

2.6.3 Threatened ecological communities (TECs)

No TECs listed on the TSC and/or EPBC Acts were recorded within the BIA study area. No TECs would be affected by the Stage 2 Extension.

2.7 Key threatening processes

Section 5.1.2 of Niche (2014) lists the Key Threatening Processes (KTPs) as listed on the TSC and/or EPBC Acts that potentially operate or will be exacerbated by the Stage 2 Extension. The KTPs applicable to terrestrial environments are listed in **Table 5**. The table demonstrates that the Stage 2 Extension constitutes, or is likely to exacerbate, the following four KTPs due to unavoidable or unmitigated impacts from the Stage 2 Extension:

1. Clearing of native vegetation.
2. Climate change (human-caused).
3. Loss of hollow-bearing trees.
4. Removal of dead wood and dead trees.

It is anticipated that, through the implementation of the management actions in the BOMP, each of these KTPs will be managed such that their effects are negligible.

Table 5. Key Threatening Processes in operation at the site (terrestrial processes)

Key threatening Process	TSC Act	EPBC Act equivalent	Proposal constitutes or is likely to exacerbate KTP
Alteration of habitat following subsidence due to longwall mining	✓	x	NO
Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.	✓	x	NO
Bushrock removal	✓	x	NO (mitigated)
Clearing of native vegetation	✓	✓	YES
Climate change (human-caused)	✓	✓	YES
Competition and grazing by the feral European rabbit	✓	✓	NO
Competition and habitat degradation by feral goats	✓	✓	NO
Competition from feral honeybees	✓	x	NO
Forest Eucalypt Dieback from psyllids and Bell Minor interaction	✓	✓	NO
Environmental degradation caused by feral deer	✓	x	NO
High frequency fires	✓	x	NO
Importation of red imported fire ants into NSW	✓	✓	NO
Infection by <i>Psittacine circoviral</i> (beak & feather)	✓	✓	NO
Infection of frogs by amphibian chytrid fungus	✓	✓	NO
Infection of native plants by <i>Phytophthora cinnamomi</i>	✓	✓	NO
Introduction of the large earth bumblebee	✓	x	NO
Invasion and establishment of exotic vines and scramblers	✓	x	NO
Invasion and establishment of Scotch Broom	✓	✓	NO
Invasion and establishment of the Cane Toad	✓	✓	NO
Invasion of native plant communities by African Olive	✓	✓	NO
Invasion of native plant communities by Bitou Bush	✓	x	NO
Invasion, establishment and spread of Lantana	✓	x	NO
Invasion of native plant communities by exotic perennial grasses	✓	✓ (only N. Aus.)	NO (mitigated)
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants	x	✓	NO
Loss of hollow-bearing trees	✓	x	YES
Loss and/or degradation of sites used for hill-topping by butterflies	✓	x	NO
Novel biota and their impact on biodiversity	x	✓	NO
Predation and hybridisation of feral dogs	✓	✓	NO
Predation by the European Red Fox	✓	✓	NO
Predation by the feral cat	✓	✓	NO
Predation by <i>Gambusia holbrooki</i> , Plague Minnow	✓	x	NO
Predation, habitat degradation, competition and disease transmission by Feral Pigs	✓	✓	NO
Removal of dead wood and dead trees	✓	x	YES

Invasion of native plant communities by exotic perennial grasses is listed as a KTP on the TSC Act. African lovegrass (*Eragrostis curvula*) and serrated tussock (*Nassella trichotoma*) are both exotic perennial grasses and are known to occur locally, and as such should be managed to reduce numbers and extent wherever possible. Serrated tussock is also a noxious weed (see Section 2.7).

2.8 Noxious and environmental weeds

Weeds as listed under the NSW *Noxious Weeds Act 1993* (NW Act) are declared in control areas (usually LGAs). If a weed is declared a noxious weed, management of such a weed is the responsibility of the landowner. The weeds listed in **Table 6** were recorded in the BIA study area and are listed as noxious on the NW Act for the Lithgow LGA. The presence of these species has implications for the on-going management

of native vegetation within the BIA study area and BOA. In a more general sense, grass weeds (Poaceae) and daisies (Asteraceae) were dominant as could be expected within the grassy open forests and degraded pastures. African boxthorn (*Lycium ferrocissimum*) and serrated tussock have been previously subject to management at the site (OnSite 2011). African boxthorn was not recorded during the current field survey though it is acknowledged as likely to be present.

Table 6. Noxious weeds recorded within the BIA study area

Noxious Weed	Class	Legal requirements
<i>Eragrostis curvula</i> African lovegrass	4	The growth of the plant must be managed in a manner that reduces its numbers, spread and incidence and continuously inhibits its reproduction
<i>Rubus fruticosus</i> agg. spp. Blackberry		
<i>Nassella trichotoma</i> Serrated tussock		
<i>Conium maculatum</i> Hemlock		
<i>Onopordum</i> spp. Scotch, Stemless, Illyrian and Taurian thistles		
<i>Hypericum perforatum</i> St. John's wort		
<i>Rosa rubiginosa</i> Sweet briar		

3. Management actions and specifications

3.1 Threats and management priorities

DoE (2008) and OEH (2016) describe the main threats to the conservation of native vegetation and silver-leaved mountain gum as a lack of security around conservation mechanisms (specifically offsetting), trampling and grazing by domestic stock and/or feral goats, fire trail widening and maintenance, catastrophic natural events, altered fire regimes, fragmentation and loss of habitat, illegal seed collection, weed invasion and unauthorised access.

DoE (2008) and OEH (2016) also describe the regional and local priority actions in relation to silver-leaved mountain gum as including (amongst other things) monitoring of known populations and the progress of recovery, identification of important populations, management of threats to known populations, ensuring road widening activities do not impact on the species, use of formal conservation arrangements to secure populations, weed management, stock and feral herbivore management, development of suitable fire regimes and an elevation of awareness for landowners and conservation groups.

Management actions that specifically relate to the conservation of native vegetation, fauna habitat and silver-leaved mountain gum populations in relation to mitigating and offsetting impacts as a result of the Stage 2 Extension of the Austen Quarry are described here. Section 5 describes the monitoring and performance evaluation program that will be implemented.

3.2 Security and tenure of the BOA

Hy-Tec proposes to secure the BOA, including Conservation Area H (DA 103 194), through a Nature Conservation Trust (NCT) agreement. This will ensure the security of the remnant silver-leaved mountain gum population in perpetuity and also the associated native vegetation and fauna habitats.

Sections 3.3 to 3.13 prescribe management actions related to access controls, stock exclusion, weed management (maintenance levels in this case), replanting of exotic pasture areas, ecological burning and feral animal control, and the management and monitoring of the remnant silver-leaved mountain gum population.

Responsibility for the management of the BOA under a NCT agreement will lie with Hy-Tec for the life of the quarry operations and then be relinquished to the landowner after quarry operations cease.

3.3 Fencing and stock exclusion

The BOA will be protected by existing fences that exclude stock from the Austen Quarry. It is not anticipated that a fence will be required along the eastern boundary of the BOA (Coxs River) which is secure due to its steepness and inaccessibility. The existing fences are a four strand post-and-wire fence. It is considered that fencing the BOA with new fences on its boundary would cause more environmental harm than is gained, given stock cannot currently access the Quarry or BOA. Signs will be erected to highlight the ecological sensitivity of the BOA to contractors and staff.

The remaining lease area is well gated and fenced and excludes access to the rehabilitation areas. These access restrictions will be maintained throughout the operational life of the quarry, and in perpetuity. The condition of existing fences and gates will be monitored by the Hy-tec Quarry Production Manager or their delegate as part of the ongoing monitoring program and failed or damaged fencing or gates to be replaced as soon as practical following detection.

3.4 Track management

Vehicular tracks are largely absent from the BOA. No degraded tracks that require rehabilitation are present within the BOA.

Existing tracks within the quarry operations are well-graded and managed with cross banks and table and mitre drains, thus minimising impacts on surrounding native vegetation and silver-leaved mountain gum occurrences.

The widening of existing tracks at the Austen Quarry will be avoided where potential impacts on planted silver-leaved mountain gum may occur.

3.5 Collection and propagation of locally native seed

The collection and propagation of locally native and provenance seed will be carried out as the initial task in the installation of silver-leaved mountain gum tubestock and associated native species. Seed collection is not contingent on staging of other works and will be undertaken in late spring/early summer when the flowers fade. Seed collection will be carried out by a suitably qualified provider such that the genetic integrity, structure and composition of native vegetation within the locality is maintained. This is particularly important given the presence and conservation significance of silver-leaved mountain gum.

Seed will be sourced as close as possible to the site and from the same general habitat. Propagules from a target range of five kilometres from the site is considered satisfactory, however it is anticipated that collection of silver-leaved mountain gum seed will occur from previously planted areas within the quarry lease and that most of the other local native species can be sourced from within or adjacent to the site. Illegal seed collection is viewed as a threat to silver-leaved mountain gum and therefore seed collection will have regard to standard industry practices including licencing (collection within threatened species habitat and EECs) and guidelines such as Florabank.

A lag of between 12 and 18 months may be required depending on the timing of on-ground works. This is to allow the supplier adequate time to collect seed (depending on season of commencement), propagate and harden-off tubestock (up to six months).

Appendix B provides a planting schedule for the rehabilitation areas and was determined with reference to the flora species recorded for the BIA (Niche 2014) and with a view to reinstating the structure of the local vegetation which provides competition for weed incursions that may threaten the planted silver-leaved mountain gum. Where appropriate, other local species will be utilised for collection, propagation and installation depending on seasonal availability.

Seed collection and propagation should be mindful of Peters *et al.* (1990).

3.6 Replanting of rehabilitation areas

3.6.1 Container sizes and labelling

Species listed in **Appendix B** will be supplied as tubestock and/or hiko-cells.

At least one plant of each species or variety in a batch will be labelled with a durable, readable tag. All hiko-cell forestry tube trays will contain only a single species which is labelled. The label will be able to withstand transit without erasure or misplacement.

3.6.2 Health and vigour

Plants delivered to site will be hardened off to suit the conditions that could reasonably be anticipated to exist on site at the time of delivery. Suitable root development will be present such that the root ball does

not disintegrate on removal from the tray or forestry tube. The root mass will be well proportioned in relation to the size of the plant material, conducive to successful installation, free of any indication of having been restricted or damaged and, in the case of hiko-cells, be air-pruned.

Plants will be supplied with foliage size, texture and colour at time of delivery consistent with the size, texture and colour shown in healthy specimens of the nominated species.

3.6.3 Freedom from pests and disease

Plants will be delivered to site that are free from pests or disease. Where attack is evident, plant supply will be restricted to those specimens with evidence of attack to less than 15 per cent of the foliage and ensure absence of actively feeding insects.

3.6.4 Storage

Tubestock will be delivered to the site on a day to day basis, and planted immediately after delivery.

3.6.5 Planting preparation and conditions

Holes will be dug on the day of installation to a depth appropriate to the size of the tubestock being installed (i.e., hiko-cell or tube). Depending on timing of planting, prevailing weather conditions and soil moisture, holes will be watered prior to planting.

Plants will be watered-in on the day of planting to the rim-level of the dish around each plant and then twice a week for the ensuing month if dry weather prevails (i.e., if weekly rainfall drops below 10 mm during that period).

Ideally planting will be programmed to coincide with cool, inclement weather. Planting will ideally be carried out during the months of March/April to allow good bedding of the root system over the ensuing winter and spring and also to minimise watering needs. Plants can, alternatively be planted in September or October but may require regular watering over the first spring and summer after installation, particularly if drought conditions prevail.

Planting in winter or summer may be appropriate when soil and climatic conditions are suitable.

3.6.6 Watering

Plants will be watered before planting, immediately after planting and as required to maintain growth rates free of stress. All plants will be watered-in immediately after planting to stabilise root-balls and remove air-pockets.

3.6.7 Fertilising

Apart from the slow release fertiliser likely to be used in the potting mixes of the tube stock, no additional fertiliser will be required. However, the possibility of using water crystals if planting must occur in very dry and hot conditions, or the application of trace elements such as iron chelates where clear deficiencies are present, will be considered.

3.6.8 Placing

Plants will be removed from forestry tubes or hiko-cells with minimal disturbance to the root ball and it will be ensured that the root ball is moist and placed in the centre of the hole and plumb. Plants will be installed in a small dish-shaped depression (i.e. not flush with but just below the surface of the topsoil) such that any subsequent rains result in a temporary pooling of water around the root-ball. This method increases tubestock survival in dry environments.

3.6.9 Mulching and organic matting

It is not anticipated that mulch will be required. Pinned coir-fibre organic mesh will be installed if the gradient is steeper than 1V:5H.

3.6.10 Tree guarding

The necessity of tree guards will be assessed prior to the planting of tubestock. The requirement will be based on whether seasonal conditions are favourable to the clear presence of herbivores that may pose a threat to the plantings (especially silver-leaved mountain gum tubestock). Tree guards are typically used for tree and shrub species only.

Damaged tree guards should be replaced as required. After 18 months, the contractor will remove all installed tree guards and stakes or at any time earlier where the plant is deemed to be sufficiently well established.

3.6.11 Maintenance program

The contractor will provide a maintenance program and amend it as required until approved. The program will specify the frequency and timing for all tasks described as part of the maintenance requirements.

Throughout the planting establishment period, the contractor will be required to carry out maintenance work including, watering, plant and tree guard replacements, rubbish removal and pest and disease control.

The contractor will provide an efficient, consistent and reliable maintenance service, undertaking all of the required tasks applicable for the requirements as per the agreed works program. Maintenance inspections should be undertaken weekly for the first month, then at three, six and 12 months post planting for the first year, and in spring every second year thereafter for the life of the approval.

3.6.12 Completion of planting

Completion of the planting works includes, but is not limited to, the establishment of plants (minimum 85% survival of tubestock), replacement of plants which have failed and mulching. The contractor will allow for additional plantings of the same species to be replaced.

3.6.13 Insect and disease control

The contractor will be responsible for the control of any pest or disease that may affect the plants. Once a problem has been correctly identified, then a suitable form of treatment should be engaged until the problem has been eliminated. Should the use of chemical spray be required, strict adherence to the manufacturer's recommended rates and handling must occur.

3.6.14 Replacements

Failed, damaged or stolen plants will be replaced within seven days of each maintenance inspection. The target will be 85% survival rates of tubestock. Should survival rates fall below 85%, replacement planting will be undertaken.

3.7 Weed management

The BOA will be subject to a biannual maintenance weed management regime.

Weed maintenance will consist of spot spraying sweeps through the BOA at regular intervals by a trained bush regenerator skilled at native and exotic plant identification. Weed incursions are minor in the BOA but it is important to the sustainability of the remnant silver-leaved mountain gum population that this remains the case. All potential weed incursions should be appropriately treated but key target species will include the noxious weeds recorded on the site including, African lovegrass, blackberry, serrated tussock, hemlock,

Scotch thistle (and other *Onopordum* spp.), St. John's wort and sweet briar. Most of these species exist in the degraded paddocks of the mining lease, however due diligence will be taken to ensure they remain largely excluded from the BOA. African boxthorn was not recorded during the field surveys by Niche but will also constitute a key focus species as it has been targeted in previous management regimes within the quarry lease.

A regular program of maintenance weed management will commence upon completion of planting of tubestock throughout the replanting areas. Noxious weeds, environmental weeds and perennial exotic grasses are considered the greatest threat to the re-establishment and improvement of native revegetation projects, and in this case for the establishment of silver-leaved mountain gum and associated plantings from tubestock. Regular maintenance weeding activities (once a month through late winter, spring and wet summers) will be undertaken for the first three years after installation of tubestock in these areas and then twice yearly.

A list of standard weed treatments for species identified on-site prior to works has been provided in **Appendix C**.

3.8 Feral animal management

Three feral animal species were recorded on site by Niche (2014), red fox, wild dog and black rat. None of these species are likely to constitute a threat to the conservation and management of silver-leaved mountain gum, either within the BOA or the replanting areas. Feral cat and wild pig have the potential to be present on the site but are unlikely to present a threat to either remnant or planted silver-leaved mountain gum specimens. Each of these vertebrate pest species is likely to have an impact on the native fauna of the locality, especially ground-dwelling mammals, however management strategies for these feral species must be targeted and conducted on a broader regional scale than just site-based management. Therefore, the landowner and OEH will be consulted as required in regards to how Hy-Tec will best be able to contribute to a regional vertebrate pest management strategy or priority (e.g., fox and feral cat baiting and pig trapping).

Though not recorded previously, it is considered likely that feral goats, rabbits and brown hare (feral herbivores) have the potential to occur on the site and negatively impact both the native vegetation of the site, the remnant silver-leaved mountain gum population in the BOA and also any planted tubestock. As described in Section 4, the presence of feral herbivores and their potential effects on native vegetation and rehabilitation will be monitored. Remedial action(s) will be taken should effects of these species be considered a substantial threat to the conservation of the site.

3.9 Management of habitat for native fauna

3.9.1 Pre-clearing surveys

A suitably qualified and experienced ecologist should conduct a pre-clearing survey, during which habitat features of importance to native fauna will be recorded spatially using a differential GPS. The survey will involve traversing the study area in parallel linear transects approximately 20 metres apart. Important features include tree hollows, logs, rocky habitat, large bird nests and termite mounds.

Hollow bearing trees should be identified to species level, recorded with a GPS, the number of hollows recorded and marked with pink spray-paint and flagging tape. The height, position (branch or trunk) and diameter of each hollow should also be recorded. Additional comments will be made regarding the nature of the tree and its chances of acting as habitat. Hollow bearing trees will only be marked if they are considered to contain hollows greater than five centimetres in diameter.

Other general features of the site to be cleared will be documented and a list of incidental vertebrate fauna observations will be made (including a bird survey). Searches of rocky habitat, and evidence of traces such as scats, diggings and feeding marks of gliders will also be conducted. No targeted threatened fauna survey will be conducted.

3.9.2 Salvage of fauna habitat from disturbance footprint

Condition 29 (f) of the NSW approval requires “maximising the salvage of environmental resources within the approved disturbance area, including tree hollows, vegetative and soil resources in the enhancement of the offset area or site rehabilitation.”

Given the good condition of the native vegetation within the BOA, and the sensitivities in regards to the remnant population of silver-leaved mountain gum in the BOA, translocation of soil, rocks, logs, fallen trees or vegetation into this area will not occur due to the risk of the spread of soil pathogens or weed propagules from adjacent lands. Further, data from Niche (2014) demonstrate that the BOA has an ample and sustainable supply of logs and other micro-habitat features.

These salvaged resources will, however, be utilised in the rehabilitation areas (i.e., planted areas) of the Quarry Site. The use of logs, rocks and fallen trees salvaged from the disturbed area will augment habitat quality and quantity within the rehabilitation areas and also help to protect planted tubestock, much of which will be silver-leaved mountain gum. Any movement of material will be under the advice of a suitably qualified and experienced ecologist and will be guided by published benchmarks regarding the amount of material/resources to be placed (e.g. the benchmarks for the length of fallen logs per 1,000 square metres in the NSW Plant Community Types database).

The salvage and re-use of soil (for rehabilitation) from the disturbed areas of the quarry will be undertaken in accordance with the procedures outlined in the Landscape and Rehabilitation Management Plan (RWC, 2016). Large scale soil translocation, i.e. of volumes exceeding that required for the establishment of a suitable growth medium for planted and seeded species, is a complicated and unreliable process. Furthermore, this is considered unnecessary in this circumstance as the rehabilitation strategy (see Section 3.6, **Appendix B** and RWC, 2016), will guarantee an improved and sustainable outcome. Recipient translocation sites require substantial preparation and staging and, in this case, silver-leaved mountain gum and the other plants nominated in **Appendix B** are easily propagated. Lastly, translocation requires large recipient areas and the sites within the quarry are not large enough to justify translocation as an option.

3.10 Fire regime

It is obvious from the dry sclerophyll forest and woodland structure and the composition of the vegetation that fire would be an inherent and natural ecological process within the locality. The vegetation of the Austen Quarry site falls broadly within the grassy woodland and dry sclerophyll NSW vegetation formations (Keith 2004). NPWS (2004) prescribes a fire interval of five to 40 years for grassy woodlands and five to 50 years for dry sclerophyll forests.

Silver-leaved mountain gum is a mallee and resprouts from a lignotuber (enlarged underground stem), an adaptation to fire. The species is listed in the NSW Threatened Species Hazard Reduction list (RFS 2004) as not requiring fire more than once every fifteen years.

Therefore, no part of the BOA, which contains intact remnant native vegetation and a population of silver-leaved mountain gum, will be subject to fire less than 15 years, or more than 40 to 50 years, from the previous fire event in that particular area.

The first managed fire event within the BOA will occur within five years of approval of this plan, take place in late summer or early autumn (to allow regeneration prior to the next spring flowering season) and be

targeted at the lower slopes and part of the core population of silver-leaved mountain gum. These lower areas of native vegetation appeared to be senescent and more in need of a burning event than the high plateau ground, while the silver-leaved mountain gum specimens within the core populations were quite large and mature (i.e. had not likely been burnt within the last 15 years). No more than a third of the extent of silver-leaved mountain gum core areas will be burnt, and no one third within the same 15 year timeframe. Subsequent managed burns within adjacent areas of the BOA will not be burnt less than five years from the previous managed event in the adjacent area, and will only be prescribed where monitoring of the silver-leaved mountain gum population has demonstrated a clear positive outcome as a result of fire from the first managed burn.

It is considered unlikely that wildfires within the district would extend to and burn the BOA. The Quarry itself, the managed trails and Quarry roads, the adjacent paddocks and the Coxs River effectively represent a fire-break to the north and west. Further, wildfire is unlikely to emanate within the locality from the sheltered southern and eastern slopes of the BOA, although this is not impossible. In any case, attempts will be made to exclude hot summer wildfires that might impact on the BOA, though it is accepted that this may be beyond the Quarry's control in some circumstance.

The location of the BOA, and the silver-leaved mountain gum occurrences within it, will be made known to RFS for inclusion in bushfire risk management plans, risk register and/or operations maps.

Managed burning will be excluded from all rehabilitation areas. Where senescence of mature planted silver-leaved mountain gum within the rehabilitation areas is detected, affected plants will be pruned back to ground level and the subsequent vegetative response monitored. Pruning to ground level is an established method used in fire prone areas to rejuvenate and extend the life of senescing plants with a lignotuber.

3.11 Exclusion zones and contractor awareness

Clearly delineated conservation exclusion zones within and around the existing Quarry and Stage 2 Extension will be implemented following approval of the BOMP to exclude movement of vehicles, plant and staff within rehabilitation areas and the BOA, other than for management activities related to the SLMGMP or the BOMP. A compulsory component of the site induction process will be to highlight all conservation exclusion areas and the BOA in its entirety on a map of the site.

3.12 Silver-leaved Mountain Gum Management Plan

This document, the BOMP, is inherently linked to the *Silver-leaved Mountain Gum Management Plan* (SLMGMP) (Niche 2016) and should be read in conjunction with it. Silver-leaved mountain gum is perhaps the most high profile management priority on the site for all responsible parties (refer to Section 4.3).

3.13 Consistency with Landscape and Rehabilitation Management Plan

A *Landscape and Rehabilitation Management Plan* (LRMP) has been prepared by RWC (2016). The LRMP will incorporate components of both the SLMGMP and BOMP, as well as describe and illustrate (amongst other things) final landforms, visual impact amelioration, site rehabilitation and the processes involved in securing the BOA and providing the conservation bond.

4. Monitoring and performance evaluation

A monitoring and performance evaluation program will be implemented to ensure the stabilisation of the site during and post-construction, and the success of the management of the site to an improved and sustainable level.

4.1 Monitoring of silver-leaved mountain gum population within the BOA

The core population and non-core occurrences of silver-leaved mountain gum within the BOA will be subject to a simple yet rigorous monitoring system. An initial monitoring event will occur following approval of the SLMGMP (preferably in spring) and be repeated biennially during spring thereafter for the life of the quarry. The monitoring program will involve five key components:

1. Mapping of the distribution and extent of the core and non-core populations using a differential GPS (every second year).
2. Population estimates utilising the method as described in Niche (2014) of 20 x 20 metre plot counts within the core areas and exact counts and differential GPS locating of the non-core occurrences (every second year).
3. An assessment of health including the following attributes at predefined and fixed locations (once a year);
 - A qualitative assessment of condition of plants, e.g., good/moderate/poor (including observations of senescence or disease),
 - Evidence of herbivory or other physical disturbance and an assessment of the severity of such where it occurs,
 - Evidence of recruitment (i.e. naturally occurring saplings),
 - Per cent foliage cover within core areas, at 10 locations along a 50 metre transect as per OEH (2014),
 - The percentage of fruiting plants within the BOA, and
 - Seed viability (i.e. from trials of collected seed, refer to Section 3.5).
4. An estimate of the percentage foliage cover of weed species in all structural layers should be undertaken within 20 x 20 metre plots. A list of problematic species would be recorded for management purposes (twice a year).
5. An assessment of the condition of the conservation exclusion measures, i.e., condition of fencing, gates and signage (minimum fortnightly inspections by Quarry staff).
6. Photographs of specimen plants at each of the predefined locations as nominated in Point 2 above.

The monitoring program will be adapted as the fire management regime is implemented to suitably record and track the response of silver-leaved mountain gum to burning, and provide a base-line, post-fire assessment of the condition of the areas and specimens affected. The proposed monitoring program to determine the silver-leaved mountain gum response to burning is described in detail in the silver-leaf mountain gum management plan.

4.2 Monitoring of replanted silver-leaved mountain gum

Monitoring of replanted silver-leaved mountain gum within the Replanting Area and the Rehabilitation Areas will take place at three, six and 12 months post planting during the first year by the Hy-Tec Quarry Production Manager and in spring biennially thereafter and will mostly be based on visual inspection of survival rates and photographic evidence. Planted areas will be surveyed and number of deceased tubestock would be recorded. Should tubestock survival rates fall below 85%, remedial planting would be undertaken. Management of the planted areas would be reviewed if tubestock survival rates consistently do not meet performance targets. Monitoring would continue for the life of the approval.

The specific performance evaluation measures for replanting of silver-leaved mountain gum are contained in Section 4.3.

4.3 Performance evaluation and adaptive management

A performance evaluation program will be implemented to:

- ensure the actions as prescribed in this management plan are monitored against known targets;
- outline adaptive and remedial actions should the targets not be met; and
- provide details of who will be responsible for implementing and reviewing the actions and monitoring program.

Table 8 aligns key performance criteria to the relevant management actions. The Quarry Production Manager, or his/her nominee will be responsible for the monitoring program and implementing the SLMGMP. The NSW Quarry Operations Manager will be responsible for coordinating review of the management plans.

Table 7. Performance evaluation criteria and targets

Management action	Performance targets	Risks	Mitigation measures	Triggers	Remedial actions if target not achieved	Responsible party	
						Quarry life	Post quarry
1. Security of BOA	Nature Conservation Trust agreement or other agreed process implemented for BOA, including Conservation Area H (DA 103 194), within 2 years of consent.	n/a	n/a	n/a	n/a	Hy-Tec through agreement with landowner.	Landowner
2. Fencing and stock exclusion	<p>The BOA will be protected by existing fences that exclude stock from the Austen Quarry. The fence is a four strand post-and-wire. Signs will be erected highlighting the ecological sensitivity of the BOA.</p> <p>Maintenance of Quarry gates and fences throughout the operational life of the quarry and in perpetuity.</p> <p>Exclusion of stock, staff, contractors, plant and machinery from the BOA and rehabilitation areas except where required for maintenance and inspection purposes.</p>	Failure of quarry gates and fences leading to undesired access.	Inspection of fences and gates on a monthly basis	Inappropriate access to the BOA by stock, staff, contractors, plant or machinery.	<p>Removal of stock from sensitive areas if required.</p> <p>Staff and contractor education where transgression has occurred. Disciplinary action will be commenced as per Hy-Tec's guidelines for further transgressions (other than for approved access).</p> <p>Failed or damaged fencing or gates to be replaced as soon as practical following detection.</p>	Quarry Production Manager or their delegate.	Landowner
3. Track management	<p>No degraded tracks requiring rehabilitation exist within the BOA and therefore avoiding the establishment of new tracks will be a key performance objective.</p> <p>No widening of existing tracks within the quarry area where potential impacts on planted silver-leaved mountain gum may occur.</p>	Formation of informal tracks or widening of existing tracks impacting the BOA.	Control access to the BOA through the use of fencing, signage and gates.	Creation of new tracks within the BOA.	<p>Remediation of tracks with native revegetation strategies should the BOA be compromised.</p> <p>Replanting of silver-leaved mountain gum will occur should plants be removed.</p>	Quarry Production Manager or their delegate.	Landowner

Management action	Performance targets	Risks	Mitigation measures	Triggers	Remedial actions if target not achieved	Responsible party	
						Quarry life	Post quarry
4. Collection and propagation of seed	<p>Appointment of a suitably qualified provenance plant supplier such that the genetic integrity, structure and composition of native vegetation and silver-leaved mountain gum is maintained within the locality.</p> <p>Supply of healthy tubestock to site as per specification (Section 3.6) and list in Appendix B.</p>	Supply of healthy, local provenance tubestock compromised.	Collection of additional reserve local provenance seed to be stored and germinated should initial germination fail.	Healthy, local provenance tubestock in required densities not available.	Contract with supplier to be renegotiated should provenance plants of the species listed in Appendix B, or closely related local surrogates, not be supplied.	Contractor	<p>Landowner</p> <p>Contractor</p>
5. Replanting of silver-leaved mountain gum and associated locally native tubestock in rehab areas	<p>Installation of tubestock to specification (Section 3.6) and regular inspections for first month. Inspection thereafter would occur at three, six and 12 months post planting during the first year and in spring every second year thereafter for the life of the approval.</p> <p>85% survival of tubestock after one year.</p> <p>Maintain 85% survival rate of plantings in subsequent years.</p>	Tubestock fail.	As above, additional local provenance seed would be collected so additional tubestock can be germinated to replace losses.	Tubestock survival rate drops below 85%.	<p>Failed, damaged or stolen plants will be replaced within seven days of each maintenance inspection, or as soon as suitable tubestock is available..</p> <p>Replacement of tubestock to necessary levels if survival rate drops below 85%.</p>	<p>Quarry Production Manager for regular inspections in first 12 months</p> <p>Contractor for biennial inspections.</p>	<p>Landowner</p> <p>Contractor</p>
6. Weed management	<p>Weed maintenance would occur twice yearly</p> <p>Engagement of suitably qualified conservation management specialist to implement maintenance weed management, prioritising noxious weed and perennial exotic grass control.</p>	Weed maintenance not successful and weed density increases.	Review of weed control methods and frequency if satisfactory weed suppression (less than 5% PFC in all structural layers) is not achieved and maintained by year three.	Weed density increases or not maintained at less than 5% PFC in all structural layers by year three.	<p>Weed management activities to be reviewed and increased in frequency until target of less than 5% PFC in all structural layers is achieved and maintained.</p> <p>Contract with supplier to be renegotiated should not be achieved satisfactorily.</p>	<p>Quarry Production Manager</p> <p>Contractor</p>	<p>Landowner</p> <p>Contractor</p>

Management action	Performance targets	Risks	Mitigation measures	Triggers	Remedial actions if target not achieved	Responsible party	
						Quarry life	Post quarry
	<p>Citation of relevant qualifications and experience.</p> <p>Suppression of noxious weeds and perennial exotic grasses on an on-going basis to less than 5% of percentage foliage cover (PFC) in all structural layers.</p>						
7. Feral animal monitoring	Negligible impacts from feral herbivores on native vegetation silver-leaved mountain gum either within the BOA or in the rehabilitation areas.	Herbivory activities impact on plant success and germination/ recruitment in BOA or rehabilitation areas.	Consultation with the land owner and as required Central Tablelands Local Land Services or OEH in regards to regional baiting programs.	Successful establishment of tubestock falls below 85% and herbivory is a major contributor to failure.	Trapping and removal, or shooting, of feral herbivores from site if detected and impacting on native vegetation and/or silver-leaved mountain gum specimens	Quarry Production Manager or their delegate.	Landowner Contractor
8. Management of native fauna habitat	<p>Logs and large trees salvaged from disturbance area utilised to augment habitat in existing and future rehabilitation areas. Materials not required for BOA.</p> <p>There is no requirement for ongoing fauna surveys or fauna monitoring in the BOA, as offsets are not required for threatened fauna.</p>	Rehabilitation areas are not suitable fauna habitat areas.	Suitably qualified and experienced ecologist engaged to conduct pre-clearing surveys.	<p>Useful habitat features not salvaged and not utilised to improve fauna habitat in rehabilitation areas.</p> <p>Pre clearing surveys not conducted prior to clearing activity</p>	Ensure engagement of suitably qualified and experienced ecologist to conduct pre-clearing surveys and supervise placement of logs and large trees.	<p>Quarry Production Manager or their delegate.</p> <p>Contract Ecologist</p>	-

Management action	Performance targets	Risks	Mitigation measures	Triggers	Remedial actions if target not achieved	Responsible party	
						Quarry life	Post quarry
9. Fire regime	<p>Clear positive outcome for silver-leaved mountain gum demonstrated from first managed burn.</p> <p>Exclusion of wildfire and provide information to RFS for inclusion of silver-leaved mountain gum locations in bushfire risk management plans, risk register and/or operations maps.</p> <p>Managed burning will be excluded from all rehabilitation areas.</p>	<p>Managed fire regime has negative impact on silver-leaved mountain gum population</p> <p>Wildfire or prescribed burn not contained to planned burn area.</p>	Engage and consult with RFS on all prescribed burns.	Monitoring of first managed burn indicates that implemented fire regime (described in Section 3.10) is not producing a positive outcome for the silver-leaved mountain gum population.	<p>A qualified ecologist will be commissioned to review the regime and recommend changes.</p> <p>Should wildfire affect the site, close monitoring of the response of remnant core and non-core silver-leaved mountain gum will occur.</p> <p>Replant silver-leaved mountain gum if individuals in rehabilitation areas are destroyed by wildfire.</p>	<p>Quarry Production Manager or their delegate</p> <p>RFS</p> <p>Contract Ecologist</p>	<p>RFS</p> <p>Contract Ecologist</p>
10. Exclusion zones and contractor awareness	Exclusion of stock, staff, contractors, plant and machinery from BOA and rehabilitation areas except where required for maintenance and inspection purposes.	Inappropriate access or activities undertaken within BOA and rehabilitation areas	Control access to the BOA through the use of fencing, signage and gates.	Evidence or inappropriate access or activities undertaken within BOA and rehabilitation areas.	Staff and contractor education where transgression has occurred. Disciplinary action will be commenced as per Hy-Tec's guidelines for further transgressions (other than for approved access)..	Quarry Production Manager or their delegate	Landowner
11. Monitoring of silver-leaved mountain gum within BOA	<p>Engage suitably qualified and experienced ecologist to implement monitoring program as specified in Section 4.1.</p> <p>Ecologist to report to DoEE on results for each monitoring event, continuing for the life of the approval.</p> <p>Maintenance of healthy remnant population in the BOA. Performance target tied to stable or increasing population of silver-leaved mountain gum within BOA and the health of the plants.</p>	Failure to maintain a healthy remnant population in the BOA.	Appropriate changes to relevant management plans in consultation with OEH to achieve stable or increasing population of silver-leaved mountain gum within BOA.	Monitoring program shows decreasing population of silver-leaved mountain gum.	Appropriate remedial action to be determined in consultation with OEH and DoE upon detection of a decline in the silver-leaved mountain gum population.	<p>Quarry Production Manager or their delegate</p> <p>Contract Ecologist</p> <p>DoE and OEH</p>	<p>Landowner</p> <p>Contract Ecologist</p> <p>DoE and OEH</p>

5. Conclusion

This document, the Biodiversity Offset Management Plan (BOMP), has been prepared in accordance with the Condition 3 of EPBC Act Approval 2013/6967 issued by the DoE on 19 October 2015, as well as to address specific requirements of Condition 29 of SSD-6084 issued by the DPE on 15 July 2015, for the Austen Quarry Stage 2 Extension.

An ecological assessment of the site was completed by Niche in 2014 as part of the EIS for the Stage 2 Extension. During the ecological surveys for the EIS, a significant local population of the threatened plant silver-leaved mountain gum (*Eucalyptus pulverulenta*) was identified, of which 721 individuals will be removed as a result of the Stage 2 Extension and are required to be offset. This offset is located on the adjacent bushland where 1,850 individuals will be conserved into perpetuity in the BOA. An estimated 755 previously planted individuals will continue to be conserved in existing locations throughout the quarry lease and a further 1,000 individuals are required to be planted.

This BOMP describes the actions that will be undertaken to ensure the security, protection, conservation, management and monitoring of the native vegetation, fauna habitats and remnant and planted occurrences of silver-leaved mountain gum throughout the BOA. These actions include:

- Securing the BOA, including Conservation Area H (DA 103 194), under a Nature Conservation Trust agreement or other agreed arrangement ;
- Maintenance of existing fences to exclude stock from the BOA;
- Permanent exclusion of stock, staff contractors, plant and equipment from both the BOA and an associated replanting area except where required for maintenance and inspection purposes ;
- Collection and propagation of locally native tubestock;
- Planting within a replanting area to a defined specification (refer to Section 3.6 and **Appendix B**);
- On-going weed management targeting noxious weeds and exotic perennial grasses;
- Monitoring the BOA and replanting area for feral herbivores;
- Implementation of an ecological burning regime to suit the native vegetation of the site and the on-going conservation of silver-leaved mountain gum; and
- Monitoring of the health of the remnant core and non-core occurrences of silver-leaved mountain gum within the BOA.

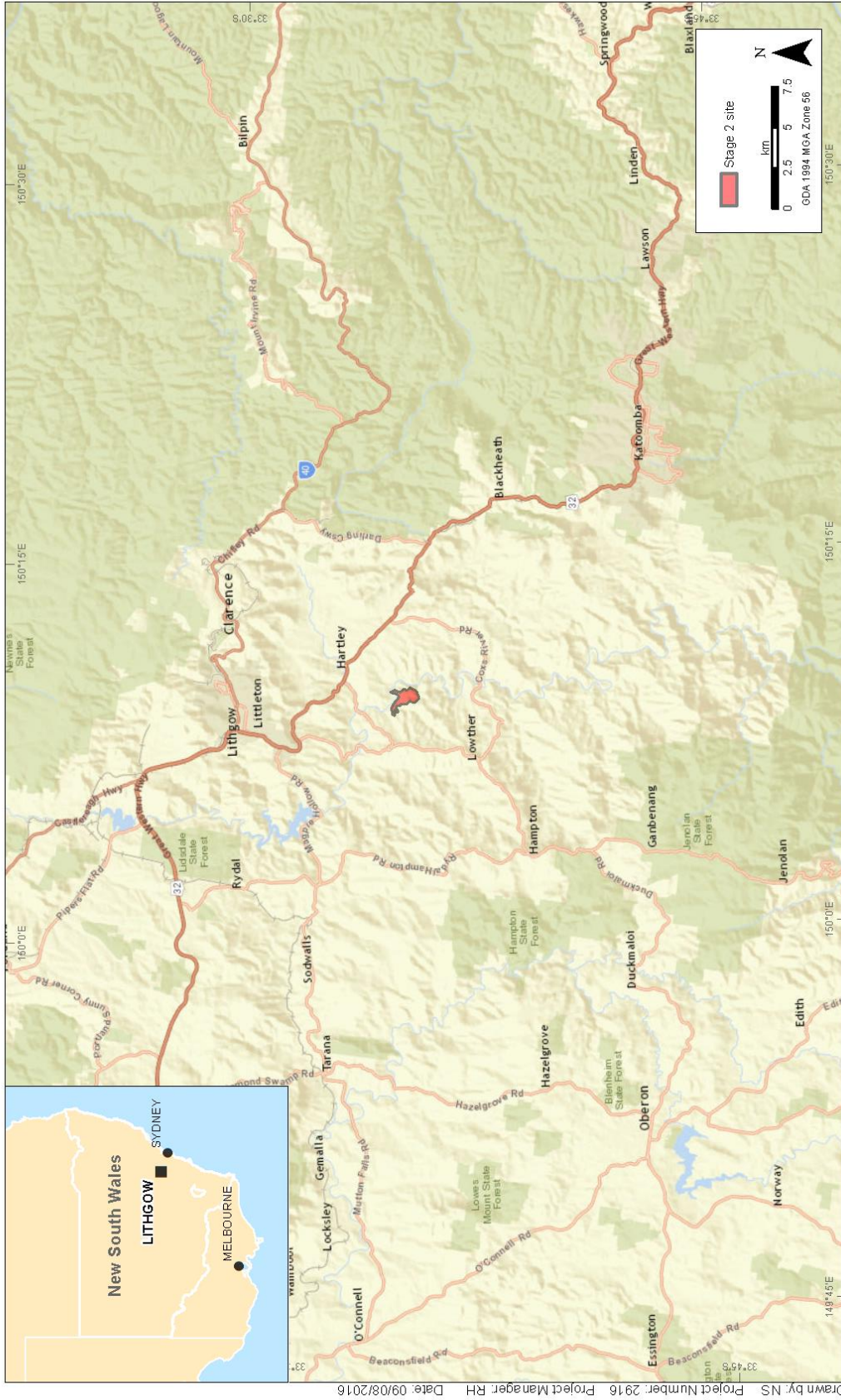
Each of these actions will be evaluated against relevant performance targets described in Section 4.3 and assigned to various parties for implementation.

Implementation of this BOMP will ensure the long term conservation of the native vegetation, fauna habitats and remnant and planted occurrences of silver-leaved mountain gum throughout the BOA, the rehabilitation areas and within the broader locality.

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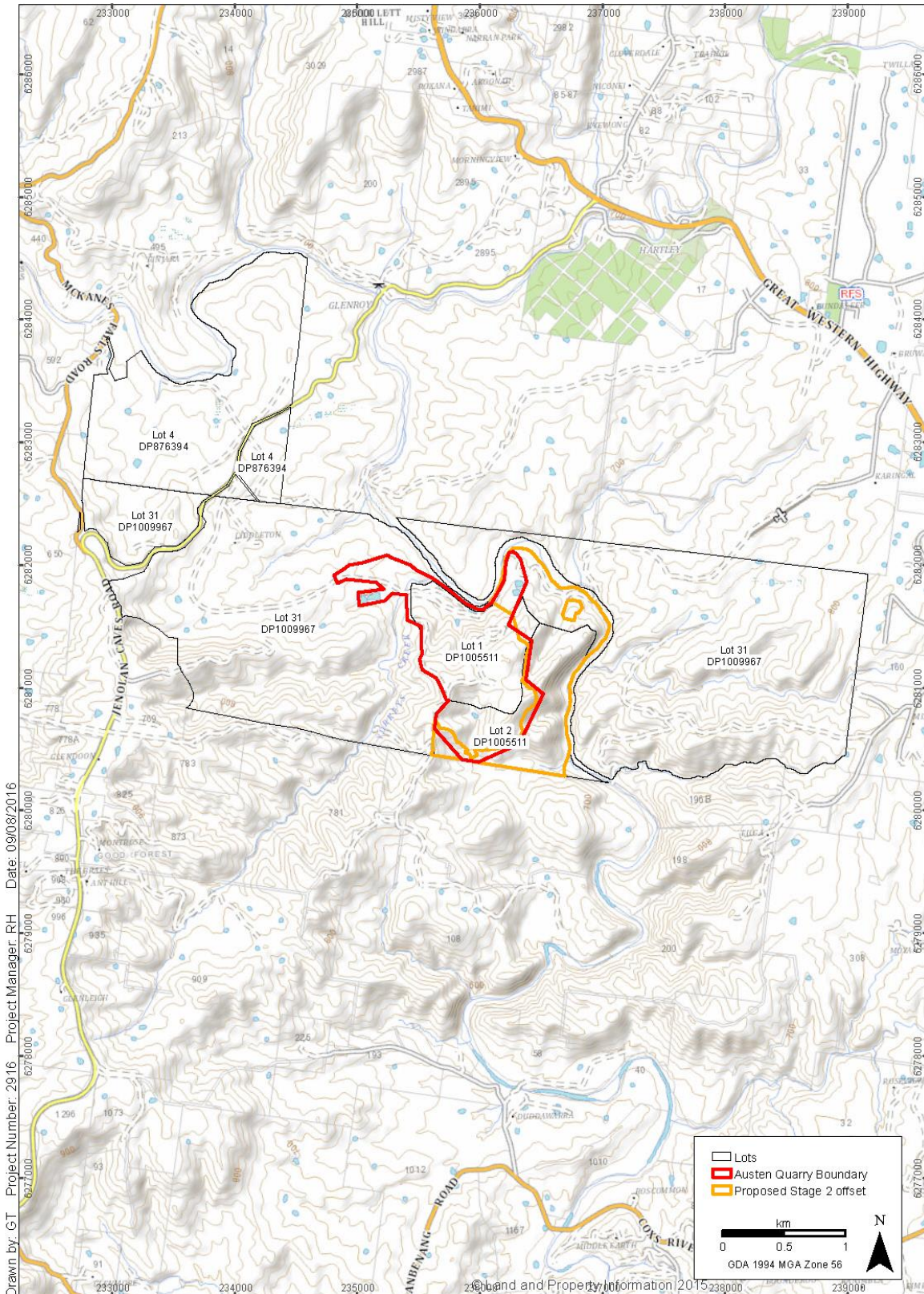
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FIGURES



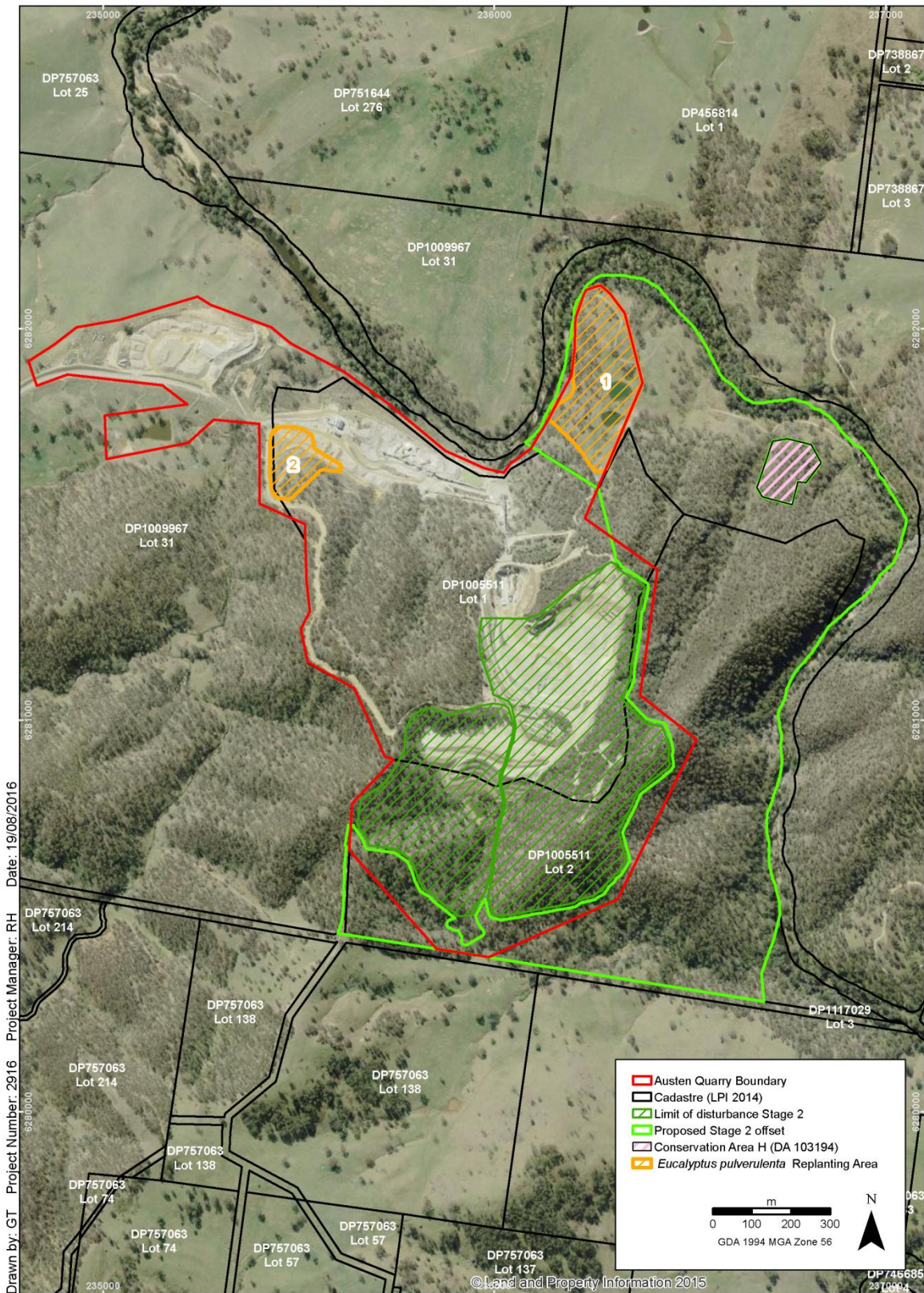
Location of Austen Quarry in a regional context
Austen Quarry Stage 2 Extension BOIMP
FIGURE 1

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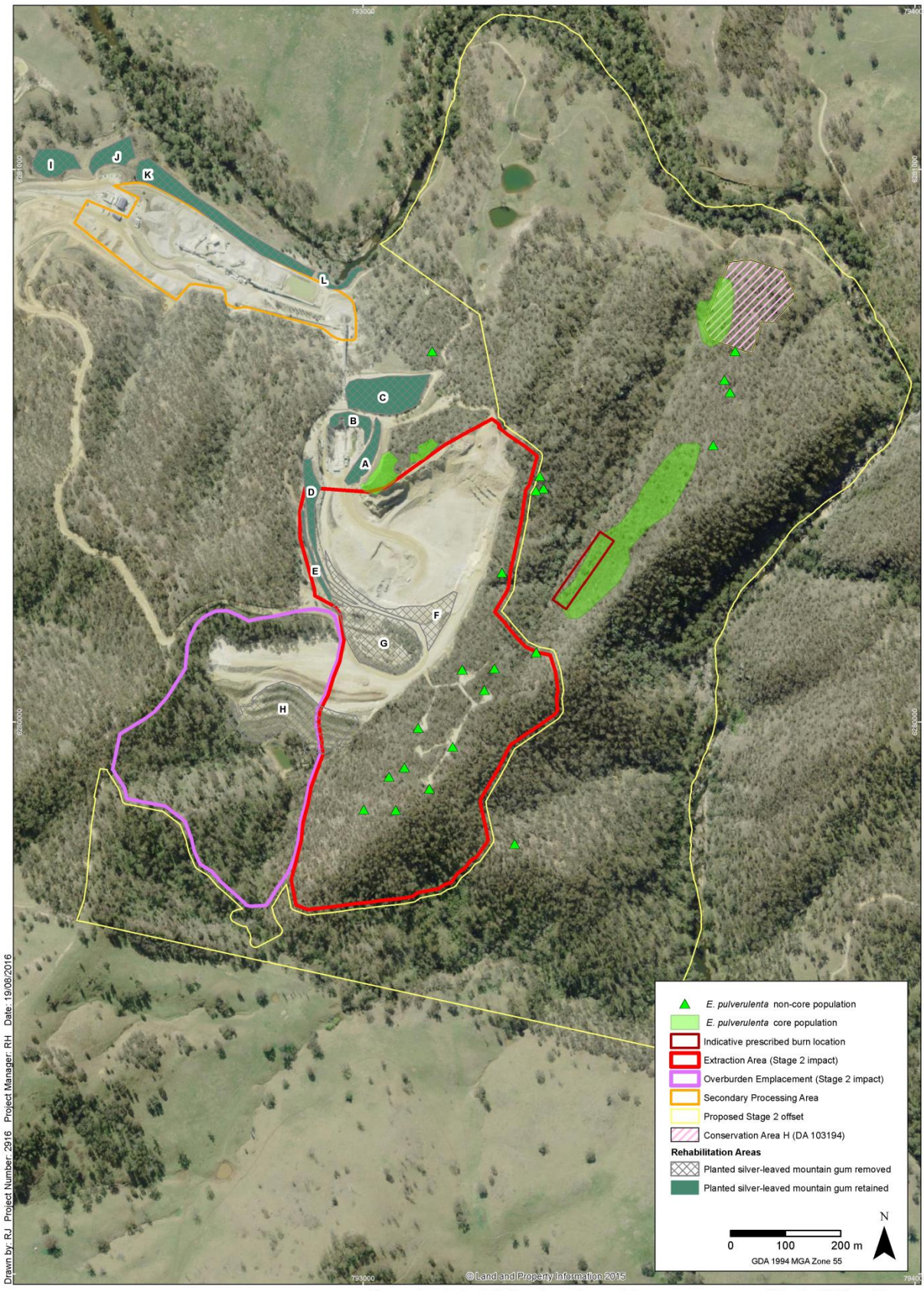


Drawn by: GT Project Number: 2916 Project Manager: RH Date: 09/08/2016

Subject Area and access
Austen Quarry BOMP



Proposed silver-leaved mountain gum replanting (from Schedule 2 DoEE conditions)
Austen Quarry Stage 2 Extension BOMP

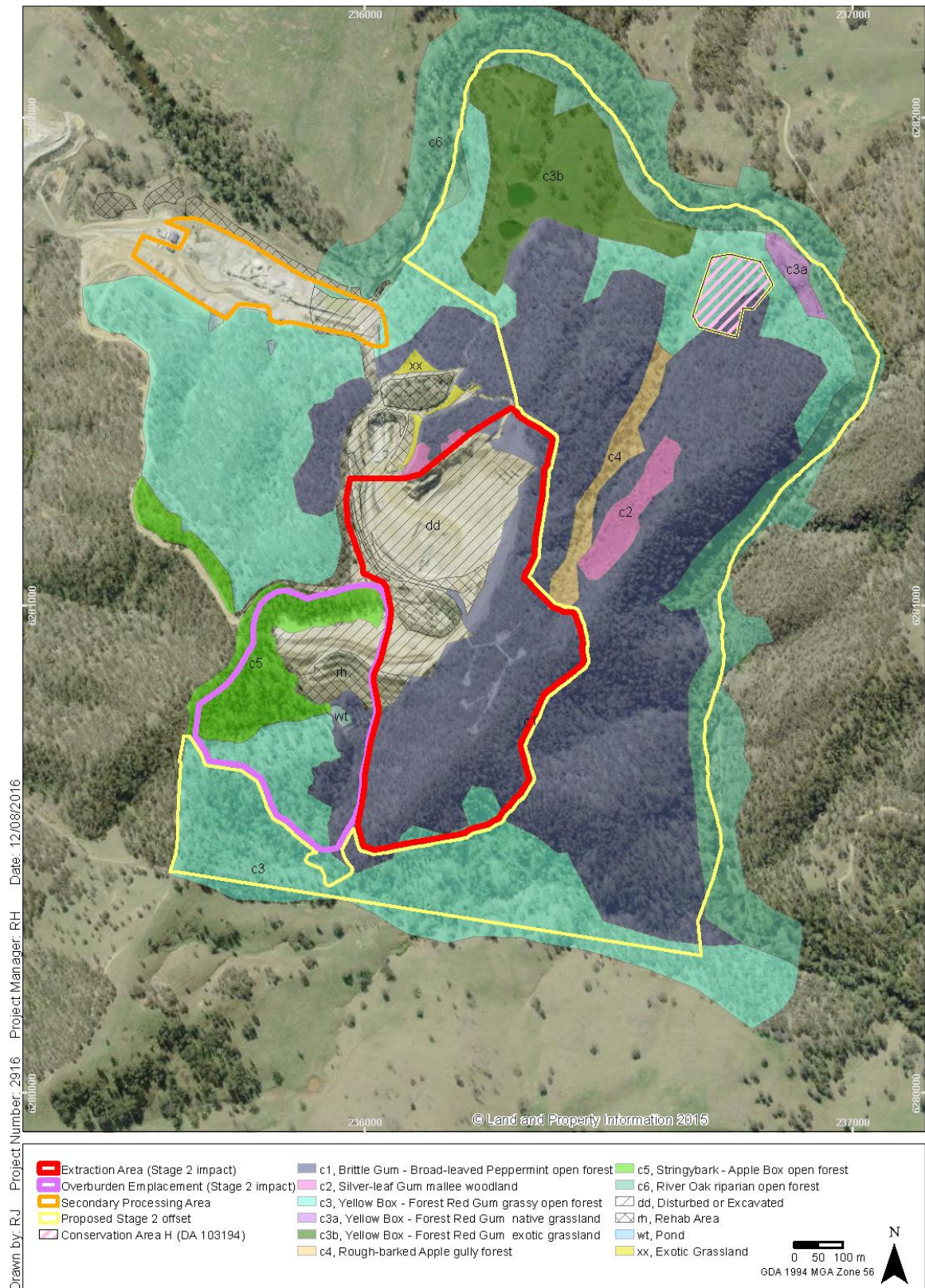


Remnant and planted silver-leaved mountain gum occurrences within the BOA and Quarry

Austen Quarry Stage 2 Extension BOMP

FIGURE 4

Imagery: (c) LPI 2013-09-03



Native vegetation of Austen Quarry and the BOA

Austen Quarry BOMP

APPENDICES

Appendix A: Biodiversity Impact Assessment for the Austen Quarry Stage 2 Extension Project

Appendix B: Planting schedule for rehabilitation areas

Family	Species	Common name
Trees (1 plant per 25 m², 5m x 5m)		
Myrtaceae	<i>Eucalyptus pulverulenta</i>	Silver-leaved mountain gum
Shrubs (1 plant per 1 m²)		
Fabaceae (Faboideae)	<i>Daviesia acicularis</i>	
Fabaceae (Faboideae)	<i>Hovea linearis</i>	
Fabaceae (Mimosoideae)	<i>Acacia buxifolia</i>	Box-leaved wattle
Asteraceae	<i>Ozothamnus diosmifolius</i>	White dogwood
Ground covers and grasses (2 per 1 m²)		
Chenopodiaceae	<i>Einadia hastata</i>	Berry saltbush
Cyperaceae	<i>Carex appressa</i>	Tall sedge
Cyperaceae	<i>Lepidosperma laterale</i>	Variable sword-sedge
Geraniaceae	<i>Geranium homeanum</i>	
Geraniaceae	<i>Geranium solanderi</i>	Native geranium
Haloragaceae	<i>Gonocarpus teucrioides</i>	Germander raspwort
Juncaceae	<i>Juncus usitatus</i>	
Lamiaceae	<i>Plectranthus parviflorus</i>	
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed mat-rush
Phormiaceae	<i>Dianella caerulea</i> var. <i>producta</i>	Blue flax-lily
Poaceae	<i>Austrodanthonia tenuior</i>	A wallaby grass
Poaceae	<i>Austrostipa scabra</i>	Speargrass
Poaceae	<i>Bothriochloa macra</i>	Red grass
Poaceae	<i>Cymbopogon refractus</i>	Barbed wire grass
Poaceae	<i>Imperata cylindrica</i>	Blady grass
Poaceae	<i>Microlaena stipoides</i>	Weeping grass
Poaceae	<i>Poa sieberiana</i>	Snowgrass
Poaceae	<i>Themeda australis</i>	Kangaroo grass

Appendix C: Standard treatments for key target weed species

Species	NW Act*	WONS**	Covered by KTP (Y/N)	Management		
				Primary	Secondary	Maintenance
<i>Cirsium vulgare</i> Spear Thistle	-	-	N	Handweed Spot Spray	Handweed Spot Spray	Spot Spray
<i>Cynodon dactylon</i> Couch	-	-	Y (exotic perennial grass)	Slash Spray	Slash Spray	Spray Handweed
<i>Echium plantagineum</i> Patersons Curse	4		N	Spot Spray Handweed	Spot Spray Handweed	Spot Spray Handweed
<i>Eragrostis curvula</i> African Love Grass	-	-	Y (exotic perennial grass)	Slash Spray Handweed Mechanical Removal	Spray	Handweed Spot Spray
<i>Erharta erecta</i> Panic Veldtgrass	-	-	N	Spray	Spray	Spray Handweed
<i>Hypericum perforatum</i> St Johns Wort	4		N	Spot Spray Handweed	Spot Spray Handweed	Spot Spray Handweed
<i>Lycium ferocissimum</i> African Boxthorn	4	X	N	Mechanical Removal Drill Scrape-and-paint stems Slash Spray	Cut-and-paint Spray	Handweed Spray
<i>Nasella trichotoma</i> Serrated Tussock	4	X	Y (exotic perennial grass)	Slash Spray Handweed Mechanical Removal	Spray	Handweed Spot Spray
<i>Onopordum</i> spp. Scotch Thistle	4	-	N	Cut-and-paint Spray	Spray	Spray
<i>Opuntia</i> spp. Prickly Pear	4	X	N	Biological (natural) Mechanical Removal	Handweed	Handweed
<i>Pennisetum clandestinum</i> Kikuyu	-	-	Y (exotic perennial grass)	Mechanical Removal Spray	Spray	Spray Handweed
<i>Rubus fruticosus</i> agg. Blackberry	4	X	Y (exotic vines and scramblers)	Slash Spray Mechanical Removal	Spray Handweed	Handweed
<i>Sida rhombifolia</i> Paddy's Lucerne	-	-	N	Cut-and-paint Handweed	Handweed	Spot Spray Handweed
<i>Silybum marianum</i> Variegated Thistle	-	-	N	Cut-and-paint Spray	Spray	Spray
<i>Solanum nigrum</i> Blackberry Nightshade	-	-	N	Handweed Spray	Handweed Spray	Handweed Spray
<i>Sonchus oleraceus</i> Common Sowthistle	-	-	N	Spray	Spray	Spot Spray Handweed
<i>Verbena bonariensis</i> Purple Top	-	-	N	Handweed Cut-and-paint Spray Slash	Spray Handweed	Handweed

Appendix D: Fauna species list (Niche 2014)

Common name	Species	Study Area	River and water bodies only	Subject Site
Amphibians				
Brown-striped Frog	<i>Limnodynastes peronii</i>	x		
Common Eastern Froglet	<i>Crinia signifera</i>			x
Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>		x	
Smooth Toadlet	<i>Uperoleia laevigata</i>			x
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>			x
Verreaux's Frog	<i>Litoria verreauxii</i>	x		
Birds				
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>		x	
Australian Magpie	<i>Cracticus tibicen</i>	x		x
Australian Raven	<i>Corvus coronoides</i>	x		x
Australian Wood Duck	<i>Chenonetta jubata</i>		x	
Bell Miner	<i>Manorina melanophrys</i>	x		x
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	x		x
Brown Falcon	<i>Falco berigora</i>			x
Brown Thornbill	<i>Acanthiza pusilla</i>	x		x
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	x		x
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	x		x
Crimson Rosella	<i>Platycercus elegans</i>	x		x
Eastern Whipbird	<i>Psophodes olivaceus</i>	x		
Eurasian Coot	<i>Fulica atra</i>		x	
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	x		
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	x		
Grey Butcherbird	<i>Cracticus torquatus</i>	x		x
Grey Fantail	<i>Rhipidura albiscapa</i>	x		x
Grey Teal	<i>Anas gracilis</i>		x	
Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>			x
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	x		
Masked Lapwing	<i>Vanellus miles</i>	x		
Noisy Friarbird	<i>Philemon corniculatus</i>			x
Pacific Black Duck	<i>Anas superciliosa</i>	x		
Pied Currawong	<i>Strepera graculina</i>			x
Powerful Owl	<i>Ninox strenua</i>	x		
Red Wattlebird	<i>Anthochaera carunculata</i>			x
Red-browed Finch	<i>Neochmia temporalis</i>	x		x
Rufous Whistler	<i>Pachycephala rufiventris</i>	x		x
Sacred Kingfisher	<i>Todiramphus sanctus</i>	x		
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	x		
Scarlet Robin	<i>Petroica boodang</i>	x		x
Silvereye	<i>Zosterops lateralis</i>			x
Spotted Pardalote	<i>Pardalotus punctatus</i>			x
Spotted Quail-thrush	<i>Cinclosoma punctatum</i>	x		
Striated Pardalote	<i>Pardalotus striatus</i>			x
Striated Thornbill	<i>Acanthiza lineata</i>			x
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	x		
Superb Fairy-wren	<i>Malurus cyaneus</i>			x
Tawny Frogmouth	<i>Podargus strigoides</i>			x

Common name	Species	Study Area	River and water bodies only	Subject Site
Wedge-tailed Eagle	<i>Aquila audax</i>	x		
Weebill	<i>Smicromis brevirostris</i>			x
White-eared Honeyeater	<i>Lichenostomus leucotis</i>			x
White-necked Heron	<i>Ardea pacifica</i>		x	
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>			x
White-throated Treecreeper	<i>Cornobates leucophaea</i>	x		x
White-winged Chough	<i>Corcorax melanorhamphos</i>	x		x
Willie Wagtail	<i>Rhipidura leucophrys</i>			x
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	x		x
Yellow-plumed Honeyeater	<i>Lichenostomus ornatus</i>	x		
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>			x
Mammals				
Brown Antechinus	<i>Antechinus stuartii</i>			x
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	x		x
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	x		x
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	x		
Common Wallaroo	<i>Macropus robustus</i>	x		
Common Wombat	<i>Vombatus ursinus</i>			x
Dog*	<i>Canis lupus familiaris</i>	x		
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	x		
Eastern Broad-nosed Bat	<i>Scotorepens orion</i>			
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	x		
Fox*	<i>Vulpes vulpes</i>			x
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	x		x
Large Forest Bat	<i>Vespadelus darlingtoni</i>	x		x
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>			x
Little Forest Bat	<i>Vespadelus vulturinus</i>			x
Rat*	<i>Rattus sp.</i>			x
Red-necked Wallaby	<i>Macropus rufogriseus</i>	x		
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	x		
Southern Forest Bat	<i>Vespadelus regulus</i>	x		x
Sugar Glider	<i>Petaurus breviceps</i>			x
Swamp Wallaby	<i>Wallabia bicolor</i>	x		x
White-striped Free-tailed Bat	<i>Tadarida australis</i>	x		x
Nyctophilus	<i>Nyctophilus sp.</i>	x		x
Reptiles				
Blackish Blind Snake	<i>Ramphotyphlops nigrescens</i>			x
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>			x
Dark-flecked Garden Sunskink	<i>Lampropholis delicata</i>	x		x
Eastern Brown Snake	<i>Pseudonaja textilis</i>	x		
Eastern Snake-necked Turtle	<i>Chelodina longicollis</i>		x	
Eastern Water Dragon	<i>Physignathus lesueurii</i>		x	
Eastern Water-skink	<i>Eulamprus quoyii</i>	x		
Lace Monitor	<i>Varanus varius</i>	x		
Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>	x		
Robust Ctenotus	<i>Ctenotus robustus</i>	x		x

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