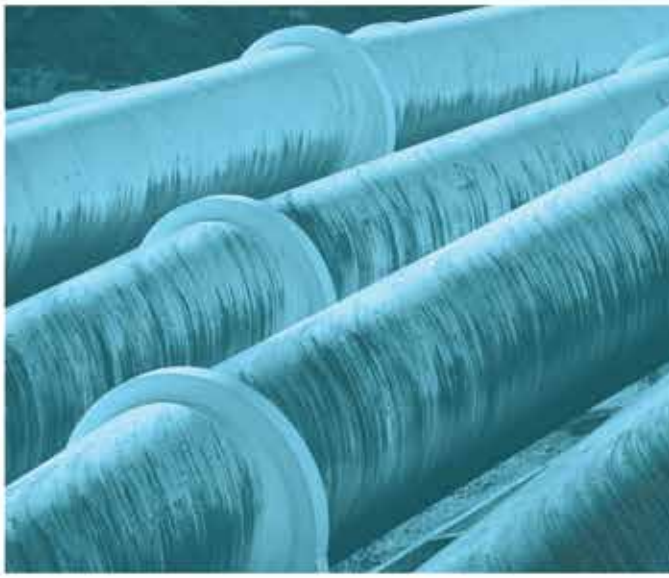



Mugga Quarry – Environmental Management Plan

Mugga Quarry Overburden Expansion Project, EPBC 2018/8151

Prepared for Boral Resources (Country) Pty Ltd
April 2021

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Mugga Quarry – Environmental Management Plan

Mugga Quarry Overburden Expansion Project, EPBC 2018/8151

Report Number

J17174 RP1

Client

Boral Resources (Country) Pty Ltd

Date

6 April 2021

Version

v7 Final

Prepared by

David Bone
Associate Director
6 April 2021

Approved by

Paul Gibbons
Director
6 April 2021

Declaration of accuracy

In making this declaration, I am aware that:

a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

b. Section 491 of the EPBC Act makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both.

I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed

Full name (please print) Shoanne Labowitch

Organisation (please print) Boral Resources (Country) Pty Ltd

Date 1 April 2021

Document Control

Version	Date	Prepared by	Reviewed by
1.0	14/11/2019	C. Douchkov & B. Rice	P. Gibbons
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1 Introduction

In accordance with conditions 18 to 20 of *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) Approval (EPBC 2018/8151), this Environmental Management Plan (EMP) has been updated to reflect the final construction footprint of the Mugga Overburden Expansion Project (the project).

Boral Resources (Country) Pty Ltd (Boral) have determined that taking the new action in accordance with this updated EMP will have an increased impact for the project (condition 18, PBC 2018/8151), which will be appropriately offset through the retirement of further biodiversity offset credits.

1.1 Project description

This EMP has been prepared by EMM Consulting Pty Ltd (EMM), on behalf of Boral, in relation to construction phase impacts associated with the project at 321 Mugga Lane, Symonston, Australian Capital Territory (ACT).

The project involves the establishment of a new permanent overburden bund and temporary emplacement area to store quarried overburden and weathered rock material. Overburden and unsuitable weathered rock would be removed from within Boral's existing Mugga Quarry approved quarry footprint to enable extraction of higher quality hard rock beneath.

The overburden material will be used to construct a permanent bund, while the weathered rock material will be stored in a temporary emplacement area and progressively blended into other quarry products to produce concrete and asphalt aggregates.

The new bund and emplacement area will be located to the north and east of the approved quarry pit extent between Mugga Lane and Callum Brae Nature Reserve within the approved extractive industry lease area of 106.4 hectares (ha).

Figure 1.1 shows the extent of the project in relation to the current quarrying activities.

This EMP has been prepared to address the requirements of conditions 6a to 6j and 18 to 20 of the EPBC determination 2018/8151 and describes the mitigation and management measures required for the project.

A separate EMP and sub-plans will be prepared by Boral in accordance with ACT government approval requirements that will cover the operational phase environmental mitigation measures for the duration of the quarry project.

1.2 Purpose and objectives

The purpose of this EMP is to describe how Boral proposes to manage potential impacts to biodiversity in accordance with conditions 6a to 6j of the EPBC approval conditions and commitments from the Mugga Quarry Overburden Expansion Project EPBC Act Referral (EPBC 2018/8151) Preliminary Documentation (EMM 2019) and Mugga Quarry Overburden Expansion Project Environmental Impact Statement (EIS) (EMM 2019).

The key objective of the EMP is to avoid and mitigate potential indirect impacts on Box Gum Woodland as a result of construction. To achieve this objective, the following will be undertaken:

- Ensure practical controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to Box Gum Woodland within, and adjacent to, the project.
- Ensure appropriate measures are implemented to address requirements detailed in the EPBC referral approval.
- Control the sequential removal of site vegetation in accordance with approvals and best practice protocols.

- Contain any clearing on-site to areas designated as being cleared, whilst identifying any vegetation to be retained for ongoing flora and fauna habitat and connectivity.
- Have minimal impact upon native fauna that may be present on-site.
- Comply with all conditions imposed within approvals.
- Outline management activities, responsibility, targets, reporting, and corrective actions.
- Achieve environmental management expectations of the community, government, and the proponent.

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KEY

- Site location - 321 Mugga Lane, Symonston
- Total disturbance area
- Approved pit extent
- Proposed new permanent overburden bund
- Proposed temporary emplacement area
- 1 Asphalt plant
- 2 Concrete batching plant
- 3 Quarry
- 4 Recycling facility
- Electricity transmission line
- Main road
- Local Road
- Block boundary
- ACT reserve

Project plan

Boral - Mugga Quarry overburden expansion
Environmental management plan
Figure 1.1

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2 Legislative requirements

2.1 EPBC Act conditions

Legislative requirements for this EMP arise from conditions 6a to 6j of EPBC Referral 2018/8151. The condition and section of this plan where each condition is addressed is outlined in included Table 2.1 below.

Table 2.1 Conditions of approval reference table

Ref	Cond.	Condition requirement	Plan reference	Demonstration of how the plan addresses condition requirements
1	6	The EMP must be consistent with the Department's *Environmental Management Plan Guidelines*	Entire Plan	This plan has been written in accordance with Departmental EMP guidelines
2	6a	The EMP must include the EMP environmental objectives, relevant to Box Gum Woodland and a reference to EPBC Act approval conditions to which the EMP refers	Section 1.0	Objectives of the EMP are provided in Section 1.0
3	6b	The EMP must include a table of commitments made in the EMP to achieve the objectives, and a reference to where the commitments are detailed in the EMP	Section 4.0	Environmental management measures are detailed throughout Section 4.0
4	6c	The EMP must include the details of the parties responsible for undertaking management actions	Section 5.0	Roles and Responsibilities are detailed in Section 5.1
5	6d	The EMP must include a description of management actions that will be implemented pre, during and post construction, including for stormwater discharge and road runoff, sediment and erosion control, invasion by exotic species and weeds, and fencing and access	Section 4.0	Environmental management measures are detailed throughout Section 4.0
6	6e	The EMP must include hygiene protocols to minimize the risk of spread of *Phytophthora cinnamomi*	Section 4.4	Measures for Pathogen management are described in Section 4.4
7	6f	The EMP must include reporting and review mechanisms, and documentation standards to demonstrate compliance with the EMP	Section 6.0	Section 6.0 details compliance management, including training, auditing and reporting processes
8	6g	The EMP must include an assessment of risks to achieving the EMP environmental objectives and risk management strategies that will be applied	Section 4.0	Section 4.1 details the various risk assessments completed as part of the project EIS.
9	6h	The EMP must include impact avoidance, mitigation and/or repair measures, and their timing	Section 3.0	Section 3.0 includes a discussion of the predicted impacts prior to the utilisation of impact avoidance, minimisation and mitigation measures through project design phase and incorporated in the project EIS

Table 2.1 Conditions of approval reference table

Ref	Cond.	Condition requirement	Plan reference	Demonstration of how the plan addresses condition requirements
10	6i	The EMP must include a monitoring program, which must include: i. Measurable performance indicators ii. Trigger values for corrective actions iii. The timing and frequency of monitoring to detect changes in the performance indicators and timely detection of trigger values	Section 5.0	Section 5.0 details the proposed monitoring program
11	6j	The EMP must include proposed corrective actions, if trigger values are reached	Section 6.7	Includes corrective action requirements in the event of non-compliance or incident

3 Predicted impacts

3.1 Ecological impacts

The project involves the establishment of a new permanent overburden bund and temporary emplacement area to store quarried overburden and weathered rock material. Emplacement out of the pit on adjoining quarry land has been considered the most viable solution for the emplacement of overburden and weathered rock, given the shortest haulage distance. It also means the weathered rock material can be later blended and re-used, instead of simply being applied to land. The vegetation surveys, topography and stormwater capture requirements have further refined the design of the emplacement to minimise its environmental footprint.

The original design proposed all overburden material placement outside the quarry pit, on surface, requiring up to 12.17 ha of Yellow Box - Red Gum Grassy Woodland (YBRGGW)/Box Gum Woodland to be removed. Given potential ecological impacts and Pre-EPBC Referral discussions, to reduce potential ecological impacts the following design parameters were considered:

- Final Mugga Quarry pit extent.
- Topography and site contours.
- Final surface water sedimentation dam locations.
- Original overburden design contours.
- Potential alternative overburden location(s).

The outcome of the initial design was an alternative overburden placement that included both in pit and on surface emplacements requiring a total vegetation clearance of 7.28 ha. During construction however, Boral re-designed the final shape and location of the sediment basins. The outcome of the re-design has resulted in altered clearing amounts for the various vegetation types (see Figure 4.1), comprising:

- 0.5 ha of cleared vegetation;
- 0.60 ha of Red Stringybark Tableland Grass/Shrub Forest;
- 2.71 ha YBRGGW/Box Gum Woodland (moderate condition);
- 2.81 ha YBRGGW/Box Gum Woodland (low condition); and
- 1.55 ha YB-RGGW (very low condition).

The re-designed sediment basins and surface water controls required 8.17 ha of vegetation clearing, an increase of 0.89 ha over the original 7.28 ha of vegetation to be cleared. As a result, the change to the clearing of YBRGGW/Box Gum Woodland, comprising patches in moderate and low condition (EPBC condition 2) is 5.52 ha an increase of 0.79 ha over the approved 4.73 ha. As a result of this increase in impacts identified, Boral conducted detailed surveys of the disturbance footprint, as required in Section 4, Table 4.6 of this management plan. Based on the survey data supplied, the result shows that impacts to Red Stringybark Tableland Grass/Shrub Forest has been reduced by 0.2 ha with impacts on the YBRGGW/Box Gum Woodland increasing by 1.04 ha.

Boral have determined that the increased impact for the project (condition 18, PBC 2018/8151) will be appropriately offset through the retirement of further biodiversity offset credits.

Figure 3.1 outlines the location of vegetation communities which intersect with the final project footprint. Figure 3.2 provides the location of nineteen (19) hollow bearing trees and habitat features from the EIS and three (3) additional hollow bearing trees recorded by Capital Ecology during the pre-clearance survey completed (Appendix C). It is noted that an additional existing hollow-bearing tree fell during a storm event on 20 August 2020 (Appendix D).

i Weed invasion

There is potential for increased weed invasion into retained vegetation adjacent to the project area. Potential for a reduction in the condition of retained vegetation has been accounted for in the assessment of the residual impact arising from the project by including a 30 m buffer in the project design, with reductions in groundcover scores and exotic cover scores assumed.

ii Spread of root rot fungus

Root rot fungus (Phytophthora cinnamomi) is an introduced plant root pathogen that can cause dieback within vegetation communities. The project is not expected to contribute any additional foot or vehicle movement outside the project disturbance footprint. It is, therefore, highly unlikely that the project will increase the possibility of the introduction of root rot fungus (Phytophthora cinnamomi) into the area.

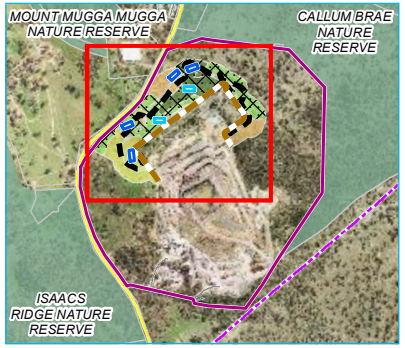
Therefore, impacts to adjacent biodiversity values are predicted to be minimal.

3.2 Changed hydrology

Hydrology, particularly surface water, has been assessed for the project via the project EIS. This assessment investigated potential surface water impacts and details the proposed concept design for stormwater collection and treatment via sedimentation dams.

All basins are contained within the project disturbance footprint and have been assessed as a direct impact.

The sedimentation basins have been designed and evaluated hydraulically using a 1 in 10 year 24 hour storm, and a 1 in 100 year 1 hour storm over the catchments. As the sedimentation basins will capture the initial 15 mm of runoff from each rainfall event it is expected that the frequency of stream flows in the immediate receiving waters will reduce. The magnitude of this change will progressively diminish in downstream sections of waterways as the contributing catchment area increases.



KEY

- Site location - 321 Mugga Lane, Symonston
- Total disturbance area
- Approved pit extent
- Block boundary
- Electricity transmission line
- Main road
- ACT reserve
- Plot location (Capital Ecology, 2018)
- Plot location (Rowell, 2018)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)
- Box Gum Woodland (EPBC Act)
- Cleared area

Native vegetation

- Grass/Shrub Forest
- Yellow Box - Red Gum Grassy Woodland (low condition)
- Yellow Box - Red Gum Grassy Woodland (very low condition)
- Yellow Box - Red Gum Grassy Woodland (moderate condition)

Source: EMM (2018); Boral (2020; 2018); Capital Ecology (2018); Rowell (2018); actmapi (2016); LPI (2015)

0 100 200 m

GDA 1994 MGA Zone 55

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Native vegetation & threatened ecological communities, including flora survey effort

Boral Mugga Quarry overburden expansion
Environmental management plan
Figure 3.1

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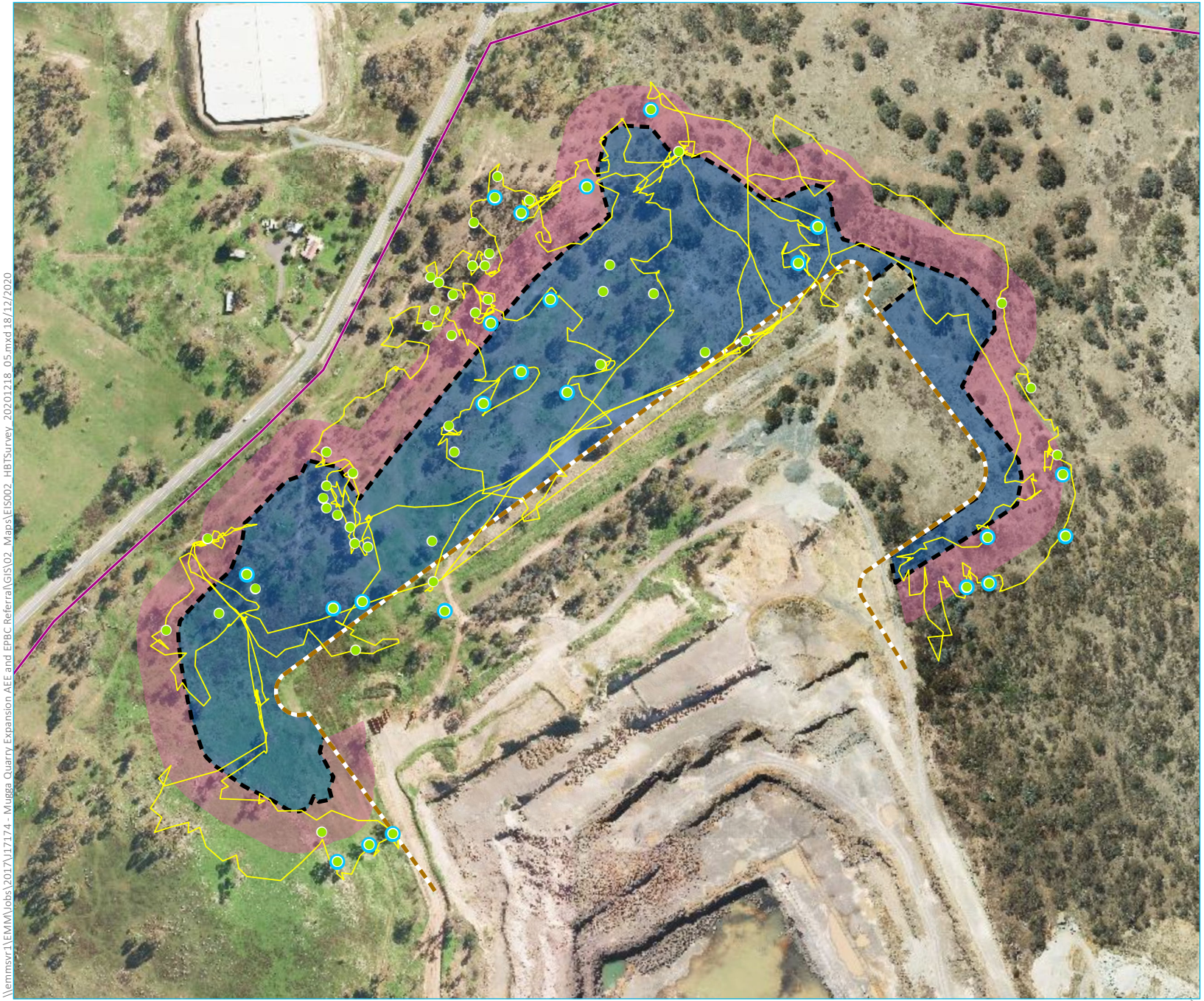

KEY

- Site location - 321 Mugga Lane, Symonston
- Hollow-bearing tree location
- Superb Parrot habitat tree
- Survey transect
- Approved pit extent
- Total disturbance area

Impact area

- Direct impact
- Indirect impact

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Source: EMM (2020); Boral (2020; 2018); Capital Ecology (2018); DFSI (2017); GA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

Hollow-bearing tree locations and survey effort

Boral Mugga Quarry overburden expansion
Environmental management plan
Figure 3.2

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4 Environment management measures

4.1 Risk assessment

4.1.1 Project EIS preliminary risk assessment

A preliminary risk (pre-mitigation) assessment was undertaken to determine the potential impacts of the project in accordance with AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines.

The risk assessment was undertaken using two variables, namely:

- the potential severity or consequences of the impact; and
- the likelihood of the impact occurring.

The variables were evaluated, assuming standard management measures would be in place. The definitions in Table 4.2 were applied.

Table 4.1 Severity or consequence of impacts

Severity or consequence of impact	Description
Minor	Near-source confined and promptly reversible impact on-site with little or no off-site impact.
Medium	Near source confined and short-term reversible impact on-site with little promptly reversible off-site impact.
Serious	Near-source confined and medium-term recovery impact on-site with near-source and short-term reversible off-site impact.
Major	Impact that is unconfined and requiring long-term recovery, leaving residual damage on-site with near-source confined and medium-term recovery of off-site impacts.

Table 4.2 Likelihood of impact

Severity or consequence of impact	Description
Rare	Impact is very unlikely to occur during the lifetime of the project.
Unlikely	Impact is unlikely to occur during the lifetime of the project.
Possible	Impact may occur during the lifetime of the project.
Likely	Impact may occur frequently during the lifetime of the project.
Almost certain	Recurring event expected during the lifetime of the project.

The risk matrix (Table 4.3) was then used to determine the environmental risk ratings for the project. In each case, a score of 1 to 5 is given for the consequence and likelihood of impact, with the sum of the scores used to determine the environmental risk.

Table 4.3 Environmental assessment matrix

		Consequence				
		1 Minor	2 Medium	3 Serious	4 Major	5 Catastrophic
Likelihood	5 Almost certain	6 (High)	7 (High)	8 (Critical)	9 (Critical)	10 (Critical)
	4 Likely	5 (Moderate)	6 (High)	7 (High)	8 (Critical)	9 (Critical)
	3 Possible	4 (Moderate)	5 (Moderate)	6 (High)	7 (High)	8 (Critical)
	2 Unlikely	3 (Low)	4 (Moderate)	5 (Moderate)	6 (High)	7 (High)
	1 Rare	2 (Low)	3 (Low)	4 (Moderate)	5 (Moderate)	6 (High)

Table 4.4 lists the four classes of environmental risk utilised in the assessment:

Table 4.4 Risk rating

Risk rating	Description
Low	Risks that are below the risk acceptance threshold and do not require active management. Certain risks could require additional monitoring.
Moderate	Risks that lie on the risk acceptance threshold and require active monitoring. The implementation of additional measures could be used to reduce the risk further.
High	Risks that exceed the risk acceptance threshold and require proactive management. Includes risk for which proactive actions have been taken, but further risk reduction is impractical.

Table 4.5 shows the outcomes of a preliminary risk assessment on the aspects and impacts specific to this EMP.

Table 4.5 Preliminary risk rating without mitigation

Potential areas of impact	Unique ID	Likelihood	Consequence	Risk rating
Biodiversity				
Adverse impacts to flora and fauna	B-1	4	3	7 (High)
Adverse impacts to ecological communities	B-2	4	3	7 (High)
Soil and hydrology				
Surface water quality	S-1	4	1	5 (Moderate)
Flooding potential	S-2	3	2	5 (Moderate)
Adverse impacts to the existing surface flow regime	S-3	3	2	5 (Moderate)

The level of risk associated with each environmental attribute was considered in the context of the EIS scoping requirements, P&D Act, Territory Plan and technical assessments undertaken to support the project.

The identification of risks enabled the determination of priorities for this EMP.

4.1.2 Post mitigation measures risk assessment

Following the risks identified in Table 4.5 above, mitigation measures were developed.

A summary of risk assessment and management actions is provided in Table 4.6, implementation schedule in Table 4.7 and monitoring schedule in Table 4.8.

Table 4.6 Risk assessment and management

Management objective/desired outcome	Risk ID	Relevant management actions/measures	Residual risk			Trigger Value	Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL			
1. To avoid indirect impact on Box Gum Woodland 2. To mitigate indirect impact on Box Gum Woodland	B-1	Refer to Section 4.2.1 regarding preclearance surveys.	3	2	5	B1.1.1 – Greater than 4.73 ha of YBRGGW/Box Gum Woodland cleared. B1.1.2 – Limit of clearing not fenced. B.1.2.1 – Ecologist not present during clearing. B.1.2.2 – Felled habitat trees removed within 24 hours. B.1.2.3 – Habitat trees felled without knocking first. B.1.2.4 – Habitat tree felled less than 5 minutes after knocking. B.1.2.5 – Habitat tree not 'soft felled'. B.1.2.6 – Injured fauna found in felled tree not notified to wildlife carer. B.1.2.7 – Unharmed fauna found in felled habitat tree not released into suitable nearby habitat. B1.2.9 – Trees felled during spring woodland bird breeding season.	Review of mapping data to be conducted in accordance with Section 4.2.1. Surveys to be undertaken in accordance with Section 4.2.1. Completion of internal 'Ground Disturbance and Vegetation Clearing Request Form' to be undertaken in accordance with Section 4.2.1 and Appendix E. Post clearance inspection.	Summary of reports and approvals will be included in annual EPBC Act compliance reporting (refer Appendix C).

Table 4.6 Risk assessment and management

Management objective/desired outcome	Risk ID	Relevant management actions/measures	Residual risk			Trigger Value	Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL			
	B1	Install fencing as required and maintain.	3	2	5	B1.1.2 – Limit of clearing not fenced.	Inspections prior to each day of clearing activities to confirm limit of clearance.	If works have encroached on any fencing it is to be reinstated and trees being protected are to be assessed for signs of stress. Report as part of compliance reporting in accordance with EPBC approval.
	B-1	A qualified ecologist will be present on site prior to and during all clearing. The clearing contractor is to be contacted immediately on identification of a superb parrot and works modified to ensure no impacts to the animal.	3	2	5	B.1.2.1 – Ecologist not present during clearing.	A qualified ecologist will be present on site prior to and during all clearing.	In the event of injury or mortality WIRES or RSPCA should be contacted to obtain further advice and site management protocols will be reviewed including potential need for additional fauna spotters. Any non-compliances are recorded and kept at the site office.
	Staff and contractor training on the requirements of this plan.	Prior to clearing commencing and during toolbox talks - training to be implemented as per Section 5.2.	3	2	5	N/A	No works to be completed until appropriate training / inductions have been completed.	Any non-compliances are recorded and kept at the site office.
	B2	Undertake weed management activities as per Section 4.3	3	2	5	B2.1.1 – Weed invasion into retained vegetation adjacent to the project area. B2.1.2 – Stockpiles of WONS not disposed of at licensed waste facility.	Inappropriate handling of stockpiled weed containing materials leads to a proliferation of weeds.	Remove weeds offsite to appropriately licensed landfill as required.

Table 4.6 Risk assessment and management

Management objective/desired outcome	Risk ID	Relevant management actions/measures	Residual risk			Trigger Value	Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL			
	S1 and S2	Install erosion and sediment controls as required by Section 4.5.	2	1	3	S2.1 – Machinery tracking on banks of drainage lines. S3.1 – Increased frequency of stream flows in the immediate receiving waters.	Lack of maintenance or installation of ESC identified through site inspections discussed in Section 5.0. Existing water quality monitoring for the quarry .	Maintain / install controls as per the guidance provided in this plan. Investigate water quality exceedance to determine cause and install additional controls if required. Report non-compliance in compliance report.
	B2	Manage in accordance with Section 4.4.	3	2	5	B.2.3.1 – Introduction of root rot fungus (*Phytophthora cinnamomi*) into the area.	Identified through Pathogen Assessment (Section 4.4.1)	Segregate material and remove from site in accordance with Section 4.4.

Table 4.7 Implementation schedule summary

Management objective/outcome	Performance targets and/or completion criteria	Management measure/s	Where	When	Related monitoring activity
1. Successful implementation of vegetation clearance program	Clearance of required vegetation without environmental incident	Throughout Section 4.0	Clearance area	Pre, during and post clearance	Review of mapping data. Preclearance surveys, during clearance inspections. Approval for internal 'Ground Disturbance and Vegetation Clearing Request Form' obtained prior to clearing. Post clearance inspection.
2. Minimisation of dirty water run-off during disturbance activities	No surface water quality or flow related incidents	Section 4.5	Disturbance area	Pre, during and post clearance	Site based water quality monitoring (existing water management plan).

Further details regarding the monitoring program are included in Section 5.4.

Table 4.8 Monitoring schedule summary

Monitoring activity	Management needs/questions addressed	Parameter/s measured	Survey/monitoring guidelines	Where	When	Responsibility
1. Monitoring of vegetation to be cleared	Appropriate clearance of vegetation for the minimisation of potential fauna and identification and differentiation of hollow bearing trees for removal.	- Identification of Superb Parrot including Marking out of hollow bearing trees - Weed identification - Identification of the potential for pathogens	- Review of mapping data to identify environmental features requiring protection and management - Completion of internal 'Ground Disturbance and Vegetation Clearing Request Form' (Appendix E) Pre-clearance procedure (Section 4.2.1) - Weed management Section 4.3 - Section 4.4 and Appendix B Arrive Clean / Leave Clean guidelines	In disturbance area	Prior to clearing	Quarry Manager
2. Erosion and Sediment Controls Monitoring	Minimisation of sediment mobilisation and minimisation of offsite sediment laden water.	Appropriate installation and maintenance of erosion and sediment controls	Erosion and sediment control and management Section 4.5	In disturbance area	Prior to and during disturbance activities associated with EPBC approval	Quarry Manager

4.2 Vegetation management

4.2.1 Pre-clearance procedure

Prior to the clearing of vegetation associated with the project, a number of internal and external measures will be completed to ensure proposed works are conducted in accordance with the approved ground disturbance footprint and in recognition of the significant environmental and cultural features of the quarry.

Internal actions to be undertaken prior to any vegetation clearing or ground disturbance works will occur in accordance with the Boral Group Standard "BA-HSEQ-8-02 Quarry Ground Disturbance". The purpose of the Standard is to provide the minimum mandatory requirements, as well as the supporting best practice guidelines to mark and control ground disturbance activities.

The following measures form part of the Standard:

- Electronic mapping of site specific habitat features will be reviewed by the Quarry Manager prior to the proposed clearing works, which will identify relevant features relating to the proposed clearing works, this will include *inter alia;* vegetation features, including EEC communities as per the details provided in Figure 3.1 and 3.2, as well as approved clearing footprints issued under the ACT and Commonwealth approvals, identification of the location of heritage items, stormwater management infrastructure and other relevant statutory and environmental items. This mapping data will then be printed off and used as part of the training and awareness exercise described in Section 5.2 prior to any ground disturbance or clearing work. Access to the site-specific maps will be restricted to ensure the information contained in the maps is controlled and accessed only by those with permissions to update the mapping. Only updated versions of the mapping will be made available for the Quarry Manager to access.
- To further ensure compliance with the conditions of the relevant Approvals' and associated management plans, an internal 'Form 1: Ground Disturbance and Vegetation Clearing Request Form' will be completed by the Quarry Manager and submitted for internal approval prior to commencing with any ground disturbance works. The template is included in Appendix E and requires sign off up the Executive General Manager level for high risk disturbance activities, such as those impacting EECs.

Prior to the clearing of vegetation, a suitably qualified Ecologist will undertake an assessment of vegetation, including an assessment of the potential for presence of target species (Superb Parrot).

The following tasks will be undertaken prior to clearing:

- Targeted surveys for the Superb Parrot, including searching of hollow bearing trees for nesting parrots and observation of understorey for feeding parrots. The location of any Superb Parrot nests will be marked for further work during clearing.
- Identification of the species and location of any weeds growing within the area to be cleared and grubbed.
- Identify and note the location of other threatened flora species, endangered ecological communities (EECs), threatened species habitat and trees which have been marked or otherwise identified for preservation.
- Marking and recording of all habitat trees within the clearing zone for removal and confirmation that no previously unidentified threatened species (or target species) are present.
- Review the potential for soil borne pathogens during pre-clearance activities.

Prior to vegetation clearing, the Boral Quarry Manager or authorised delegate will ensure:

- all subcontractors and employees involved in the clearing are trained via Toolbox Talks or Pre-Starts on the environmental risks and aspects to be considered prior to clearing. The following tasks will be undertaken prior to clearing:
    - Mapping detailing vegetation, habitat and cultural heritage features will be presented to all subcontractors and employees involved in the clearing.
    - Completion and approval of internal 'Form 1: Ground Disturbance and Vegetation Clearing Request'.
    - Limits of clearing will be fenced off with clearly visible temporary fencing (or similar).
    - The removal of hollow bearing trees will be minimised where possible.
    - Trees will be felled between December and August to avoid the spring woodland bird breeding season.
    - Establish a clearly marked boundary, including any 'no go zones' such as creeks, watercourses, and drainage lines to indicate where clearing will stop.
    - Identify and mark any areas of contaminated soil or waste materials on site for disposal to appropriately licenced landfill.
    - Where required, weed eradication has been carried out and areas of weed-infected topsoil have been identified in accordance with the *Biosecurity Act 2015* (refer to Section 4.3). Stockpiles of Weeds of National Significance (WONS), including any affected topsoil, have been disposed of at an appropriately licenced waste management facility.
    - Ensure erosion and sediment controls are in place as required.

4.2.2 Vegetation clearing procedure

The Boral Quarry Manager or authorised delegate shall ensure that the following clearing procedure is complied with:

1. monitor the clearing operations daily to ensure proper management and compliance;
2. a suitably experienced and qualified Ecologist will be present daily during clearing operations;
3. non-habitat trees, shrubs and groundcover will be cleared first allowing fauna the opportunity to move from the habitat trees;
4. habitat trees will be **left for 24 hours** after felling of the non-habitat trees nearby. Where possible, trees are to be left no longer than 72 hours after clearing surrounding vegetation. The Ecologist will be present on site for the felling of all habitat trees;
5. where possible, habitat trees are to be knocked with an excavator bucket or other machinery used for clearing to create enough disturbance for fauna to move from the tree (this may not be possible for some large dead trees due to safety risks to plant operator). Excessive knocking of the tree must not take place. The tree is to be left for a period of 5 minutes before being felled, which should be undertaken as gently as possible;

6. habitat trees are to be removed strictly under the guidance of an Ecologist. Habitat trees are to be felled using a 'soft felling' method to ensure the integrity of the tree material around the hollow;

7. felled habitat trees will be immediately inspected by an Ecologist for fauna. If fauna is found, the Ecologist will identify the species and assess the animal for injuries. If fauna is observed to be unharmed, it will be released into suitable nearby habitat. Wildlife carers will be called for any injured wildlife;

8. techniques to minimise impacts on bank stability are to be implemented where relevant. For example, machinery tracking on banks of drainage lines will be minimised;

9. holes left during removal of trees and stumps will be promptly backfilled with suitable material; and

10. weed-infested and/or pathogen-impacted topsoil will be stockpiled separately for disposal.

4.2.3 Post clearing

Following the completion of clearing in accordance with the EPBC Approval, ongoing measures will be undertaken to avoid and minimise impacts, including those committed to in the project EIS. These activities are also managed by existing site management plans in accordance with state level approvals and requirements. These ongoing activities include:

- updated mapping to reflect site conditions post-clearing and identify any habitat features requiring protection and preservation;

- ongoing inspection of retained vegetation, with any weed infestations identified (in accordance with the overarching EMP for Mugga Quarry operations);

- ongoing treatment of any identified weed infestations to be undertaken using qualified bush regeneration contractors;

- the trunks and large branches from trees felled will be placed amongst the remaining woodland on the lease area to provide fauna habitat;

- a program to monitor natural native revegetation will be undertaken to ensure emplaced material is screened or covered; and

- ongoing flora and fauna monitoring for the life of the quarry.

To ensure impacts are contained within the project area, and no encroachment into surrounding vegetation results from the project:

- installation of appropriate exclusion fencing to the boundary of the retained vegetation and any construction areas where there is some potential for accidental encroachment. This would include appropriate signage such as 'No Go Zone' or 'Environmental Protection Area';

- the location of 'No Go Zone's' will be identified and included in site inductions, Toolbox Talks and Pre-Starts; and

- all material stockpiles, vehicle parking and machinery storage to be located within the areas proposed for clearing, and not in areas of native vegetation that are to be retained.

4.3 Weed management

4.3.1 Weed inventory

Table 4.9 provides an inventory of weeds observed onsite during an inspections undertaken by qualified Ecologists on 9 July 2018 and during pre-clearance surveys on 16 June 2020. The list comprises state level priority weeds, Weeds of National Significance (WONS) and other exotic species that occur within the project area.

Table 4.9 Weed inventory

Species name	Common name	Category
Acetosella vulgaris	Sheep Sorrel	Exotic – no state or regional priority
Aira sp.	Hairgrass	Exotic – no state or regional priority
Briza maxima	Quaking Grass	Exotic – no state or regional priority
Bromus hordeaceus	Soft Brome	Exotic – no state or regional priority
Centaurium erythraea	Common Centaury	Exotic – no state or regional priority
Echium plantagineum	Paterson's Curse	State declared pest plant, Must be contained
Echium vulgare	Vipers Bugloss	State declared pest plant, Must be contained
Galium aparine	Goosegrass	Exotic – no state or regional priority
Hirschfeldia incana	Buchan Weed	Exotic – no state or regional priority
Hordeum sp.	Barley Grass	Exotic – no state or regional priority
Hypericum perforatum	St John's Wort	State declared pest plant, Must be contained
Lolium rigidum	Wimmera Ryegrass	Exotic – no state or regional priority
Nassella trichotoma	Serrated Tussock	WONS, State declared pest plant, Must be contained, Prohibited
Onopordum acanthium	Scotch Thistle	State declared pest plant, Must be contained
Oxalis sp.		Exotic – no state or regional priority
Phalaris aquatic	Phalaris	Exotic – no state or regional priority
Plantago lanceolate	Plantain	Exotic – no state or regional priority
Rubus fruiticosus (complex)	Blackberry	WONS, State declared pest plant, Must be contained, Prohibited
Trifolium angustifolium	Narrow-leaved Clover	Exotic – no state or regional priority
Trifolium arvense	Haresfoot Clover	Exotic – no state or regional priority
Verbascum Thapsus	Great Mullein	Exotic – no state or regional priority
Verbascum virgatum	Twiggy Mullein	Exotic – no state or regional priority
Vulpia sp.	Fescue	Exotic – no state or regional priority

Table 4.10 provides an inventory of WONS and state declared pest plants that may occur within the project, as determined by an EPBC Protected Matters Search, undertaken on 17 August 2020.

Table 4.10 EPBC Protected Matters Search – WONS

Species name	Common name	Category
Alternanthera philoxeroides	Alligator Weed	Weed of national significance, State declared pest plant
Cytisus scoparius	Broom	Weed of national significance, State declared pest plant
Genista sp. X Genista monspessulana	Broom	Weed of national significance, State declared pest plant
Lycium ferocissimum	African Boxthorn	Weed of national significance, State declared pest plant
Nassella neesiana	Chilean Needle grass	Weed of national significance , State declared pest plant
Nassella trichotoma	Serrated Tussock	Weed of national significance, State declared pest plant
Opuntia spp.	Prickly Pear	Weed of national significance , State declared pest plant
Pinus radiata	Radiata Pine	State declared pest plant
Rubus fruticosus aggregate	Blackberry, European Blackberry	Weed of national significance, State declared pest plant
Sagittaria platyphylla	Arrowhead	Weed of national significance, State declared pest plant, Notifiable, Must be supressed, Prohibited
Salix spp.	Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow	Weed of national significance, State declared pest plant, Must be supressed, Prohibited
Senecio madagascariensis	Fireweed	Weed of national significance, State declared pest plant, Notifiable, Must be supressed, Prohibited
Ulex europaeus	Gorse	Weed of national significance, State declared pest plant Must be supressed, Prohibited

4.3.2 Weed management

Any WONS removed during vegetation clearance, including any affected topsoil, will be disposed of at an appropriately licenced waste management facility as required by the *Biosecurity Act 2015*.

Weed infestations identified will be treated using methods employed by qualified bush regeneration contractors.

4.4 Management actions for the control of pathogens

4.4.1 Site pathogen assessment

A site assessment for potential risk of pathogens in the Project area will be undertaken by the Ecologist during pre-clearing surveys. The site assessment will identify and describe or map potential pathogen-containing vegetation areas.

Based on Ecologist advice, testing from a National Association of Testing Authorities (NATA) approved laboratory may be required to confirm the presence of pathogens in the soil and/or water if dieback is detected. The DAWE 'Arrive Clean, Leave Clean' Guidelines provide management measures for weeds and pathogens including *Phytophthora cinnamomi*. A copy of the guideline is included as Appendix B.

4.4.2 Establish pathogen control measures

Pathogens can be spread during construction on footwear, vehicles and machinery, particularly during wet weather or in wet conditions. Controlling the introduction and spread of pathogens that have the potential to harm the environment in the project area is a high priority.

If pathogens are identified, environmental controls will be implemented in consultation with the Ecologist to prevent the spread or introduction of pathogens to the project area. Controls will include:

- map and mark any areas that are infested with pathogens as an exclusion zone with fencing and signage to limit access by personnel and vehicles;
- installation of suitable stabilised access points, as per the erosion and sediment controls discussed in Section 4.5 (eg wheel wash, rumble grids);
- provide boot wash down facilities at areas where transport of weeds or pathogens is identified as a risk; and
- program works commencing in uninfected areas and progressing to infected areas (where possible).

4.4.3 Determine pathogen prevention / control methods

Management measures for pathogens can include planning or awareness measures, exclusion measures and containment measures. The suitability of control techniques will vary depending on the pathogen and will be determined on advice from the Ecologist and best practice guidelines.

Best practice protocols will be utilised if pathogen is identified and may include:

- minimise work during excessively wet or muddy conditions;
- provide parking and turn-around points on hard, well-drained surfaces;
- restrict vehicles to designated tracks, trails and parking areas;
- personnel working in an infected site should shower and launder clothes before moving to another vegetated site;
- ensure vehicles and footwear are free of soil before entering or exiting the site (ie directed to wash down area before entering or exiting the site);
- use a certified supply of plants and soil that is disease-free;
- removed infected vegetation will be securely wrapped in bags prior to disposal; and
- quarantine infected material for disposal to an appropriately licenced landfill.

4.4.4 Material disposal

Where materials are known or suspected to be affected by *Phytophthora cinnamomi*, the material will be retained within the contaminated area. Stockpiles of mulch, topsoil and fill material will be separated to avoid potential contamination and spread.

4.5 Erosion and sediment management

Primary sediment control will be through the construction of sediment dams (refer to Figure 4.1). The sedimentation dams will be designed and operated in accordance with the guideline titled *Environment Protection Guidelines for Construction and Land Development in ACT* (EPA 2011) and the Blue Book, which recommends the following design and management practices:

- The basins will be sized to capture greater than the initial 150 m^3 of runoff per ha of disturbance area. This is equivalent to 15 mm of runoff. Accounting for soil losses, approximately 30 to 50 mm of rainfall is expected to be required to produce 15 mm of runoff.

- Following rainfall, the basins will be dewatered to 20% capacity to provide capacity to capture the next runoff event.

Boral will continue to implement a surface water monitoring program. If monitoring identifies that the sedimentation dams are not providing effective treatment during overflow conditions, the following additional measures would be implemented to reduce water quality risks:

- Gypsum (or other chemical flocculants) applied to the basin water bodies to improve sedimentation rates.

- Water from the dams dewatered to the open pit where it will be temporarily stored and used for process water make-up.

The local area is not prone to flooding and the following erosion and sediment controls measures will be adopted during construction to minimise potential for adverse environmental impacts:

- Clean-water diversions will be established up-gradient of soil intrusive works to minimise the risk of polluting watercourses and stormwater drains.

- Stockpiling will incorporate stormwater diversion and sediment controls.

- Construction activities and storage of materials, plant and equipment will be conducted with an awareness of potential flood risks.

- Weather forecasts are to be monitored during construction to provide indication of predicted heavy rainfall events.

- During periods of heavy rainfall works will cease and where possible exposed areas covered to reduce risk of sediment laden water entering watercourses, stormwater drains and off-site tracking.

- Access road run-off will pass-through site-specific sediment controls, utilising a combination of bunding, sediment fencing. Dirty water drains will include sediment controls and will either be:

    - lined with geofabric or jute mesh;

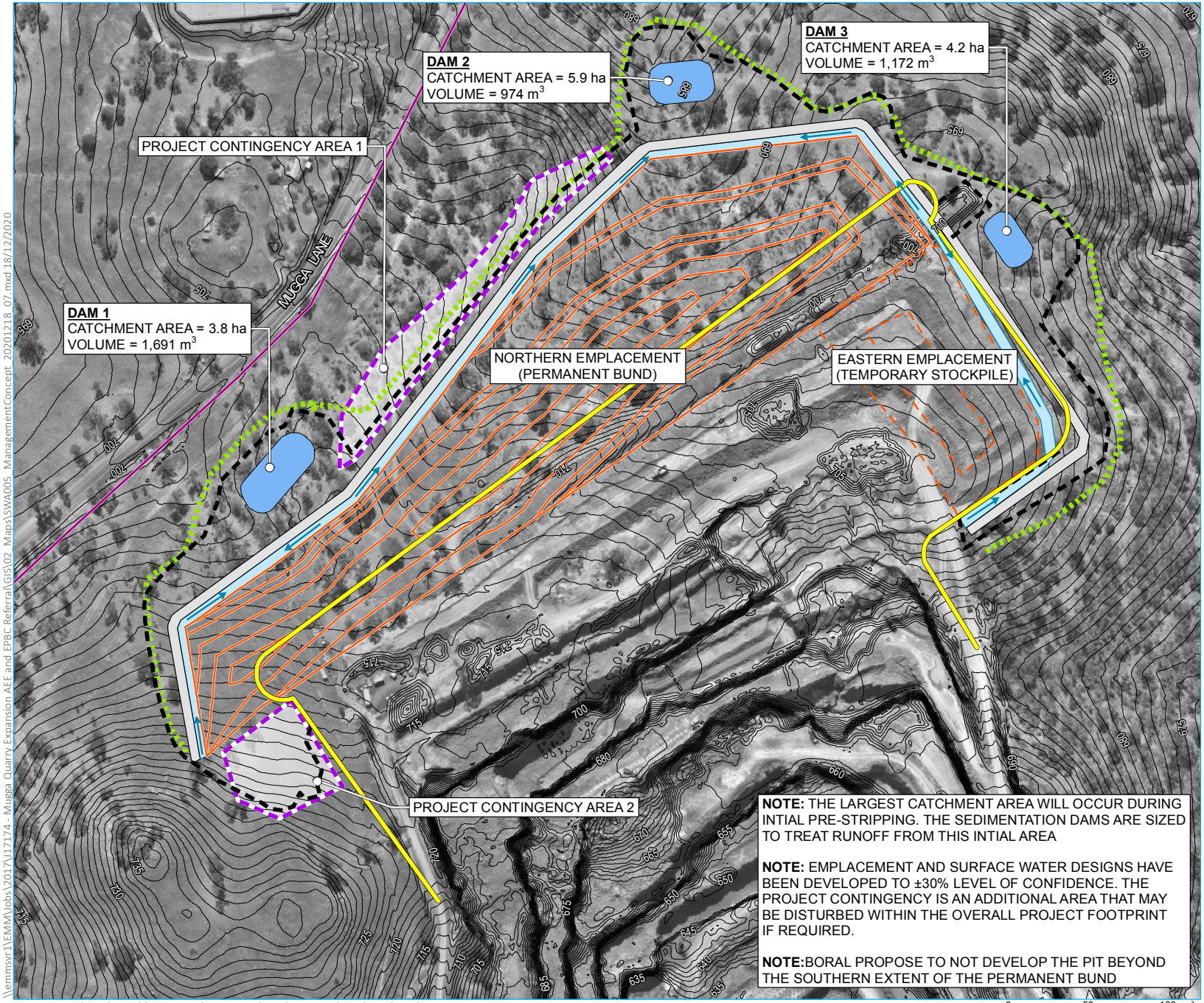
    - seeded and stabilised; or

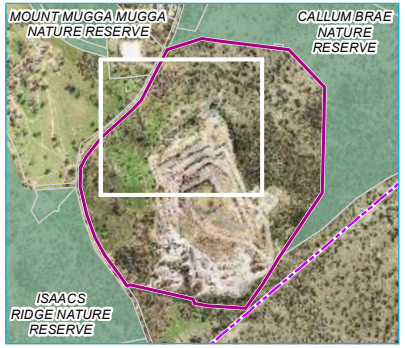
- controlled via the use of rock checks or sandbags;

- All truck loads will be covered to minimise dust generation and road spillages.
- Dust will be suppressed through sprays or water cart.

4.6 Fencing and access

The project site has secure fencing surrounding the roadside boundaries along Mugga Lane. The adjoining Boral operations are attended 24-hours a day and the project site will be under continual surveillance. The risk of any unauthorised access resulting in vandalism or illegal dumping during the construction period is considered remote.





KEY

- Site location - 321 Mugga Lane, Symonston
- Total disturbance area
- Approved pit extent
- Proposed new permanent overburden bund
- Proposed temporary emplacement area
- Sedimentation fence boundary
- Sedimentation dam
- Perimeter road (including batters)
- Toe drain (including batters)
- Project contingency area
- Contour (LiDAR - 1m)

Source: EMM (2018); Boral (2020; 2018); NearMap (2018); actmapi (2016); LPI (2015)

0 50 100 m

GDA 1994 MGA Zone 55

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Water management concept

Boral Mugga Quarry overburden expansion
Environmental management plan
Figure 4.1

EMM
creating opportunities

5 Compliance management

5.1 Roles and responsibilities

Roles and responsibilities are detailed in Table 5.1.

Table 5.1 Roles and responsibilities

Role	Responsibilities
Quarry Manager	Responsible for ensuring adequate resources are available to implement the requirements of this EMP. They are also responsible for assisting with the development and implementation of training, inspections monitoring and reporting, and internal and external reporting of environmental performance, incident response and notifications.
Site Supervisor	The Site Supervisor is responsible for environmental performance and compliance for the Project. Specific responsibilities include management of site works, ensuring employees and contractors are competent on the basis of training, education, and experience; ensure processes and resourcing are in place to implement this EMP; and report any incidents or non-compliances to the Quarry Manager. The Site Supervisor is responsible for the implementation of the EMP. They are also responsible for ensuring all personnel are suitably trained, conducting site inspections of environmental controls and reporting of environmental performance.
Environmental Advisor	The Environmental Advisor is to assist with the implementation of the EMP. They are also responsible for assisting with community complaints/ inquiries, developing and reviewing environmental induction/training materials and conducting site inspections and audits.
Employees and contractors	Employees and contractors would be required to complete project and site inductions and must attend all environmental training and toolbox meetings. Contractors are required to report any activity which has resulted, or has the potential to result, in an environmental incident.
Contractor Ecologist	Undertake pre-clearance ecology surveys and supervise vegetation clearing in accordance with the requirements of this EMP.

5.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to flora and fauna management issues. The induction training will address elements related to environmental management covered by this plan including:

- existence and requirements of this EMP;
- relevant legislation;
- specific weed and threatened species occurring in the location of the construction works and how these species can be recognised and reported;
- stockpile locations and management measures;
- general flora and fauna management measures for clearance activities, including fauna rescue requirements;
- specific responsibilities for the protection of flora and fauna, including weed control measures;
- erosion and sediment control measures and locations;

- presentation of mapping data to illustrate areas of environmental and Aboriginal cultural significance; and
- internal ground disturbance and vegetation clearing approval request process.

Records of training will be maintained and include:

- name of person receiving the training;
- name of the trainer;
- date of training; and
- summary of the training given.

5.3 Emergency contacts

In the event of an environmental emergency (ie injury or orphaning of a listed threatened species) the Site Supervisor should be contacted immediately and all works that have potential to cause further harm ceased. Any environmental incidents with the potential to cause material harm will be reported in accordance with Boral's HSEQ Management System Reporting requirements.

Internal site telephone lists will be kept up to date for the reporting of emergencies to the appropriate site personnel. Personnel should have the power to stop and direct works. The site emergency management plan will cover more detailed information regarding emergency contacts outside of the Boral organisation, should the need arise.

Table 5.2 Emergency contacts

Role	Contact Information
Quarry Manager	Robert Young – 0401 894 245
Site Supervisor	Ricky Gray - 0401 895 513

5.4 Inspections / monitoring

5.4.1 Monitoring purpose / objectives

Inspections of sensitive areas and activities with the potential to impact flora and fauna will occur for the duration of the Project as approved by the EPBC approval. As discussed in Section 4.1.2, an existing suite of management plans detail the ongoing monitoring for the life of the quarry, post the completion of activities associated the EPBC approval.

5.4.2 Performance Indicators and trigger values

Table 5.3 provides performance indicators and trigger values for the implementation of this EMP.

Table 5.3 Performance Indicators and Trigger Values

Risk	Performance Indicator	Trigger Value
B1 - Adverse impacts to flora and fauna	B1.1 – Confirm nil direct impact to vegetation outside of approved areas	B1.1.1 – YBRGGW/Box Gum Woodland cleared within approved limits
	B1.2 – Confirm minimal impact to flora / fauna during clearance activities	B1.1.2 – Limit of clearing not fenced
		B1.1.3 – Any impacts outside of the approved project footprint would not be likely to have a new or increased impact
		B1.1.4 – Internal 'Form 1: Ground Disturbance and Vegetation Clearing Request' not completed and approved.
		B.1.2.1 – Ecologist not present during clearing
		B.1.2.2 – Felled habitat trees removed within 24 hours
		B.1.2.3 – Habitat trees felled without knocking first
		B.1.2.4 – Habitat tree felled less than 5 minutes after knocking
		B.1.2.5 – Habitat tree not 'soft felled'
		B.1.2.6 – Injured fauna found in felled tree not notified to wildlife carer
		B.1.2.7 – Unharmed fauna found in felled habitat tree not released into suitable nearby habitat
		B1.2.8 – Trees not felled during spring woodland bird breeding season
B2 - Adverse impacts to ecological communities	B2.1 – Confirm weed control and disposal	B2.1.1 – Weed invasion into retained vegetation adjacent to the project area
	B2.2 – Confirm appropriate segregation, inspection and removal of habitat trees within approved areas	B2.1.2 – Stockpiles of WONS not disposed of at licensed waste facility
	B2.3 – Confirm pathogen control	B2.2.1 – Avoidable loss, fragmentation and degradation of breeding, sheltering and foraging habitat within approved areas
		B.2.3.1 – Introduction of root rot fungus (*Phytophthora cinnamomi*) into the area
S1 - Surface water quality	S1.1 – Confirm minimal impact to surface water as a result of erosion and subsequent loss of sediment from site	S1.1 – Increased frequency of stream flows in the immediate receiving waters
S2 - Flooding potential	S2.1 – Confirm drainage line banks stable	S2.1 – Machinery tracking on banks of drainage lines

5.4.3 Monitoring timing and frequency

The frequency of inspections will be weekly and prior to clearing, during and post clearing. Clearance activities will be inspected by an Ecologist as per the pre-clearance procedure (Section 4.2.1).

If detected, management activities for the removal of pathogen impacted vegetation will be undertaken in accordance with Ecologist advice and in the presence of the Ecologist.

General environmental inspections (including inspections for effectiveness of erosion and sediment control measures) will be undertaken on a weekly basis during the construction and after significant rainfall events as required. General environmental inspections will cover:

- vegetation management;
- erosion and sediment controls;
- fencing and access;
- soil management activities; and
- weed management.

5.5 Reporting

Results of the monitoring completed as part of this EMP will be reported in the EPBC Approval Compliance Report. Ongoing monitoring in accordance with the state level approvals will be reported through state level reporting processes and the annual review for the quarry**.** Further details are included below.

5.5.1 Internal ecological reporting

Specific reporting requirements associated with the Project include:

- prior to clearing: a statement from an Ecologist detailing the results of the pre-clearance survey (Appendix C) completed, including:
  - targeted surveys for the Superb Parrot, including searching of hollow bearing trees for nesting parrots and observation of understorey for feeding parrots. The location of any Superb Parrot nests will be marked for further work during clearing;
  - identification of the species and location of any weeds growing within the area to be cleared and grubbed; and
  - marking and recording of all habitat trees within the clearing zone for removal and confirmation that no previously unidentified threatened species (or target species) are present.
- post clearance: a statement from an Ecologist detailing the results of the clearance works completed, including:
  - the presence of any fauna species (threatened or otherwise) observed during clearance and actions taken to relocate or protect fauna; and
  - habitat trees that have been felled, actions taken to relocate or salvage the hollow bearing trees.

5.5.2 Internal documentation records

In accordance with conditions 9 and 10 of the EPBC approval, Boral must maintain accurate and complete compliance records.

If the Minister makes a request in writing, the approval holder must provide electronic copies of compliance records to the Department within the timeframe specified in the request.

5.5.3 Reporting to Department of Environment and Energy

Boral must prepare a compliance report for each 12-month period following the date of commencement of the action at Mugga Quarry, or as otherwise agreed to in writing by the Minister. Boral must:

- publish each compliance report on the website within 60 business days following the relevant 12-month period;
- notify the Department by email that a compliance report has been published on the website within five business days of the date of publication;
- keep all compliance reports publicly available on the website until the approval expires;
- exclude or redact sensitive ecological data from compliance reports published on the website; and
- where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.

The EPBC Approval Compliance Report will include at least the following information:

- Details of any EPBC listed species encountered during normal operations including species, location, health and nature of interaction (ie crossing the road, within buffer areas, etc).
- Detail of any complaints received including date and time of complaint, details of the complaint and actions taken to resolve the issue.
- Details of any clearing works that have occurred at the site over the previous 12-month period.
- Any fauna encountered during the clearing including actions taken in response to the encounter (fauna spotter reports).
- Non-compliances with this EMP, including details of the non-compliance and rectification actions taken.

5.6 Incidents / non-compliance

As a result of audits, inspections and monitoring undertaken, incidents and/or non-compliances may be identified. In accordance with condition 13 of the EPBC Approval, Boral must notify the Department in writing of any:

- incident;
- non-compliance with the conditions; or
- non-compliance with the commitments made in this EMP.

The notification must be given as soon as practicable, and no later than two business days after becoming aware of the incident or non-compliance. The notification must specify:

- the condition which is or may be in breach; and
- a short description of the incident and/or non-compliance.

Boral must provide to the Department the details of any incident or noncompliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying:

- any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;
- the potential impacts of the incident or non-compliance; and
- the method and timing of any remedial action that will be undertaken by the approval holder.

5.7 Auditing

In accordance with condition 15 of the EPBC Approval, Boral must ensure that independent audits of compliance with the conditions are conducted as requested in writing by the Minister.

In accordance with condition 16 of the EPBC Approval, for each independent audit, Boral must:

- provide the name and qualifications of the independent auditor and the draft audit criteria to the Department;
- only commence the independent audit once the audit criteria have been approved in writing by the Department; and
- submit an audit report to the Department within the timeframe specified in the approved audit criteria.

Boral must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of the EPBC Approval.

6 Review and improvement

6.1 Continuous improvement

Continuous improvement of this EMP will be achieved by the ongoing evaluation of environmental management performance against EPBC condition requirements and results inspections/monitoring undertaken.

The continuous improvement process is designed to:

- identify areas of opportunity for improvement of environmental management and performance;
- determine the cause or causes of non-conformances and deficiencies;
- develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies; and
- verify the effectiveness of the corrective and preventative actions.

6.2 Revision of EMP

Any revisions to this EMP will be undertaken as required, should site conditions change or designs for site development vary.

Boral can revise this EMP by submitting an application in accordance with the requirements of Section 143A of the EPBC Act. If the Minister approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous EMP.

If Boral makes the choice under condition 19 to revise an action management plan without submitting it for approval, the approval holder must:

- notify the Department in writing that the approved action management plan has been revised and provide the Department with:
  - an electronic copy of the RAMP (this updated EMP);
  - an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP;
  - an explanation of the differences between the approved action management plan and the RAMP;
  - the reasons the approval holder considers that taking the action in accordance with the RAMP would not be likely to have a new or increased impact; and
  - written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 business days after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the Department.
- subject to condition 22, implement the RAMP from the RAMP implementation date.

References

Department of the Environment and Energy, 2019. Mugga Quarry Overburden Expansion Project Approval Decision Notice (EPBC 2018 /8151).

Department of the Environment, 2014. Environmental Management Plan guidelines. Commonwealth of Australia, Canberra.

EMM,2019. Environmental Impact Statement Mugga Quarry Overburden Expansion Project. EMM Consulting Pty Ltd, Sydney.

EMM,2019. EPBC Referral Preliminary Documentation Mugga Quarry Overburden Expansion Project. EMM Consulting Pty Ltd, Sydney.

Environment Protection Authority, 2011. Environment Protection Guidelines for Construction and Land Development in ACT (EPA 2011).

Appendix A

Mugga Quarry Overburden Expansion Project – EPBC Approval (EPBC 2018/8151)

Australian Government
Department of the Environment and Energy

APPROVAL

Mugga Quarry Overburden Expansion Project, Symonston, ACT (EPBC 2018/8151)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*. Note that section 134(1A) of the **EPBC Act** applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Boral Resources (Country) Pty. Limited
ACN of approval holder	000 187 002
Action	To extend the existing Mugga Quarry to create a new permanent bund and temporary stockpile area at Symonston, ACT.

Approval decision

My decision on whether or not to approve the taking of the action for the purposes of the controlling provision for the action is as follows.

Controlling Provisions

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 31 March 2039

Decision-maker

Name and position	Louise Vickery Assistant Secretary of Assessments and Waste Branch Department of the Environment and Energy
Signature	Louise Vickery
Date of decision	10th July 2019

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

Impacts

1. The approval holder must ensure that clearing of **Box Gum Woodland** within the **proposed action area** is limited to the area marked as 'total disturbance area' in **Attachment 1**.

   Note: This condition does not preclude the approval holder from continuing their operations within the area marked as 'Approved Pit Extent' in **Attachment 1**.

Compensation measures

2. To offset the impacts to 4.73 hectares (ha) of **Box Gum Woodland**, the approval holder must acquire or **retire** no less than 170 **Biodiversity credits** for **Box Gum Woodland** prior to the **commencement of the action**.

3. As evidence that **Biodiversity credits** as required by Condition 2 have been **retired**, the approval holder must submit a **Bio Banking Credit Retirement Report** to the **Department,** within 10 **business days** of **retiring** the **Biodiversity credits**.

Environmental management plan

4. At least 30 **business days** prior to the **commencement of the action**, the approval holder must submit an environmental management plan (EMP) for the **Minister's** approval to avoid and mitigate potential indirect **impacts** on **Box Gum Woodland** as a result of **construction**. If the **Minister** approves the EMP, then the approved EMP must be implemented.

5. The approval holder must not **commence the action** unless the **Minister** has approved the EMP described in condition 4 in writing.

6. The EMP described in condition 4 must be consistent with the **Department's** *Environmental Management Plan Guidelines*, and must include:

   a. The EMP environmental objectives, relevant to **Box Gum Woodland** and a reference to **EPBC Act** approval conditions to which the EMP refers;

   b. A table of commitments made in the EMP to achieve the objectives, and a reference to where the commitments are detailed in the EMP;

   c. Details of the parties responsible for undertaking management actions;

   d. A description of management actions that will be implemented pre, during and post construction, including for stormwater discharge and road runoff, sediment and erosion control, invasion by exotic species and weeds, and fencing and access;

   e. Hygiene protocols to minimise the risk of spread of *Phytophthora cinnamomi*;

   f. Reporting and review mechanisms, and documentation standards to demonstrate compliance with the EMP;

   g. An assessment of risks to achieving the EMP environmental objectives and risk management strategies that will be applied;

   h. **Impact** avoidance, mitigation and/or repair measures, and their timing; and

i. A monitoring program, which must include:

i. measurable performance indicators;

ii. trigger values for corrective actions;

iii. the timing and frequency of monitoring to detect changes in the performance indicators and timely detection of trigger values; and

j. proposed corrective actions, if trigger values are reached.

Part B – Standard administrative conditions

Notification of date of commencement of the action

7. The approval holder must notify the **Department** in writing of the date of **commencement of the action** within 10 **business days** after the date of **commencement of the action.**

8. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

9. The approval holder must maintain accurate and complete **compliance records**.

10. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department**'s website or through the general media.

Preparation and publication of plans

11. The approval holder must:

a. submit **plans** electronically to the **Department** for approval by the **Minister**;

b. publish each **plan** on the **website** within 20 **business days** of the date the **plan** is approved by the **Minister** or of the date a revised action management plan is submitted to the **Minister**, unless otherwise agreed to in writing by the **Minister**;

c. exclude or redact **sensitive ecological data** from **plans** published on the **website** or provided to a member of the public; and

d. keep **plans** published on the **website** until the end date of this approval.

Annual compliance reporting

12. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or as otherwise agreed to in writing by the **Minister**. The approval holder must:

a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;

b. notify the **Department** by email that a **compliance report** has been published on the **website** within five **business days** of the date of publication;

c. keep all **compliance reports** publicly available on the **website** until this approval expires;

d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and

e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **Department**'s website. The first **compliance report** may report a period less than 12 months so that it and subsequent **compliance reports** align with the similar requirement under state/territory approval.

Reporting non-compliance

13. The approval holder must notify the **Department** in writing of any: **incident;** non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

    a. the condition which is or may be in breach; and

    b. a short description of the **incident** and/or non-compliance.

14. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

    b. the potential **impacts** of the **incident** or non-compliance; and

    c. the method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

15. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted as requested in writing by the **Minister**.

16. For each **independent audit**, the approval holder must:

    a. provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**;

    b. only commence the **independent audit** once the audit criteria have been approved in writing by the **Department**; and

c. submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.

17. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.

Revision of action management plans

18. The approval holder may, at any time, apply to the **Minister** for a variation to an action management plan approved by the **Minister** under condition 4, or as subsequently revised in accordance with this condition, by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**. If the **Minister** approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.

19. The approval holder may choose to revise an action management plan approved by the **Minister** under condition 4, or as subsequently revised in accordance with this condition, without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the RAMP would not be likely to have a **new or increased impact**.

20. If the approval holder makes the choice under condition 19 to revise an action management plan without submitting it for approval, the approval holder must:

    a. notify the **Department** in writing that the approved action management plan has been revised and provide the **Department** with:

        i. an electronic copy of the RAMP;

        ii. an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP;

        iii. an explanation of the differences between the approved action management plan and the RAMP;

        iv. the reasons the approval holder considers that taking the action in accordance with the RAMP would not be likely to have a **new or increased impact**; and

        v. written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 **business days** after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the **Department**.

    b. subject to condition 22, implement the RAMP from the RAMP implementation date.

21. The approval holder may revoke its choice to implement a RAMP under condition 19 at any time by giving written notice to the **Department**. If the **approval holder** revokes the choice under condition 19, the **approval holder** must implement the previous action management plan approved by the **Minister**.

22. If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the RAMP would be likely to have a **new or increased impact**, then:

    a. condition 19 does not apply, or ceases to apply, in relation to the RAMP; and

    b. the approval holder must implement the action management plan specified by the **Minister** in the notice.

23. At the time of giving the notice under condition 22, the **Minister** may also notify that for a specified period of time, condition 19 does not apply for one or more specified action management plans.

Note: conditions 19, 20, 21 and 22 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised action management plan, at any time, to the **Minister** for approval.

Completion of the action

24. Within 30 days after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C - Definitions

25. In these conditions, except where contrary intention is expressed, the following definitions are used:

    a. **Bio Banking** means the New South Wales Government's biodiversity credit and offset scheme of that name created under the *Threatened Species Conservation Act 1995* (NSW), as amended and repealed or an equivalent scheme under a **successor mechanism** under the Biodiversity Conservation Act 2016 (NSW).

    b. **Bio Banking Credit Retirement Report** has the meaning given under the under the Threatened Species Conservation Act 1995 (NSW), as amended and repealed or an equivalent report under a successor mechanism under the Biodiversity Conservation Act 2016 (NSW).

    c. **Biodiversity credits** - has the meaning given under the under the Threatened Species Conservation Act 1995 (NSW), as amended and repealed, or an equivalent report under a **successor mechanism** under the Biodiversity Conservation Act 2016 (NSW).

    d. **Box Gum Woodland** means the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community listed as critically endangered under the **EPBC Act.**

    e. **Business days** means a day that is not a Saturday, a Sunday or a public holiday in the Australian Capital Territory.

    f. **Commencement/Commencement of the action/ Commence the action** means the first instance of any specified activity associated with the action including clearance of vegetation and **construction** of any infrastructure except for minor physical disturbance necessary to:

        i. undertake pre-clearance surveys or monitoring programs;

        ii. undertake geotechnical investigations;

        iii. install signage and /or temporary fencing to prevent unapproved use of the **proposed action area**; and

iv. protect environmental and property assets from fire, weeds and pests, including erection or **construction** of fencing and signage, and maintenance or use of existing surface access tracks, if agreed in writing by the **Department.**

g. **Completion data** means an environmental report and spatial data information clearly detailing how the conditions of this approval have been met. The **Department's** preferred spatial data format is ESRI shapefile, including containing '.shp, '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference and a '.prj' file or specification of the projection/geographic coordinate system used.

h. **Completion of the action** means the time at which all approved conditions (except condition 24) have been fully met.

i. **Compliance records** means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully;

j. **Compliance reports** means written reports:

i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**;

ii. consistent with the **Department's** *Annual Compliance Report Guidelines* (2014)

iii. include a shapefile of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period; and

iv. annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12 month period.

k. **Construction** means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; preliminary site preparation work which involves breaking of the ground; and any associated excavation work; but excluding the installation of fences and signage.

l. **Department** means the Australian Government agency responsible for administering the **EPBC Act**.

m. **EPBC Act** means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

n. **Impact/ Impacted** means any measureable direct or indirect disturbance/change that occurs as a result of any activity associated with the proposed action.

o. **Incident** means any event which has the potential to, or does, **impact** on **Box Gum Woodland.**

p. **Independent audit**: means an audit conducted by an independent and **suitably qualified person** as detailed in the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines* (2015).

q. **Minister** means the Australian Government Minister administering the EPBC Act including any delegate thereof.

r. **New or increased impact** means a new or increased environmental **impact** or risk relating to any **protected matter**, when compared to the likely **impact** of implementing the action management plan that has been approved by the **Minister** under condition 4, including any subsequent revisions approved by the **Minister,** as outlined in the *Guidance on 'New or Increased **Impact**' relating to changes to approved management plans under EPBC Act environmental approvals (2017).*

s. **Plan(s)** means any of the documents required to be prepared, approved by the **Minister**, and/or implemented by the approval holder and published on the **website** in accordance with these conditions (includes action management plans and/or strategies).

t. **Proposed action area** means the area as shown in Attachment 1.

u. **Retire or retirement** means a change in the status of a credit such that the credit has been used to offset the development impact or achieve a conservation outcome, and can no longer be bought or sold.

v. **Sensitive ecological data** means data as defined in the Australian Government Department of the Environment (2016) Sensitive Ecological Data – Access and Management Policy V1.0.

w. **Shapefile** means an ESRI Shapefile containing .shp, .shx, .dbf and prj files and other files capturing attributes of the **proposed action area**, including the shape (including specification of the projection or coordinate system used), EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in .xls format.

x. **Successor mechanism** means any biodiversity offsetting mechanism legislated and implemented by the New South Wales Government to replace, or as a successor to, BioBanking. Such a mechanism is only acceptable for the purposes of this approval if it:

   i. is included in a bilateral agreement under the EPBC Act (either referenced directly in the agreement, or as part of a wider process that is adopted in a bilateral agreement) OR

   ii. has been agreed by the Department in writing to the approval holder or the title holder as being an appropriate successor mechanism.

y. **Suitably qualified person** means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

z. **website** means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

ATTACHMENTS

Attachment 1 – Map showing proposed action area (marked as total disturbance area)

ATTACHMENTS

Attachment 1 – Map showing proposed action area (marked as total disturbance area).

Appendix B

Arrive clean, leave clean guidelines

Australian Government

Department of the Environment

Arrive Clean, Leave Clean

Guidelines to help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems

The Department acknowledges the traditional owners of country throughout Australia and their continuing connection to land, sea and community. We pay our respects to them and their cultures and to their elders both past and present.

Images
(front cover) John Baker and the Department of the Environment
(back cover) Nick Rains

Arrive Clean, Leave Clean

Help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems

When working in the bush, it's important to remember:

- Any activity in the bush has the potential to spread invasive species, including environmental restoration activities such as weeding and revegetation.
- Revegetation carries a particularly high risk as it involves the introduction of plants and soil. This risk increases through the use of dirty tools and equipment or plants and materials that are not certified to be free of pathogens and weeds.
- Clothing, hats, footwear, tools, equipment, machinery and vehicles can transport invasive species like *Phytophthora cinnamomi*, myrtle rust (*Puccinia psidii*), insects and weeds into our bushland.
- Even your skin and hair, as well as glasses, phones, watches, wallets and other pocket items can carry myrtle rust spores.
- Once these pathogens and weeds invade our bushland, eradication is often impossible. Follow these guidelines to help prevent their spread.

Photos: (left) Wildflowers on Mondurup Peak, Stirling Range before Phytophthora dieback (Robert Olver), (right) Mondurup Peak, Stirling Range after Phytophthora dieback (Department of Parks and Wildlife WA)

Phytophthora cinnamomi

What is *Phytophthora cinnamomi*?

Phytophthora cinnamomi is a soil-borne plant pathogen that attacks the roots of susceptible plants—destroying the root system and reducing the ability of the plant to absorb water and nutrients. This causes symptoms referred to as 'dieback' which can lead to plant death.

Under favourable conditions *Phytophthora* spp. can spread easily and quickly, destroying plants and plant communities. These guidelines to help minimise the risk of spreading *Phytophthora cinnamomi* also apply to other species of *Phytophthora* present in Australia, as the management of those species is similar.

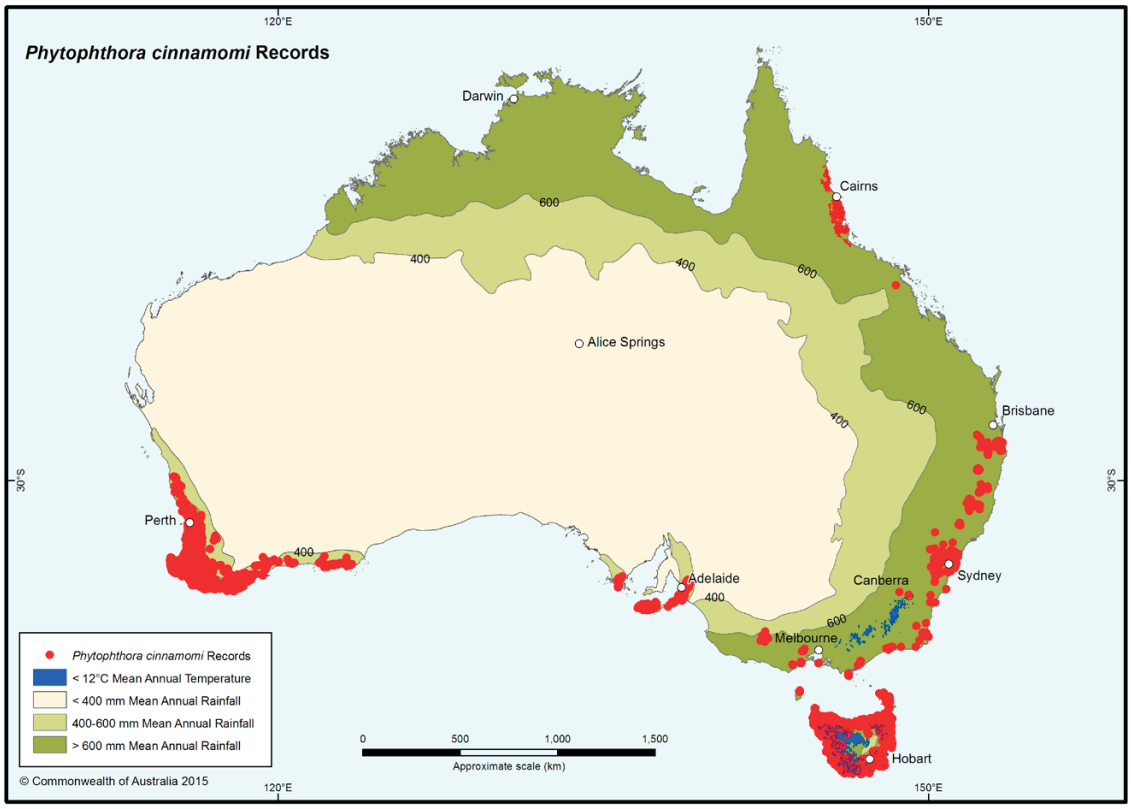
Photo: Impact of *Phytophthora cinnamomi* at Dwellingup, WA (Department of Parks and Wildlife WA)

What does *Phytophthora cinnamomi* threaten?

Thousands of Australian native plant species are susceptible to *Phytophthora cinnamomi*, and several of those species may be at risk of extinction due to its impacts. The dramatic impact of *Phytophthora* spp. infestations on plant communities may also lead to major declines in some insect, bird and animal species due to the loss of shelter, nesting sites and food sources.

Where is *Phytophthora cinnamomi* found?

Phytophthora cinnamomi thrives in warm, moist conditions with temperatures between 15°C and 30°C, and with rainfall greater than 400 millimetres a year. Its impact is greatest in Western Australia, Victoria, Tasmania and South Australia. The Northern Territory remains the only jurisdiction unaffected, as its environmental conditions are generally unfavourable to the pathogen.



Map: *P. cinnamomi* isolations, records of impact and broad climatic envelope of *P. cinnamomi* susceptibility in Australia.

This map was published in the *Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi* in 2014. It does not represent the precise distribution of the pathogen in Australia and is for general information only.

How does *Phytophthora cinnamomi* spread?

Phytophthora cinnamomi spreads through soil, water and organic matter. It can remain dormant for long periods during dry weather and is impossible in most situations to eradicate from infested areas, which means limiting further spread is critical. Any activity that moves soil, water or plant material can spread the disease. This includes soil on tools, footwear and vehicles.

To help to prevent the spread of this plant disease:

- arrive clean, leave clean: ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of mud, soil and organic matter before entering and exiting bushland
- ensure any soil, plants or other materials entering the site are certified free of weeds and pathogens. You can do this by purchasing from Nursery Industry Accreditation Scheme Australia (NIASA) accredited businesses, and by ensuring that materials conform to Australian Standards—for example, *AS3743–2003 Potting mixes* or *AS4454–2012 Composts, soil conditioners and mulches*.

Myrtle rust

What is myrtle rust?

Myrtle rust is a disease caused by the fungus *Puccinia psidii*, initially identified as *Uredo rangelii*. It affects trees and shrubs in the Myrtaceae plant family—attacking young, soft, actively-growing leaves, shoot tips and young stems, as well as fruits and flower parts.

The first signs of rust infection are tiny raised spots or pustules on infected leaves. After a few days, the pustules erupt into distinctive bright yellow spore masses. Left untreated, the disease can cause deformed leaves, heavy defoliation of branches, dieback, stunted growth and plant death.

Photo: Myrtle rust pustules on scrub turpentine (*Rhodamnia rubescens*) fruit (R.O. Makinson)

What does myrtle rust threaten?

Plants susceptible to myrtle rust are those in the Myrtaceae family, which includes bottle brush (*Callistemon* spp.), tea tree (*Melaleuca* spp. and *Leptospermum* spp.), lilly pillies (*Syzygium* spp.) and eucalypts (*Eucalyptus* spp., *Angophora* spp. and *Corymbia* spp.). The Myrtaceae family in Australia is ecologically important, accounting for about 10% of Australia's native flora, with many Australian plant communities dominated by myrtaceous species.

Knowledge of the impacts of myrtle rust on Australian biodiversity is still limited. Myrtle rust infection may cause significant mortality among younger plants and therefore reduce the number of plants capable of maturing and reproducing. This may contribute to the decline of species, including threatened species, leading to potential impacts on the structure and function of ecosystems dependent on Myrtaceae. At the time of writing, nearly 350 native species are known to be susceptible to myrtle rust infection, some severely. The host list (see **References and resources** below) is expected to grow. However, all Myrtaceae are potentially susceptible and potential hosts for the disease.

Photo: Myrtle rust pustules on scrub turpentine (*Rhodamnia rubescens*) leaves (R.O. Makinson)

Where is myrtle rust found?

Myrtle rust was first detected in Australia in 2010 on the New South Wales central coast. It is now established along the east coast of Australia from southern New South Wales to far north Queensland, mostly east of the Great Escarpment. It is also present in Victoria, mainly at production nurseries and wholesale outlets in and around metropolitan Melbourne. The first detection of myrtle rust in Tasmania was in February 2015 at a property near Burnie on the north-west coast. At the time of writing, myrtle rust has not been detected in the Australian Capital Territory, the Northern Territory, South Australia, Western Australia or on Lord Howe Island or Christmas Island, but moister regions and vegetation types in all these jurisdictions are at risk of myrtle rust establishment. Domestic import restrictions apply for non-infested jurisdictions.

How does myrtle rust spread?

Myrtle rust spores can spread easily via contaminated clothing, hats, footwear, equipment or vehicles. It can also be spread by infected plant material, insects and other animals, or the wind. Even your skin and hair, as well as watches, wallets and other pocket items can carry myrtle rust spores. It is impossible to eradicate myrtle rust from infested bushland, so limiting further spread is critical.

To help to prevent the spread of myrtle rust:

- arrive clean, leave clean:
  - Wash all clothing, hats and gloves between site visits—using warm or hot machine wash with detergent.
  - Ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of mud, soil and organic matter before entering and exiting bushland.
  - Use a solution of 70% ethanol or methylated spirits in 30% water to disinfect items that may be contaminated (including hats, footwear, tools, equipment, machinery, vehicles, walking sticks, tent pegs, phones, glasses, watches, wallets and other personal items).
- ensure any soil, plants or other materials entering the site are certified free of weeds and pathogens. You can do this by purchasing from Nursery Industry Accreditation Scheme Australia (NIASA) accredited businesses, and by ensuring that materials conform to Australian Standards—for example, *AS3743–2003 Potting mixes* or *AS4454–2012 Composts, soil conditioners and mulches*.
- monitor plants carefully as nurseries and plant maintenance facilities may provide ideal conditions for myrtle rust (see Australian Nursery Industry myrtle rust management plan 2012 in **References and resources** below).

Photo: Myrtle rust spores on clothing after chance contact with an infected shrub (R.O. Makinson)

Weeds

What is a weed?

A weed is any plant that has a negative impact on our economy, environment, health and surroundings. Weeds are generally species which are not native to Australia. However, some native species growing outside of their native range can also become invasive. Many weeds are species which have escaped cultivation and become naturalised—that is, they have begun reproducing without human assistance.

What do weeds threaten?

Many weed species are able to invade natural areas and cause disturbance to bushland ecosystems. They can alter plant and animal community composition, cause changes to nutrient cycles, change natural fire regimes, outcompete native species for resources, impact threatened species and threaten biodiversity.

Where are weeds found?

The diversity of weed species recorded in Australia means that most terrestrial and aquatic ecosystems are vulnerable to weed invasion. Weeds have characteristics that help them grow well in many environments—from our towns and cities through to our coasts, deserts and alpine areas.

How do weeds spread?

Weeds typically spread easily by producing large numbers of seeds or reproducing vegetatively. They are often excellent at surviving and reproducing in disturbed environments and are commonly the first species to colonise and dominate in these conditions. Seeds and other plant material can spread into natural and disturbed environments via wind, animals, waterways and people (including contaminated clothing, hats, footwear, tools, equipment, machinery and vehicles).

To help to prevent the spread of weeds:

- arrive clean, leave clean: ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of weed seeds, mud, soil and organic matter before entering and exiting bushland.
- ensure any soil, plants or other materials entering the site are certified free of weeds and pathogens. You can do this by purchasing from Nursery Industry Accreditation Scheme Australia (NIASA) accredited businesses, and by ensuring that materials conform to Australian Standards—for example, *AS3743–2003 Potting mixes* or *AS4454–2012 Composts, soil conditioners and mulches*.
- if revegetating, select indigenous plants that occur naturally in your local area. Undertake weed control work well in advance to minimise the weed seed bank before you start planting. At the very least, slash the flower heads of weed species before they go to seed.

Before beginning a project

Undertake a risk assessment:

- Identify any planned activities with the potential to spread pathogens and weeds. This includes movement of people, equipment, vehicles and materials to/from/through infected or potentially infected areas.
- Determine the project site's pathogen and weed risks through liaison with land managers (for example government agencies, traditional owners, Indigenous Protected Area managers etc.).
- Consult sources of advice and expertise for contingent risks (for example state/territory departments of primary industry, pathology/weed identification services at botanic gardens).

Develop a hygiene management plan:

- Use your risk assessment to determine which hygiene procedures are necessary to prevent the spread of pathogens and weeds, and how and where to apply them.
- Ensure all materials taken onto the site—such as seedlings, mulch, soil, gravel, rock and sand—are certified free of weeds and pathogens. You can do this by purchasing from Nursery Industry Accreditation Scheme Australia (NIASA) accredited businesses, and ensuring materials conform to Australian Standards—for example, *AS3743–2003 Potting mixes* or *AS4454–2012 Composts, soil conditioners and mulches*.
- Create a checklist of hygiene procedures for project managers and participants to use.

Consider the following during project planning:

- Limit the number of sites you visit to one per day. If this is not possible, visit clean sites before infested sites.
- Provide training or briefing to all participants on the risks of spreading pathogens and weeds and risk mitigation strategies. If available, provide maps to participants with the location of infested and clean areas and wash-down points.
- Ensure that rigorous inspections and quality checks are built into the management of the entire supply chain for materials and plant material when carrying out revegetation or translocation activities where pathogens are a potential concern (see Australian Nursery Industry myrtle rust management plan 2012 in **References and resources** below). This is particularly important when working in areas where threatened species and threatened ecological communities are found.
- Where there is the risk of Phytophthora dieback (a plant disease caused by the pathogen *Phytophthora cinnamomi*), schedule activities for the dry season as it spreads more easily in wet and muddy conditions. If necessary, postpone activities and reschedule for a day when the soil is dry and doesn't stick to footwear, equipment and tools.
- If working in a weedy area, try to schedule activities for when the weed species are not in seed.
- Avoid taking vehicles into bushland. If a vehicle is necessary, ensure it is clean and dry on entry and exit, and restrict movement to hard, dry surfaces, formed roads and designated parking areas—avoid driving through puddles and mud. Where myrtle rust is a risk, avoid parking near myrtaceous plants—for example bottle brushes, tea trees, lilly pillies and eucalypts—and thoroughly clean vehicles inside and out between site visits.
- Avoid polystyrene boxes and tools with wooden or cracked handles. Use equipment that can be cleaned easily and thoroughly.
- Minimise the number of personal items you carry. Where myrtle rust is a risk, clean all items—such as GPS devices, glasses, phones, watches, wallets and other items kept in your pockets—with alcohol wipes before entering and leaving sites.

One site per day

Before entering or leaving a site

- Be aware of what plants look like when infected with myrtle rust and Phytophthora dieback (see images above).
- Remove all weed seeds, mud, soil and organic matter from clothing, footwear, tools, equipment, machinery, vehicles, boxes, backpacks, walking sticks, tent pegs and anything else that touches plants or the ground. Stay as clean as possible while in the bush.
- If you are entering clean bushland or have come from an area that is infested with *Phytophthora* spp. or myrtle rust, ensure everything with you is cleaned and disinfected with a solution of 70% ethanol or methylated spirits in 30% water. This includes footwear, tools, equipment, machinery, vehicles, backpacks, walking sticks, tent pegs and personal items.

Disinfecting clothing, footwear, equipment and other personal items

i. Carry a hard brush and a spray bottle of disinfectant—made up of a solution of 70% ethanol or methylated spirits in 30% water. If you are able to carry more, assemble a simple hygiene kit—see Appendix A.

ii. Set up a wash-down area for participants to wash and dry their face and hands and clean their footwear before entering and exiting the site.

iii. To clean footwear, first use a hard brush or stick to remove as much mud, soil and organic matter as possible before disinfecting with a solution of 70% ethanol or methylated spirits in 30% water—applied through a spray bottle or a footbath.

iv. Seal all personal rubbish in a bag and spray the outside of the bag with a solution of 70% ethanol or methylated spirits in 30% water before responsible disposal offsite.

v. Collect all removed mud, soil and organic matter in a bag or bucket, and keep it out of clean bushland.

Disinfecting vehicles and machinery

i. Use a wash-down facility for vehicles and machinery if available, or wash-down on a hard, well-drained surface, for example a road, and on ramps if possible. See **References and resources** below for links to online wash-down guidelines.

ii. Pay particular attention to cleaning mud flaps and tyres.

iii. Dispose of wash-down water so that it drains back into a low area of the infested zone away from waterways. If this is not possible, empty it into a waste container for responsible disposal offsite.

iv. Don't allow wash-down water to drain into clean bushland.

v. Don't drive through wash-down water.

Photo: Wash-down point (Department of Parks and Wildlife WA)

Photo: Truck undercarriage wash-down (South Coast Natural Resource Management, WA)

Additional considerations where myrtle rust is present

- Disposable overalls and caps may be worn over clothing upon entering a site, and removed when leaving the site. However, in high-risk cases, also shower and change into clean clothes (including hats, gloves and footwear).
- Wash all clothing, hats and gloves between site visits using warm or hot machine wash with detergent.
- Do **NOT** remove any plant material from sites infested with myrtle rust. Dispose of plant waste by burial on site. If this is not possible, seal the waste in a plastic bag, seal the bag in a second bag and spray the outside of the bag with a solution of 70% ethanol or methylated spirits in 30% water before responsible disposal offsite.

Revegetation

Where weeds and other disturbances are controlled, natural regeneration can assist the bushland to revegetate over time. Where revegetation activities are necessary, the following steps will help stop the spread of invasive species:

- Arrive clean, leave clean—ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of weed seeds, mud, soil and organic matter before entering and exiting bushland.
- Liaise with land managers and relevant plant specialist stakeholders (for example Australian Network for Plant Conservation, Greening Australia, Landcare groups, botanic gardens, seed banks etc.) to collaborate on the revegetation strategy.
- Select indigenous plants that occur naturally in your local area wherever possible.
- Avoid species with the potential to become weeds of the environment or agriculture.
- If the site is infested with *Phytophthora* spp. or myrtle rust, select species resistant to the disease, or seed from more tolerant individuals of susceptible plant species.
- Consult the Australian Network for Plant Conservation translocation guidelines 2004 (see **References and resources** below). These focus on threatened species but many of the techniques and considerations also apply to non-threatened species.
- Consider a combination of revegetation techniques such as seed production areas, direct sowing and enhancement of natural sites to assist natural regeneration. Many of these will be lower risk than the use of seedlings.
- If using seedlings, purchase them from a supplier that can guarantee high standards of hygiene—such as NIASA-accredited businesses. For added certainty, ensure the supplier allows testing of a random sample of seedlings and soil for *Phytophthora* spp. 3–6 weeks before acceptance of the seedlings. If the pathogen is present, the batch must be rejected.
- Check plants on receipt and at intervals during any holding period. Seek specialist advice if any suspect symptoms appear (for example coloured pustules, leaf necrosis).
- If propagating, maintain high standards of hygiene—see the section on propagation below.
- Plant when the soil is moist but not wet.
- Use mains or disinfected water to irrigate plants.
- If you are aware of a plant pathogen infestation, begin revegetation in the clean part of the bushland before moving to the infested area. Ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are clean before leaving the infested area.

Weed management

When conducting weed management activities, the following steps will help stop the spread of invasive species:

- Arrive clean, leave clean—ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of weed seeds, mud, soil and organic matter before entering and exiting bushland.
- Schedule weeding for dry soil conditions where possible.
- Use techniques that minimise soil disturbance. For example, mow or slash or use an appropriate herbicide in preference to digging or grading.
- Ensure transport and disposal of plant material does not introduce weeds to new areas. In sites free of myrtle rust, place weeds into a bag or container immediately for removal. Always cover trailers when transporting plant material to prevent anything from falling off. Some weeds can reproduce vegetatively—from leaves, bulbs or other plant material—while others use seeds, and some may require heat or cold treatment before composting, mulching or disposal.
- If a site is infested with myrtle rust, do **NOT** remove any plant material. Dispose of plant waste by burial on site. If this is not possible, seal the waste in a plastic bag, seal the bag in a second bag and spray the outside of the bag with a solution of 70% ethanol or methylated spirits in 30% water before responsible disposal offsite.
- If you are aware of a plant pathogen infestation, begin weeding in the clean part of the bushland before moving to the infested area. Clean all clothing, hats, footwear, tools, equipment, machinery and vehicles before leaving the infested area.

Propagation

The following steps will help stop the spread of invasive species during propagation activities:

- Ensure all benches, equipment, pots and containers are clean and disinfected.
- While using implements such as cutting knives or secateurs, wash them regularly with a solution of 70% ethanol or methylated spirits in 30% water.
- Steam-air pasteurise soil mixes for 30 minutes at 60°C, or select materials that conform to Australian Standard *AS3743–2003 Potting mixes* or *AS4454–2012 Composts, soil conditioners and mulches*. These standards require the materials to be free from plant pathogens, pests, harmful chemicals and weeds.
- Avoid bringing soil on boots and equipment into the nursery areas.
- If possible, keep pots on raised wire-mesh benches at least 30 centimetres off the ground. Otherwise, keep them on free-draining blue metal.
- Keep the whole nursery area clean and free of dead plant material and rubbish.

References and resources—general

Guidelines for the translocation of threatened plants in Australia—Second edition	2004	Vallee L, Hogbin T, Monks L, Makinson B, Matthes M and Rossetto M; Australian Network for Plant Conservation, Canberra	https://www.anbg.gov.au/anpc/publications/translocation.html
Leave no trace Australia		Web resources	www.lnt.org.au/resources/biosecurity/bio-security.html www.lnt.org.au/resources/skills-ethics-series.html

References and resources—wash-down procedures

Vehicle and machinery checklists—clean-down procedures	2014	Biosecurity Queensland, Department of Agriculture, Fisheries and Forestry; State of Queensland	https://www.daff.qld.gov.au/__data/assets/pdf_file/0011/58178/IPA-Cleandown-Procedures.pdf
Weed out the seeds—How to clean down your vehicle and machinery to help prevent the spread of weed seeds	2011	Biosecurity Queensland, Department of Agriculture, Fisheries and Forestry; State of Queensland	https://www.youtube.com/watch?v=dTNDecjTVfI
A guide for machinery hygiene for civil construction	2011	Civil Contractors Federation, State of Victoria, Department of Primary Industries, Department of Sustainability and Environment, VicRoads and the Association of Land Development Engineers	www.civilcontractors.com/Uploads/files/LR%20CCF%20Machinery%20Hygiene%20Bklt%2040pp.pdf
Keeping it clean: A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens	2010	NRM South, Tasmania	dpipwe.tas.gov.au/Documents/15130802_52keepingitcleanspreadswe.pdf
Biosecurity videos		NRM South, Tasmania	www.nrmsouth.org.au/biosecurity/
Field hygiene kits for landholders or community groups in Tasmania—available for purchase		NRM South, Tasmania	Landholders www.nrmsouth.org.au/wp-content/uploads/2014/08/Biosecurity-kits-sales-flyer-2015-Landholders.pdf Community groups www.nrmsouth.org.au/wp-content/uploads/2014/08/Biosecurity-kits-sales-flyer-2015-community.pdf

References and resources—seed production areas

Sowing seeds: bridging the gap between ex situ collections and reintroduction	2012	Guja L, North T, Taylor D and McAuliffe J; Australasian Plant Conservation 21(3)	www.anbg.gov.au/anpc/apc/21-3_guja.html
Developing seed production areas for native plants—Corangamite region guidelines	2008	Heyes S, Butler M, Gartlan C and Ovington A; Corangamite Seed Supply and Revegetation Project	www.florabank.org.au/files/documents/seedproductionareas/Corangamite%20Seed%20Production%20Area%20Guidelines08%20P1.pdf
Introducing seed production areas: an answer to native seed shortages	2008	Vanzella B; Greening Australia	www.florabank.org.au/files/newsattachments/SPA%20handout_%20master%20GACR%20Bindi%20Vanzella%20March08.pdf

References and resources—*Phytophthora cinnamomi*

Managing Phytophthora dieback—Guidelines for local government	2000	Dieback Working Group	https://www.dwg.org.au/images/dieback_publications/Managing_Phytophthora_Dieback_guidelines.pdf
Managing Phytophthora dieback in bushland—A guide for landholders and community conservation groups	2008	Dieback Working Group	https://www.dwg.org.au/images/dieback_publications/Managing_Phytophthora_Dieback_in_Bushland.pdf
Resistant native plant species—A list of resistant native plant species from Western Australia from the Centre of Phytophthora Science and Management at Murdoch University		Dieback Working Group	https://www.dwg.org.au/images/dieback_publications/Western_Australian_Natives_Resistant.pdf
Susceptible native plant species—A list of susceptible native plants species from Western Australia from the Centre of Phytophthora Science and Management at Murdoch University		Dieback Working Group	https://www.dwg.org.au/images/dieback_publications/Western_Australian_natives_susceptible.pdf

Management of *Phytophthora cinnamomi* for biodiversity conservation in Australia: Part 1—A review of current management.	2005	O'Gara E, Howard K, Wilson B and Hardy GEStJ—a report by the Centre for Phytophthora Science and Management, Murdoch University, Western Australia funded by the Australian Government Department of the Environment and Heritage	www.environment.gov.au/biodiversity/invasive-species/publications/management-phytophthora-cinnamomi-biodiversity-conservation
Management of *Phytophthora cinnamomi* for biodiversity conservation in Australia: Part 2—National best practice guidelines. Appendix 1—*Phytophthora cinnamomi* Appendix 2—The rationale of current management options Appendix 3—Areas vulnerable to disesase caused by *Phytophthora cinnamomi* Appendix 4—The responses of native Australian plant species to *Phytophthora cinnamomi*	2005	O'Gara E, Howard K, Wilson B and Hardy GEStJ—a report by the Centre for Phytophthora Science and Management, Murdoch University, Western Australia funded by the Australian Government Department of the Environment and Heritage	www.environment.gov.au/biodiversity/invasive-species/publications/management-phytophthora-cinnamomi-biodiversity-conservation
Management of *Phytophthora cinnamomi* for biodiversity conservation in Australia: Part 3—Risk assessment for threats to ecosystems, species and communities: A review	2005	Wilson B, Howard K, O'Gara E and Hardy GEStJ—a report by the Centre for Phytophthora Science and Management, Murdoch University, Western Australia funded by the Australian Government Department of the Environment and Heritage	www.environment.gov.au/biodiversity/invasive-species/publications/management-phytophthora-cinnamomi-biodiversity-conservation
Management of *Phytophthora cinnamomi* for biodiversity conservation in Australia: Part 4—Risk assessment models for species, ecological communities and areas.	2005	Centre for Phytophthora Science and Management—a report by the Centre for Phytophthora Science and Management, Murdoch University, Western Australia funded by the Australian Government Department of the Environment and Heritage	www.environment.gov.au/biodiversity/invasive-species/publications/management-phytophthora-cinnamomi-biodiversity-conservation

Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*	2014	Australian Government Department of the Environment	www.environment.gov.au/resource/threat-abatement-plan-disease-natural-ecosystems-caused-Phytophthora-cinnamomi
Background: Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*	2014	Australian Government Department of the Environment	www.environment.gov.au/resource/threat-abatement-plan-disease-natural-ecosystems-caused-Phytophthora-cinnamomi
Response of selected South Australian native plant species to *Phytophthora cinnamomi*	2012	Kueh KH, McKay SF, Facelli E, Facelli JM, Velzeboer RMA, Able AJ, Scott ES	onlinelibrary.wiley.com/doi/10.1111/j.1365-3059.2012.02593.x/full
Infection of native plants by *Phytophthora cinnamomi*—key threatening process listing	2002	New South Wales Government Office of Environment and Heritage	www.environment.nsw.gov.au/determinations/PhytophthoraKTPListing.htm
Stamp out the spread of Phytophthora dieback		Royal Botanic Gardens Sydney	www.rbgsyd.nsw.gov.au/__data/assets/pdf_file/0008/106937/Phytophthora_brochure.pdf
Are you a carrier? Phytophthora dieback is a silent plant killer		Royal Botanic Gardens Sydney	www.rbgsyd.nsw.gov.au/__data/assets/pdf_file/0007/106936/Phytophthora_flyer.pdf
Management of *Phytophthora cinnamomi* in production forests	2009	Tasmanian Government Forest Practices Authority	www.fpa.tas.gov.au/__data/assets/pdf_file/0004/58054/Flora_technical_note_8_Phytophthora.pdf
Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects Guide 7: Pathogen management	2011	NSW Roads and Maritime Services	www.rms.nsw.gov.au/documents/about/environment/biodiversity_guidelines.pdf

References and resources—myrtle rust

Look out for myrtle rust	2010	New South Wales Department of Primary Industries	www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/364870/myrtle-rust-brochure.pdf
Identification of myrtle rust	2010	New South Wales Department of Primary Industries	www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/337374/identification-myrtle-rust.pdf
Preventing spread of myrtle rust in bushland	2010	New South Wales Department of Primary Industries	www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/362096/preventing-spread-Myrtle-Rust-bushland.pdf
New South Wales Department of Primary Industries myrtle rust resources page		New South Wales Department of Primary Industries	www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust/resources
Australian Nursery Industry myrtle rust management plan	2012	Nursery and Garden Industry Australia	www.ngia.com.au/Folder?Action=View%20File&Folder_id=135&File=Myrtle%20Rust%20Management%20Plan%202012%20Final%20V2.pdf
Myrtle rust—current information including national and international host lists; bibliography.	2014	The Australian Network for Plant Conservation	https://www.anbg.gov.au/anpc/resources/Myrtle_Rust.html
Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects Guide 7: Pathogen management	2011	NSW Roads and Maritime Services	www.rms.nsw.gov.au/documents/about/environment/biodiversity_guidelines.pdf
Current Biosecurity Threats		Biosecurity Tasmania, Department of Primary Industries, Parks, Water and Environment	dpipwe.tas.gov.au/biosecurity/current-biosecurity-threats

References and resources—weeds

Australian Weeds Strategy—A national strategy for weed management in Australia	2006	Natural Resource Management Ministerial Council, Australian Government Department of the Environment and Water Resources	www.environment.gov.au/biodiversity/invasive/weeds/publications/strategies/pubs/weed-strategy.pdf
Weeds in Australia web pages		Australian Government Department of the Environment	www.weeds.gov.au
Weeds of National Significance (WoNS) web pages		Australian Weeds Committee	www.weeds.org.au
Vehicle and machinery checklists—clean-down procedures	2014	Biosecurity Queensland, Department of Agriculture, Fisheries and Forestry; State of Queensland	https://www.daff.qld.gov.au/__data/assets/pdf_file/0011/58178/IPA-Cleandown-Procedures.pdf
Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects Guide 6: Weed management	2011	NSW Roads and Maritime Services	www.rms.nsw.gov.au/documents/about/environment/biodiversity_guidelines.pdf

Appendix A

Example checklists

Risk assessment checklist

Determine all risks associated with the potential transfer of pathogens or weeds to/from/through the project site (consider all participants handling plant material and equipment, from collection to site through to on-site works and clean-up).

Liaise with the project site's land managers to determine the presence of:

☐ *Phytophthora* spp.

☐ Myrtle rust

☐ Weeds

Liaise with the project site's land managers to determine the presence of:

☐ Vulnerable native plant communities

☐ Species susceptible to *Phytophthora* spp. or myrtle rust

☐ Threatened species or communities listed under Commonwealth or state/territory legislation

Identify any planned activities with the potential to introduce or spread pathogens or weeds:

☐ Introduction of plant material to a site (seedlings, seeds, mulch etc.)

☐ Introduction of other materials to a site (soil, gravel, rock, sand etc.)

☐ Vehicle or machinery access to a site

☐ Any potential soil disturbance

Hygiene management plan checklist

To prevent the risks having an impact:

☐ Plan to visit only one site per day

☐ Schedule activities for the right conditions

☐ Use equipment that can be cleaned easily and thoroughly

☐ Minimise personal items that can carry pathogens

☐ Include training sessions so participants are aware of why hygiene is necessary, how to arrive clean, stay clean and leave clean

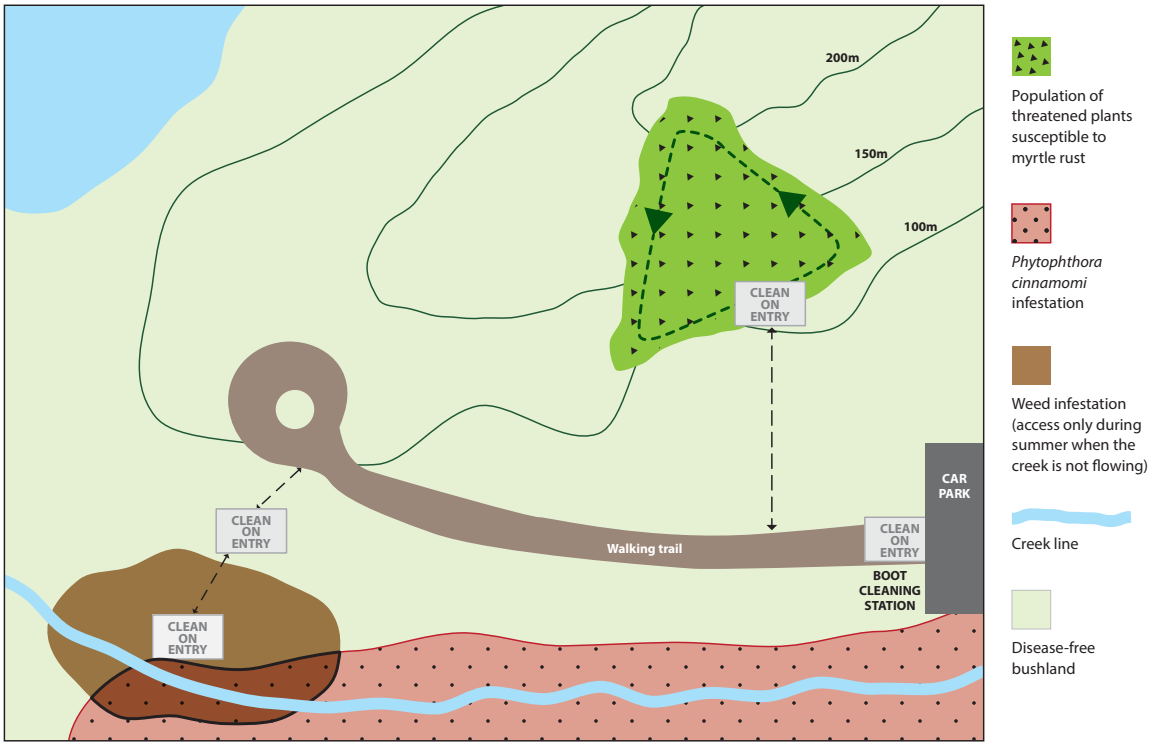
☐ Establish access controls including routes of access and timing on a management map

☐ Establish hygiene controls including hygiene procedures, hygiene infrastructure, clean on entry locations and wash-down points on a management map

☐ Maintain wash-down facilities and hygiene infrastructure

☐ Record and monitor site for any accidental spread of pathogens or weeds

Example hygiene management map



A large area within the project site is disease-free bushland, including a population of threatened plants susceptible to myrtle rust. This population must be monitored regularly during and after the project for any indications of disease.

There is an infestation of the weed arum lily (*Zantedeschia aethiopica*) limited to a small area on either side of the creek. Part of this area is also infested with *Phytophthora cinnamomi* which is present along much of the creek line. To avoid the spread of *Phytophthora cinnamomi*, all weed control activities should be scheduled during the dry season when the creek is not flowing.

'Clean on entry' access to the site is via a boot cleaning station at the car park entrance. From the walking trail there is one pathway of access to the population of threatened plants and another to the arum lily population. At both of these 'clean on entry' points there will be hygiene kits containing hard brushes, spray bottles of disinfectant and alcohol wipes.

Biosecurity hygiene kit: assemble a simple kit with the following items:

☐ Plastic tub with a lid (to carry items and to use as a footbath)

☐ Stiff brush

☐ Newspaper to cover the footwell of a vehicle (replace with clean newspaper regularly)

☐ Dustpan and brush; possibly also a long-handled broom

☐ Plastic bag for sweepings and dirty newspaper

☐ Drum of water and some disinfectant, for example a solution of 70% ethanol or methylated spirits in 30% water; or 20% household bleach (with 5% active ingredient) in 80% water; or quaternary ammonium disinfectant diluted according to manufacturer's directions.

☐ Spray bottle with a solution of 70% ethanol or methylated spirits in 30% water

☐ Alcohol wipes or gel for hands and personal items

Photo: Biosecurity hygiene kit (Department of Parks and Wildlife WA)

environment.gov.au

BIO382.0215

Appendix C

Pre-clearance survey (Capital Ecology)

17 June 2020

Mr Mitch Ryan
Project Engineer - National Resources
Triniti 2, 39 Delhi Road, NSW 2113
M: 0401 893 023
E: mitch.ryan@boral.com.au

Pre-clearance statement for the Mugga Quarry overburden emplacement project

Capital Ecology project no. 2969

Dear Mr Ryan,

This letter outlines the required pre-clearance surveys and works completed on 16 June 2020 prior to the vegetation clearance of the Mugga Quarry overburden emplacement extension (the 'project area').

As outlined in Section 4.2.11.1 of the Construction Environmental Management Plan[1] (CEMP), a qualified ecologist is required to complete several tasks prior to the vegetation clearance associated with the project. The following tasks were completed as outlined in the CEMP.

- *Marking and recording of all habitat trees within the clearing zone for removal and confirmation that no previously unidentified threatened species (or target species) are present.*
- *Targeted surveys for the Superb Parrot, including searching of hollow bearing trees for nesting parrots and observation of understorey for feeding parrots. The location of any Superb Parrot nests will be marked for further work during clearing.*
- *Identification of the species and location of any weeds growing within the area to be cleared and grubbed.*
- *Identify and note the location of other threatened flora species, endangered ecological communities (EECs), threatened species habitat and trees which have been marked or otherwise identified for preservation.*

[1] Boral (2020). *Construction Environmental Management Plan – Mugga Quarry Overburden Expansion Project*. May 2020.

Marking of hollow-bearing trees within the clearance area

Capital Ecology (2018) conducted a hollow-bearing tree assessment to identify potential habitat trees in the project area[2]. A total of 19 hollow-bearing trees were identified in the CEMP to be directly impacted, and therefore removed, by the overburden emplacement extension (Figure 1). Each of these trees was marked with high-vis tape around the trunk and/or a branch near breast height. The removal of these trees will be conducted in accordance with Section 4.2.11.2 of the CEMP.

It is noted that four hollow-bearing trees (Tree 12, 13, 14 and 51) identified by Capital Ecology occur in the existing Mugga Quarry approved quarry footprint and will also be removed as part of the overburden emplacement extension. The felling of these trees should be conducted in accordance with the removal of hollow-bearing trees as outlined in Section 4.2.11.2 of the CEMP.

Three additional hollow-bearing trees were identified during pre-clearance surveys. These trees have been marked with high-vis tape and are shown on Figure 1. Tree A1 is a Blakely's Red Gum *Eucalyptus blakelyi*, Trees A2 and A3 are both stags.

Trees 6, 17, 18, 19, 26, 35 and 36 occur immediately adjacent to or within the boundary of the total disturbance area (refer Figure 2) but will not be removed as part of the clearance works. Each of these trees has also been marked with high-vis tape.

Targeted Superb Parrot Survey

A 2-hour targeted Superb Parrot *Polytelis swainsonii* survey was conducted in the project area between 9:40 – 11:40 am on 15 June 2020. All hollow-bearing trees in the project area and immediately surrounding area were searched for the presence of Superb Parrot individuals. No Superb Parrots or other threatened bird species were recorded.

A total of 17 bird species were recorded during the survey. Additionally, the native Eastern Grey Kangaroo *Macropus giganteus* and exotic Brown Hare *Lepus capensis*, European Rabbit *Oryctolagus cuniculus*, and Red Fox *Vulpes vulpes* were recorded. A list of recorded fauna species is provided in Appendix A.

Table 1. Survey weather conditions. (Source - Bureau of Meteorology)

Date	Temperature Min-Max	Wind @ 3pm	Cloud (8th)	Rain
15/06/2020	6.4 – 13.5°C	24 km/h	6	0 mm

Weed identification and mapping

The project area was surveyed for significant weed infestations. The majority of the project area supports a substantial cover of common agricultural weed species (Paterson's Curse *Echium plantagineum*, Buchan Weed *Hirschfeld incana*, and Scotch Thistle *Onopordum acanthium*). Significant weed species (i.e. Weeds of National Significance or NC Act listed species) were restricted to a single Blackberry *Rubus fruticosus* plant, the location of which is shown on Figure 2.

[2] Capital Ecology (2018). *Supplementary ecological surveys for the Mugga Quarry overburden emplacement project*. Authors: R. Speirs, S. Thompson, and S. Reid. Project no. 2969.

Conclusion

The pre-clearance surveys and activities were completed in accordance with Section 4.2.11.1 of the CEMP. All hollow-bearing trees in the project area, including those to be retained, have been marked with high-vis tape prior to any clearance in the project area. No Superb Parrots or other threatened species were recorded in the project area and the locations of significant weed species were recorded.

We trust that this letter-report provides the information required. However, please do not hesitate to contact us should you have any questions relating to this letter or the works completed.

Yours sincerely,

Robert Speirs

Director / Principal Ecologist

Accredited BAM Assessor (No: BAAS17089)

Shannon Thompson

Field Ecologist

Attachments:

Figure 1. Hollow-bearing Trees to be Removed

Figure 2. Direct Impact Area

Appendix 1. Fauna Species Recorded

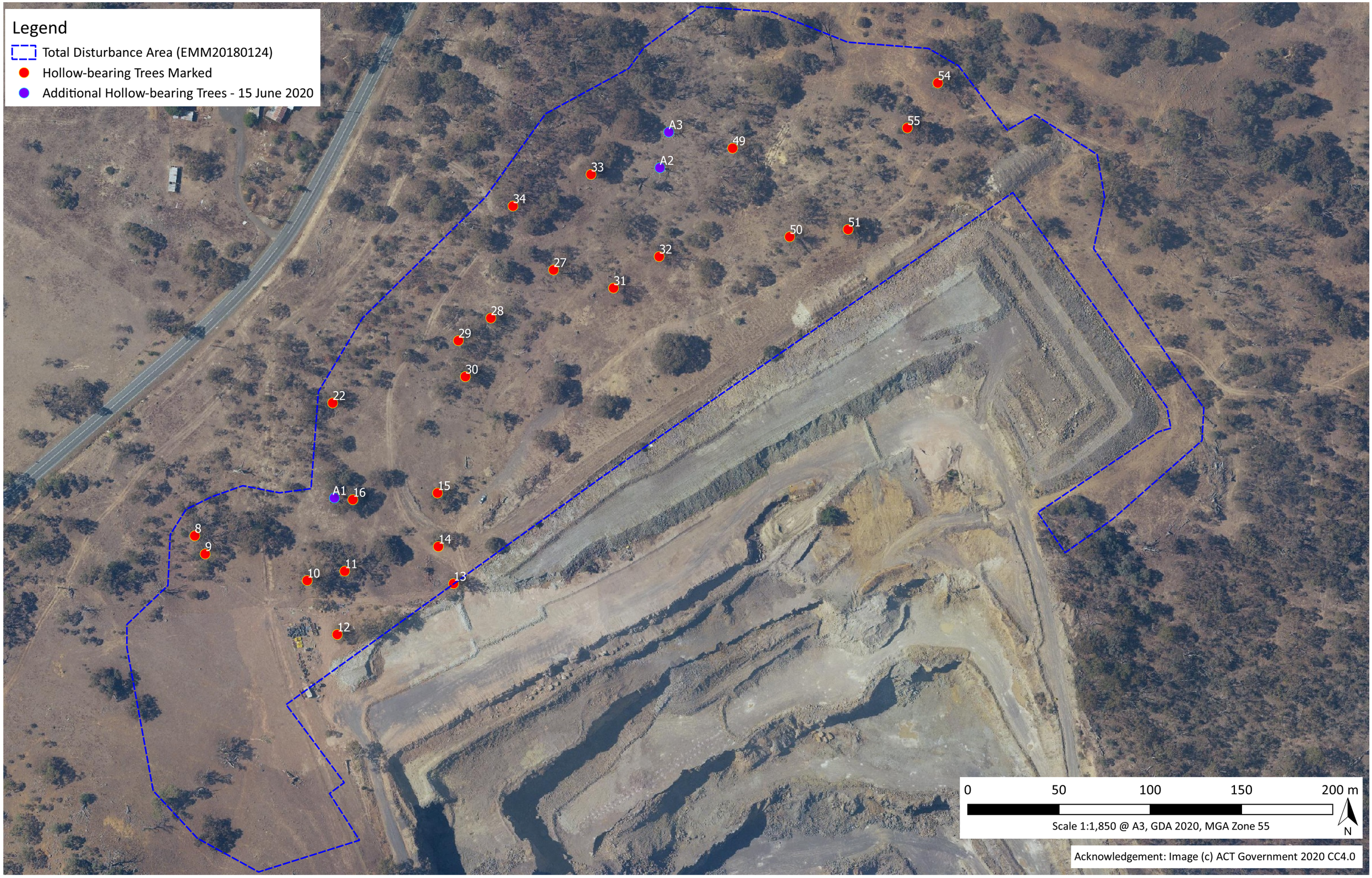


Figure 1. Hollow-bearing Trees to be Removed

Capital Ecology Project No: 2969
Drawn by: S. Thompson
Date: 16 June 2020

capital ecology

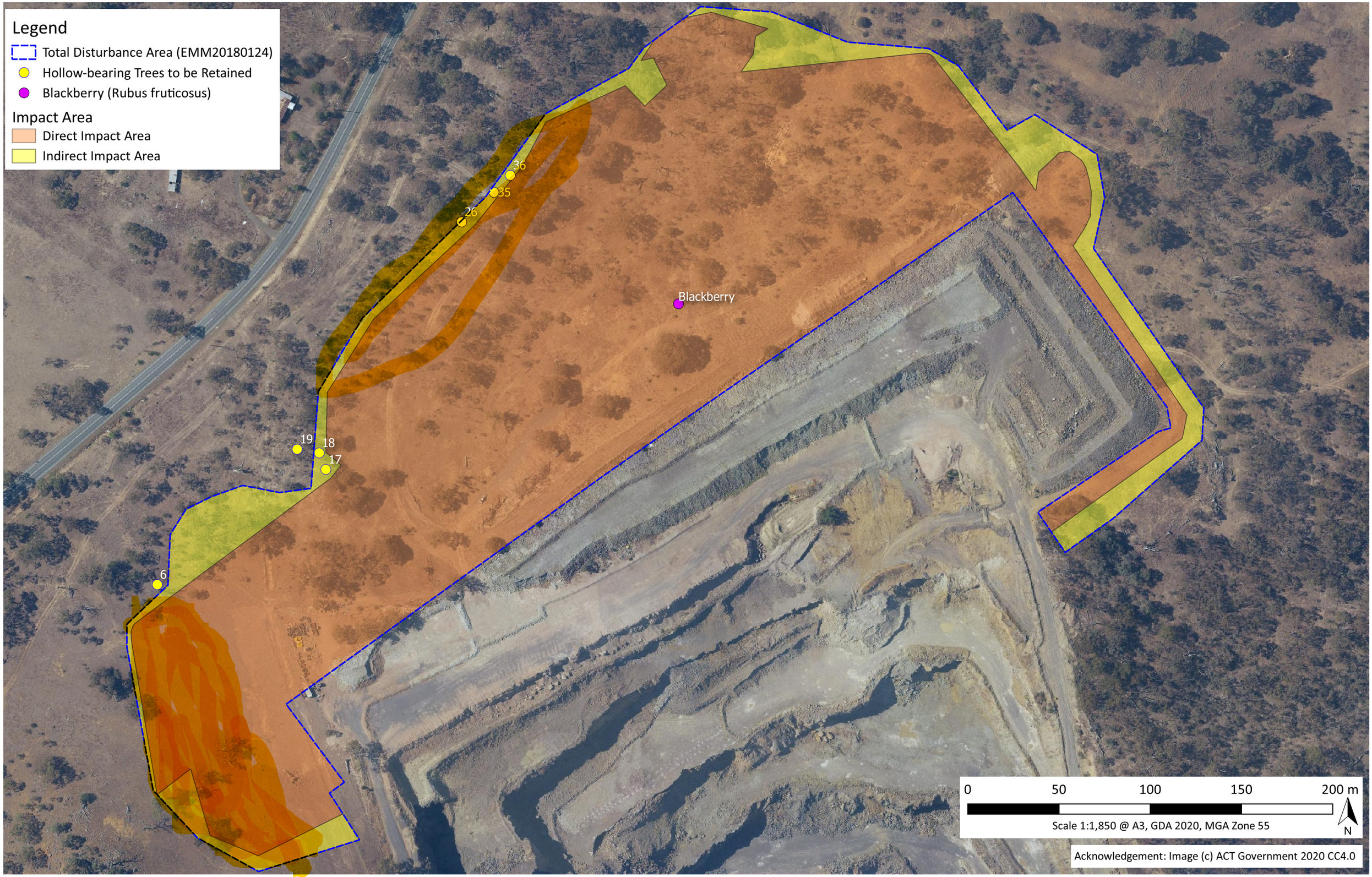


Figure 2. Direct and Indirect Impact Area

Capital Ecology Project No: 2969
Drawn by: S. Thompson
Date: 16 June 2020

capital ecology

Appendix A. Fauna Species Recorded

Class	Common name	Scientific name	Native/Exotic
Aves	Australian Magpie	*Gymnorhina tibicen*	Native
Aves	Australian Raven	*Corvus coronoides*	Native
Aves	Crimson Rosella	*Platycercus elegans*	Native
Aves	Eastern Rosella	*Platycercus eximius*	Native
Aves	Galah	*Eolophus roseicapilla*	Native
Aves	Golden Whistler	*Pachycephala pectoralis*	Native
Aves	Grey Fantail	*Rhipidura albiscapa*	Native
Aves	Grey Shrike-thrush	*Colluricincla harmonica*	Native
Aves	Magpie-lark	*Grallina cyanoleuca*	Native
Aves	Noisy Miner	*Manorina melanocephala*	Native
Aves	Red Wattlebird	*Anthochaera carunculata*	Native
Aves	Rufous Whistler	*Pachycephala rufiventris*	Native
Aves	Sulphur-crested Cockatoo	*Cacatua galerita*	Native
Aves	Superb Fairy-wren	*Malurus cyaneus*	Native
Aves	Wedge-tail Eagle	*Aquila audax*	Native
Aves	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	Native
Aves	Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*	Native
Mammalia	Brown Hare	*Lepus capensis*	Exotic
Mammalia	Eastern Grey Kangaroo	*Macropus giganteus*	Native
Mammalia	European Rabbit	*Oryctolagus cuniculus*	Exotic
Mammalia	Red Fox	*Vulpes vulpes*	Exotic

Appendix D

High wind event 20 August 2020

Photo 1 - Hollow-bearing tree 18 (looking south-east)

Photo 2 - Hollow-bearing tree 18 (looking west)

Appendix E

Form 01: Ground disturbance and vegetation clearing request form

Form 01: Ground disturbance and vegetation clearing

8-03 Land Management
8-08 Ecosystems and Biodiversity Management
8-09 Culture & Heritage Protection

When to use this form?

If you are planning to, or have the potential to:

- disturb areas of virgin ground; or
- clear / cut / disturb any vegetation, including shrubs or ground covers (excluding pruning to landscaped gardens); or
- disturb **Aboriginal Cultural Heritage** or **European Heritage**

This form and its process can take months to complete, so engage early with your Environment Manager.

Who uses this form?

Site Managers or their delegate.

Who is responsible for managing actions resulting from this form?

The Site Manager.

If in doubt, call your regional Environment Manager (see below).

Environmental contacts

Region / business	Environment contact	Contact details
NSW/ACT	Shoanne Labowitch	0401 895 827
QLD	Jessica Cawley	0401 892 535
VIC/TAS	Kit Sleeman	0401 893 653
SA	Peter Snell	0401 892 327
WA/NT	Tyra Sherriff	0401 896 948
Cement	Greg Johnson	0401 893 420
Timber & RME	Rod Wallace	0411 659 271

PROCESS

PART A	Vegetation Clearing / Ground disturbance details	This section to be completed by: Site Manager
Site:	**{type text here]**	
Requestor Name and Position:		
Date of request:		
Proposed timing of the vegetation clearing/ ground disturbance:		
Purpose of vegetation clearing/ ground disturbance:		
Description and location of vegetation clearing/ ground disturbance:		
Proposed clearing methods and controls. I.e.: • Method and equipment to be used • Survey, mark out vegetation and/ or peg area • Install Sediment and Erosion Controls • Engage Fauna Spotter and Catcher • Commission Aboriginal Cultural Heritage Survey		
Attachments (i.e. map, photos, plans)):	*[Insert text and images here or list larger images appended to this request]*	

PART B - Approval Review Checklist *(This section to be completed by: Environment, BLPG and NRG)*		
Checklist	**Is the site compliant (yes/ no/ comments)**	**List action if required Refer PART C**
NRG – QUARRIES ONLY		
Is the proposed clearing/ ground disturbance consistent with the approved Mine Operating Plan (MOP) or other mine regulator documentation?		
Is the mapping layer to be provided to the surveyor consistent with relevant approvals? This may need to be checked with BLPG.		
BLPG		
Are the required approvals in place for the proposed clearing/ ground disturbance activities (local, state/ territory, federal government levels)? Refer to Attachment 2 for region specific approvals.		
Is the clearing in accordance with the approved Clearing Plans?		
Have relevant pre-clearance approval conditions been satisfied?		
Is the clearing / ground disturbance within the Boral property boundaries?		
Is there a requirement for Offsets? If so have the offsets been legally secured?		
Have we taken appropriate steps to investigate the presence of cultural heritage values and engaged with appropriate groups / authorities under the Cultural Heritage legislation (i.e. Reports, Agreements, Cultural Heritage Management Plan or Due Diligence) and have all pre-ground disturbance / clearing conditions been satisfied for the proposed disturbance area (ie. Cultural Heritage Surveys, Inductions)?		
Environment		
Have relevant Environment approval and Environment Permit Planner (EPP) requirements been completed?		
Has Site proposed appropriate sediment and erosion control measures?		
Has Site proposed appropriate fauna/ protected flora management?		
Has Site proposed adequate method of vegetation clearing and appropriate disposal?		

PART C - Actions / Controls *(This section to be completed by, Environment, BLPG and NRG)*				
#	**Implementation Action/Control**	**Timing (prior to and post clearing)**	**Responsibility**	**Evidence required**
1	During ground disturbance or vegetation clearing activities, all Boral staff and contractors must STOP WORKS IMMEDIATELY if there are any artifacts or cultural heritage values found.		Site Manager	
2				
3				
4				

PART D – Authorisation *(This section to be completed by: Environment, BLPG and NRG)* **This authorisation is valid for 3 months from the date issued – after 3 months, or if the scope is varied, this authorisation will need to be re-issued based on any changes.**			
Position	**Name**	**Signature**	**Date**
Regional Resources Manager, NRG			
Regional Environment Manager, HSE			
Planning and Development Manager, BLPG			
Operations / Regional Manager			
General Manager			
*Executive General Manager / Director of business			

**Approval required if:*

- *Endangered, threatened or vulnerable flora and fauna are impacted; or*
- *Aboriginal Cultural Heritage or European Heritage will be impacted; or*
- *Offsets of more than $75,000 unbudgeted or $150,000 budgeted are required.*

ATTACHMENT 1 - Process

The following process must be followed prior to undertaking any vegetation clearing, ground disturbance activities that may disturb Aboriginal Cultural Heritage or European Heritage. Vegetation includes, but is not limited to, trees, shrubs, grasslands, wetlands and re-growth. Ground disturbance means undertaking activities that physically impact previously undisturbed areas. This process is managed by the Regional Environment Manager (REM).

Step	Responsible	Actions
1	Site Manager	1.1 Site Manager to **call** the Regional Environment Manager (REM)and explain what vegetation clearing and/ or ground disturbance is planned
2	Environment Manager	*2.1* REM to determine if the Vegetation Clearing/Ground Disturbance Assessment and Approval Form are required to be completed. *Most activities will require the form to be completed however some, such as clearing some weeds, will be exempt.* 2.2 If the form is **not** required the REM will advise the Site Manager they can commence vegetation clearing and/ or ground disturbance – and follow up with an email. 2.3 If a form **is** required, the REM shall provide Site Manager the form and explain the process (as outlined below) 2.4 REM to record all requests in the register
3	Site Manager	3.1 Site Manager to complete ***PART A*** of the form and send to the REM with any attachments
4	Environment Manager	4.1 REM to upload the form onto the collaboration page and email relevant BLPG and NRG Managers that the form has been
5	Environment, BLPG & NRG Manager	5.1 REM, BLPG and NRG Managers to complete ***PART B, PART C*** and ***PART D*** of the form and notify Environment Manager when it is complete
6	Environment Manager	6.1 REM to send completed form to Site Manager and if required discuss the implementation actions (including any evidence required prior to commencing clearing/ ground disturbance)
7	Site Manager	7.1 Site Manager to **complete** any **implementation actions from PART C** as per the timing schedule and obtain evidence required. Evidence shall be provided to Environment Manager 7.2 Site Manager to complete vegetation clearing/ ground distance in accordance with the form.
8	Environment Manager	8.1 REM to file completed form and evidence

ATTACHMENT 2 – Region specific approval requirements

State	Approvals to be considered
National	• Department of Agriculture, Water and the Environment (DAWE) National EPBC Approval (*for matter of national environmental significance, which is in addition to relevant state/local based approvals*)
ACT	• Clearing laws are regulated predominantly by the Nature Conservation Act 2014 (ACT). • Environment, Planning and Sustainable Development Directorate - The Executive Director of Policy holds the office of the Conservator of Flora and Fauna. • Written approval from the Conservator required as a part of Development approval/variation.
NSW	• Department of Planning, Industry and Environment Development Approval • Local Land Services Clearing Approval • WaterNSW Controlled Activity Approval (CAA) for disturbance of any land within 40m of a watercourse • Local Council Vegetation Clearing Approval
NT	• Department of Primary Industry and Resources (DPIR) Mining Managament Plan. • Departmeent of Lands, Planning and the Environment Clearing Permit (Freehold land) • Pastoral Land Board Clearing Permit (Pastoral leases) • NT Environment Protection Authority (NTEPA) Ministerial Statement (State based assessment)
QLD	• MCU DA • OPW Vegetation Clearing • Local Law Permit Vegetation Clearing • NCA Permit or Exemption • EPBC Act/ Referral/ Exemption
SA	• Clearance approval under Section 28 of the Native Vegetation Act 1991 • Council / Local Laws / Permits for tree and vegetation removal
TAS	• Council / Local Laws / Permits for tree and vegetation removal • Certified forest practices plan to authorise land clearing for clearing forest or clearing and converting threatened native vegetation communities
VIC	• Council / Local Laws / Permits for tree and vegetation removal • EPBC Act/ Referral/ Exemption
WA	• Department of Mines, Industry Regulation and Safety (DMIRS) Mining Proposal (Tenements only) • Local Government Extravtive Industry Licence and Development Approval (Private land only) • Department of Water and Environment Regulation (DWER) Clearing Permit • Environment Protection Authority (EPA) Ministerial Statement (State based assessment)