EPBC Annual Compliance Report 2023
Lynwood Quarry, EPBC 2012/6560

Prepared for Holcim

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BGWMP	Box-Gum Woodland Management Plan
CEEC	Critically Endangered Ecological Community
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change Energy, the Environment and Water
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*
MNES	Matters of National Environmental Significance
RLMP	Rehabilitation and Landscape Management Plan

1. Introduction

Lynwood Quarry (the quarry) is a hard rock quarry owned and operated by Holcim (Australia) Pty Ltd (Holcim) located west of Marulan, New South Wales (NSW). Holcim is the trading name for Holcim (Australia) Pty Ltd which, as a member of the Holcim group, is one of the leading suppliers of heavy construction material products in Australia; operating over 80 quarries, over 200 fixed concrete plants and a fleet of over 900 concrete delivery trucks. Holcim began quarry operations at Lynwood Quarry in 2015 and since this time it has provided high quality sand and aggregates for use in construction and landscaping across the local, regional and Sydney markets.

1.1. Project history

Development consent under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) was originally granted for the quarry in December 2005. The key features of the approved operations are shown in Figure 1 in **Appendix D**.

Consideration of listed matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was undertaken in 2005 as part of the original EPBC Act environmental assessment for the quarry. This assessment did not identify any MNES pertinent to the development. Holcim commenced construction of the quarry in late 2010 with operations commencing in October 2015.

However, MNES were identified part way through construction works as a result of pre-clearance site inspections by environmental personnel. They included the *Leucochrysum albicans* var*. tricolor* (Hoary Sunray) and *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* which is listed as a Critically Endangered Ecological Community (CEEC). The Hoary Sunray is listed as an endangered species under the EPBC Act. At the time of the original ecological assessment in 2005 the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland community was not listed as threatened under the EPBC Act. The ecological community was subsequently listed under the EPBC Act in May 2006. Approximately 19.6 ha of the CEEC was identified within the Project Area, of which 7.9 hectares was approved to be impacted by the quarry development.

Following the identification of MNES, two referrals were prepared for the quarry and approved under the EPBC Act:

- The first referral (EPBC 2012/6560) related to the impacts of Lynwood Quarry on MNES associated with the NSW approved quarry at the time of the referral. That referral was found to be a controlled action and on 13 September 2013 was granted approval subject to conditions.
- The second referral (EPBC 2016/7653) related to a second quarrying area at Lynwood Quarry referred to as the Granite Pit. The extension of quarrying into the Granite Pit was referred in 2016 and was found to not be a controlled action.

On 10 November 2021, Holcim received a notice of a breach of conditions of their EPBC Act approval from the Commonwealth Department of Agriculture, Water and the Environment (DAWE), now Department of Climate Change Energy, the Environment and Water (DCCEEW). This notice specified

that the Box Gum Woodland Management Plan (BGWMP) had not been implemented as required and that the monitoring and record keeping of works had not been done as per the conditions of approval.

As a result of the non-compliance, DAWE has specified that Holcim is required to revise and review the BGWMP and the offsets package that was submitted as part of the EPBC Approval 2012/6560. Work towards this has begun and is scheduled to be completed in 2024.

This document provides an annual compliance report for EPBC Approval 2012/6560 and provides a consolidated review of the compliance actions identified by DAWE in September 2021 along with a description of relevant works program for corrective actions.

1.2. Description of activities

The approved controlled action (2012/6560) comprises aspects of the quarry resulting in surface disturbance as shown in Figure 1.4 in **Appendix A**. Ecological impacts associated with the action include impacts on the identified MNES, specifically, the removal of:

- a total of 7.9 hectares of the EPBC listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (Box Gum Woodland).
- approximately 160 individuals of *Leucochrysum albicans* var*. tricolor* (Hoary Sunray) (refer to Figure 1.3 in Appendix A).

A range of measures to avoid or mitigate impacts on MNES were implemented as part of the Lynwood Quarry development, and a Biodiversity Offset Package has been approved to compensate for residual and unavoidable impacts (refer to Figure 1.4 in **Appendix A** which outlines the Biodiversity Offset Area).

A Box Gum Woodland Management Plan (BGWMP) (**Appendix A**) was prepared and approved in accordance with Condition 2 of the approval, providing a framework for the implementation of ecological management actions, regeneration and revegetation strategies, procedures, controls and monitoring programs for the Biodiversity Offset Area. The Biodiversity Offset Area aims to protect and enhance the extent and condition of critically endangered box gum woodland, provide protection for Hoary Sunray habitat and increase local and regional biodiversity connectivity.

1.3. Purpose

This annual compliance report for January to December 2023 has been prepared to meet the reporting requirements of Condition 8 of the EPBC Approval 2012/6560. Condition 8 of the EPBC Approval 2012/6560 states:

'Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the BGWMP as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published. Non-compliances with any of the conditions of this approval must be reported to the Department within 2 business days of becoming aware of the non-compliance.'

Holcim is required to submit an annual report by 20 March of each year.

2. EPBC Approval Conditions and Compliance

The proposed action was granted approval as a controlled action (EPBC 2012/6560) under the EPBC Act subject to conditions to ensure the protection, sustainability and viability of the MNES within the Project Area. The conditions of approval are detailed in Table 1, along with a statement of compliance for the 2022 reporting period.

Table 1: EPBC Approval Conditions – Compliance Status

Condition no. /reference	Condition	Compliance status	Evidence/comments
1	The person taking the action must not clear more than 7.9 hectares of the ecological community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	**Compliant**	Less than 7.9 hectares of the ecological community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland approved to be cleared as part of the controlled action has been removed as of 31 December 2022.
2	To assist in mitigating the impacts of the proposal on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (box gum woodland (box gum woodland), the person taking the action must prepare and submit a Box Gum Woodland Management Plan (BGWMP) for Minister's written approval prior to commencement of the action. The BGWMP must include:	**Compliant**	The BGWMP was submitted to the Minister for approval on 24 September 2013 and approval was granted on 11 November 2013. Confirmation of this approval is provided in **Appendix B**. A copy of the BGWMP is provided in **Appendix A**.
2 cont.	a. Management actions designed to improve the ecological quality of box gum woodland on the project area (refer to Map at Schedule 1) and proposed biodiversity offset area and protect it from degradation for the duration of the action's impact on box gum woodland.	**Compliant**	Covered in the BGWMP (**Appendix A**).
2 cont.	b. Regeneration and revegetation strategies for box gum woodland on the project area and the proposed biodiversity offset area (refer to Map at Schedule 1) to improve the ecological quality of these areas of box gum woodland.	**Compliant**	Covered in the BGWMP (**Appendix A**).

Condition no. /reference	Condition	Compliance status	Evidence/comments
2 cont.	c. An ecological monitoring program to monitor the success of the management actions in the BGWMP and define measurable targets of management actions, performance indicators, and an adaptive management framework for the duration of the action's impact on box gum woodland.	**Compliant**	Covered in the BGWMP (**Appendix A**).
2 cont.	d. Management of the offset site as above from commencement of the action. The action must not commence until the BGWMP is approved by the Minister. The approved BGWMP must be implemented.	**Non-Compliant**	As noted in Condition 6 below, the date of commencement of the action was 20 December 2013, with approval granted for the BGWMP on 11 November 2013. Therefore, the BGWMP was approved prior to the commencement of the action. The condition also requires the BGWMP to be implemented. Several Regeneration and Revegetation Monitoring Program requirements have not been completed during the reporting period. DAWE consulted with Holcim and issued a non-compliance in September 2021. No further non-compliances were issued during this audit period. These are outlined in **Table 2** and **Table 3**. Corrective actions have been identified and are in progress, these are further outlined in **Table 4**.

Condition no. /reference	Condition	Compliance status	Evidence/comments
3	To compensate for the loss of 7.9 hectares of box gum woodland the person taking the action must secure the lands identified as the 'Proposed Biodiversity Offset Area' in the Map at Schedule 1 of this notice as a biodiversity offset and protect the lands for the duration of the action's impact through a conservation agreement under section 69 of the NSW National Parks and Wildlife Act 1974. The conservation agreement must state; 'This agreement must not be terminated without the written consent of 'The Minister Administering the Commonwealth Environment Protection and Biodiversity Conservation Act 1999'.	**Non-Compliant**	A section 69 Conservation Agreement application was lodged with then NSW Office of Environment and Heritage (OEH) on 18 November 2013 (now dealt with via the NSW Biodiversity Conservation Trust [BCT]). After processing of the application by the then OEH, a conservation agreement was drafted in 2017 and submitted to OEH. After review by OEH, the draft agreement was provided back to Holcim with comments. The conservation agreement has not yet been finalised, however, Holcim has recently refocussed on progressing the finalisation of the agreement. The final timing of the agreement is unknown and is partly dependent on BCT timeframes. It is planned that the wording within the draft agreement will reflect this condition. Final wording of the approved document is at the discretion of the BCT. The offset has been managed as a conservation area while the agreement is being finalised. A meeting on site with the BCT occurred on 6 May 2022. Correspondence is included in **Appendix E**. The meeting demonstrates that progress has been made towards the finalisation of the Conservation Agreement. As of July 2022, there has been no further correspondence. The status is such that the BCT had discussed the condition wording internally and recommended speaking directly to the Commonwealth. The BCT were also waiting on a new copy of the template for reporting, which they would then forward on to Holcim. The following actions on Holcim are currently outstanding; • Provide an email and postal address for the agreement • Provide copy of AHMP for records • Check if any vegetation shapefiles exist for the following yellow area (refer to Appendix E of this report) • Pursue consent from the lessee on Lot 3 of DP1107232 • Look into whether there are latitudes and longitudes for what appear to be two infrastructure points near DD8 This item remains open, in progress and non-compliant with completion expected by the end of June 2024 upon satisfaction of the BCT.

Condition no. /reference	Condition	Compliance status	Evidence/comments
4	Prior to the commencement of the action the person taking the action must provide evidence to the Department of; a. Their ownership of the offset lands described in Condition 3 along with offset attributes, shapefiles and textual descriptions and maps to clearly define the location and boundaries of the offset sites. b. Lodgement of the section 69 conservation agreement application form with the NSW Office of Environment and Heritage.	**Compliant**	Holcim provided evidence of the ownership of the offset lands described in Condition 3 along with offset attributes, shapefiles and textual descriptions and maps to clearly define the location and boundaries of the offset sites on 26 November 2013. A section 69 Conservation Agreement was lodged with the then OEH on 18 November 2013. Confirmation of lodgement is provided as **Appendix C**. As noted in Condition 6 below, the date of commencement of the action was 20 December 2013. The section 69 application was therefore lodged prior to commencement of the action.
5	If the person taking the action is unable to comply with Conditions 3 and 4 above they must propose an alternative offset strategy for box gum woodland that meets the current Commonwealth EPBC Act Environmental Offsets Policy. The proposed action must not commence until the alternative proposed offset has been approved in writing by the Minister.	**Non-Compliant**	Holcim have not complied with Condition 3 and the offset strategy for Box Gum Woodland (BGWMP and Conservation Agreement). Review of whether the strategy meets the current Commonwealth EPBC Act Environmental Offsets Policy is currently being carried out in response to the request from DAWE under Condition 11. If any changes are proposed to the Plan, this will be approved in writing by the Minister. Review and update of the BGWMP is currently in progress.
6	Within 30 days after the commencement of the action, the person taking the action must advise the Department in writing of the actual date of commencement.	**Compliant**	Holcim notified the Department on 5 December 2013 the action was scheduled to commence in January 2014. The action was later commenced by Holcim on 20 December 2013. Written notification of the actual commencement date was overlooked due to staffing changes. Formal notification was provided to the Department in the 2014 compliance report, dated May 2015, submitted, and published on Holcim's website. This is a historical non-compliance, however as it has been addressed previously and has been considered compliant for the purpose of this report and the reporting period it covers.

Condition no. /reference	Condition	Compliance status	Evidence/comments
7	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to these conditions of approval, including measures taken to implement the offset and BGWMP, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of the audits may also be publicised through the general media.	**Compliant**	A compliance register was developed for Lynwood Quarry to maintain all records and evidence to substantiate activities undertaken on the site to implement this approval, the BGWMP and to protect the Biodiversity Offset Area. During the reporting period, Holcim have maintained records for the Lynwood Quarry. These records substantiate all activities associated with or relevant to these conditions of approval, including measures taken to implement the offset and BGWMP. ELA notes that given the BGWMP has not been implemented, there are no records relevant to this plan.
8	Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the BGWMP as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published. Non-compliance with any of the conditions of this approval must be reported to the Department within 2 business days of becoming aware of the non-compliance.	**Compliant**	The 2014, 2015, 2016, 2017, 2018 and 2022 annual compliance reports are published on the Holcim website: http://www.holcim.com.au/lynwood.html The 2019 and 2020 compliance reports were not published in the timeframe specified in the condition, however both were published in July 2021. These are historical non-compliances, however as they have been addressed previously, they have been considered compliant for the purpose of this report and the reporting period it covers. This 2023 compliance report will be published in the timeframe specified in the condition, therefore the condition is assessed as compliant for the 2023 compliance period. The 2024 compliance report is planned to be initiated in January 2025 so that it can be submitted within the required timeframe.

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Condition no. /reference	Condition	Compliance status	Evidence/comments
9	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	**Compliant**	During the 2023 reporting period, an independent auditor was engaged in December 2023 with the independent environmental audit (IEA) completed on 12 January 2024. The scope of the audit was to assess compliance with the consent conditions DA 128-5-2005. The draft table of compliance was provided for this review. Non-compliances relevant to the EPBC Approval were; • Condition 44(c) *describe in detail the measures that would be implemented over the next 5 years to rehabilitate and manage the landscape on the site.* RLMP was identified as being out of date. Holcim are in the process of the RLMP update for the next 5 years. • Condition 46 *Within 3 months of the Independent Environmental Audit (see Condition 11 in Schedule 5), the Applicant shall update the Rehabilitation and Landscape Management Plan to the satisfaction of the Secretary.* Audit findings "no evidence provided". Action on Holcim to ensure management plans are issued to DPHI following IEAs.
10	If the person taking the action wishes to carry out any activity otherwise than in accordance with the Plan as specified in the conditions, the person taking the action must submit to the Department for the Minister's written approval a revised version of that Plan. The varied activity shall not commence until the Minister has approved the varied Plan in writing. The Minister will not approve a varied Plan unless the revised Plan would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised Plan, that Plan must be implemented in place of the Plan originally approved.	**Compliant**	No activity outside the scope of the plan as specified in the conditions have been carried out during the audit period. The plan is currently being reviewed under the guidance of DAWE and will be subject to approval by the Minister once finalised. The intended management practises of the Plan have not occurred during the 2023 reporting period. DAWE consulted with Holcim in September 2021 and the points raised are outlined in **Table 2** and **Table 3**. Corrective actions that have been identified and are in progress are further outlined in **Table 4**. Depending upon the outcome of the corrective actions there may be changes to the Plan. Management activities will continue to be actioned throughout the next reporting period.

Condition no. /reference	Condition	Compliance status	Evidence/comments
11	If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities to do so, the Minister may request that the person taking the action make specified revisions to the Plan specified in the conditions and submit the revised Plan for the Minister's written approval. The person taking the action must comply with any such request. The revised approved Plan must be implemented. Unless the Minister has approved the revised Plan then the person taking the action must continue to implement the Plan originally approved.	**Compliant**	DAWE consulted with Holcim in September 2021 and requested that Holcim make specified revisions to the Plan. Holcim are currently taking action to fulfill the requested revisions. These are outlined in **Table 2** and **Table 3**. Corrective actions that have been identified and are in progress are further outlined in **Table 4**. Management activities will continue to be actioned throughout the next reporting period.
12	If, at any time after 5 years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.	**Compliant**	The action was commenced by Holcim on 20 December 2013 and was substantially progressed during 2014. This was within 5 years of the date of the approval.
13	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish the Plan and Program referred to in these conditions of approval on their website. The Plan and Program must be published on the website within 1 month of being approved.	**Compliant**	Completed and reported on in 2014. The BGWMP has been uploaded to the Holcim website and is accessible at http://www.holcim.com.au/lynwood.html. Assessed as compliant for the reporting period as the approved document is published and available.

The BGWMP required by Condition 2 contains management actions designed to improve and protect the condition of Box Gum Woodland in the Conservation Area. These management actions are discussed in Table 2 and Table 3 below. The BGWMP is currently being reviewed and updated.

Table 2: Box Gum Woodland Management Plan – Regeneration and Revegetation Program Requirements

Activity	Description	Timeframe as defined in the BGWMP	Progress in 2023	Compliance status
Fencing	Fence entire Biodiversity Offset Area (offset area).	2013/14	All required fencing has been completed.	**Compliant**
Natural regeneration of derived native grassland	Exclusion of stock from the offset area.	2013/14	The offset area is free from grazing activities by stock.	**Compliant**
Seed collection for direct seeding	Seed collection to target box-gum woodland using local provenance. Direct seeding of 5.5 ha of the offset area.	2013/14	Completed	**Compliant**
Site preparation for direct seeding	Light scarification of the ground if deemed essential to seed germination (i.e. if seeding coincides with very dry conditions)	2014/15	Completed	**Compliant**
Direct seeding	Direct seeding of 5.5 ha. Seeding to be conducted using a tractor with fertilizer spreader and vermiculate.	2014/15	Completed	**Compliant**
Planting of tube stock	5.5 ha of the existing native pasture to be revegetated using tube stock at a density of 600 stems per hectare. No deep ripping is to be conducted.	2014/15	Not commenced.	**Non-Compliant**
Tube stock propagation	Tube stock quantity to be sufficient to revegetate 5.5 ha.	2013/14	Not commenced.	**Non-Compliant**
Site preparation for tube stock planting	Slashing/mowing of 5.5 ha site prior to planting.	2014/15	Not commenced.	**Non-Compliant**
Weed management within revegetation/ regeneration area	Biannual weed management action to be conducted across 30% (approximately 7 ha) of the offset area. Spraying to occur prior to the flowering of weed species with follow up spraying to be undertaken after the initial round of spraying has taken effect.	6-monthly until 2017/18	This item was not completed within the timeframe. Spraying for Blackberry and Sifton Bush has commenced within the offset site during the audit period.	**Non-Compliant**

Activity	Description	Timeframe as defined in the BGWMP	Progress in 2023	Compliance status
Monitoring of revegetation/ regeneration area	Annual monitoring to be undertaken in order to determine the success or otherwise of revegetation works and the progress of natural regeneration. Permanent monitoring plots to be established during the first year of monitoring.	Yearly	Monitoring has been undertaken by SLR in 2023. The draft monitoring report was completed in December 2023 and provided to ELA for this audit. The monitoring determined the progress of natural regeneration but did not determine the success or otherwise of revegetation works. Revegetation works are currently being reviewed and potentially revised. Refer to **Table 4** for further detail.	**Compliant**

Table 3: Box Gum Woodland Management Plan – Monitoring Program Requirements

Activity	Description	Timeframe as defined in the BGWMP	Progress in 2023	Compliance status
Weed Management	Weed assessments are to be undertaken by the Environment Officer every six months in the offset area. Outbreaks of weeds are to be controlled using spraying, slashing or manual removal. Where appropriate, the local weeds authority and the Goulburn-Mulwaree Council will be consulted regarding weed control measures.	6-monthly from establishment of offset area	Active weed management has not been carried out in the offset area within the audit period. A preliminary site assessment of the biodiversity offset area was carried out in December 2021 by ELA ecologists. This included an assessment of weeds and control recommendations.	**Non-Compliant**
Feral animals	Feral fauna species are to be visually monitored during the Environmental Officer's six-monthly inspections and during fauna surveys undertaken once every three years. Measures to control feral species are to be implemented as required and in consultation with the Rural Lands Protection Board, where necessary.	Opportunistic and during scheduled 6-monthly and 3-yearly monitoring.	Feral fauna species were visually monitored for during the fauna surveys of the 2023 ecological monitoring conducted by SLR Consulting Australia Pty Ltd.	**Compliant**
Retained vegetation	The condition of retained vegetation is currently monitored once every three years by a qualified ecologist to identify any change in habitat quality. Permanent monitoring plots are located in the northern Habitat Management Area, on Joarimin Creek, and in the Cultural Heritage Management Zone. The permanent monitoring plot in the Cultural Heritage Management Zone in the offset area will form part of the offset monitoring requirements. The following will be recorded: • General health of vegetation; • Evidence of natural regeneration; • Occurrence and abundance of weed species; • Signs of disturbance, either by stock or humans; • Evidence of feral animals; and • Any observable impacts of the operation, such as the effectiveness of sediment and erosion control structures. At each vegetation plot, species diversity and structural composition is to be recorded. Photo monitoring will also be undertaken at	3-yearly	Ecological monitoring was conducted by SLR Consulting Australia Pty Ltd during the 2023 reporting period.	**Compliant**

Activity	Description	Timeframe as defined in the BGWMP	Progress in 2023	Compliance status
	established photo monitoring points at each monitoring site. Fauna will also be monitored at these sites.			
Revegetation areas	Following revegetation works, monitoring is to be undertaken to assess the progress of the revegetation program. The offset area will be included in the existing monitoring schedule for revegetation areas. Specifically, the monitoring inspections will assess: • The extent of the vegetation cover and species diversity, and any requirement for additional revegetation works to be undertaken; • The general health of the vegetation • Any occurrence of weed species in the revegetation area and any requirements for weed control • Feral animals and the need for control; • Erosion and the need for repair of eroded areas; • Fire management • Any signs of disturbance, either by animals or humans; and The success of any management programs implemented following previous monitoring inspections.	3-monthly for first three years following completion of rehabilitation works. Annually thereafter.	Revegetation has not been completed.	**Non-Compliant**
Revegetation areas (cont.)	In addition to annual monitoring the Environmental Officer will inspect the offset area revegetated areas every three months for the first three years after the completion of rehabilitation works. This inspection will include: • The general health of the vegetation and the need for fertilisation; • The growth of the vegetation and the need to replace any dead plants; • Any erosion and the need for sediment and erosion controls to be implemented; • Any occurrence of weed species in the revegetation area and any requirements for weed control activities: and • Signs of disturbance and the need to access controls.	3-monthly for first three years following completion of rehabilitation works. Annually thereafter	Rehabilitation works have not been completed	**Non-Compliant**

Activity	Description	Timeframe as defined in the BGWMP	Progress in 2023	Compliance status
Box Gum Woodland	• Ecological monitoring of retained box gum woodland patches will be undertaken annually against benchmark sites for a period of 5 years with the monitoring frequency to be reassessed after that time. This monitoring will assess the condition and recovery of box gum woodland at the site. Permanent plots and photographic monitoring sites will be established to allow for comparison between monitoring events.	Annually for years 0-5 Following establishment of Offset area, biannually for years 6-11 following successful implementation of rehabilitation.	Ecological monitoring of retained Box Gum Woodland patches against benchmark sites was undertaken by SLR Consulting Australia Pty Ltd in 2023. Final results and reporting are included in Appendix F. Rehabilitation has not been carried out. Actions to rectify this are in progress. Refer to **Table 4.**	**Compliant**
Box Gum Woodland	Ecological monitoring of retained box gum woodland patches will be undertaken annually against benchmark sites for a period of 5 years with the monitoring frequency to be reassessed after that time. This monitoring will assess the condition and recovery of box gum woodland at the site. Permanent plots and photographic monitoring sites will be established to allow for comparison between monitoring events.	Annually for years 0-5 Following establishment of Offset area, biannually for years 6-11 following successful implementation of rehabilitation.	Ecological monitoring of retained Box Gum Woodland patches against benchmark sites was undertaken by SLR Consulting Australia Pty Ltd in 2023. Final results and reporting are included in Appendix F. Rehabilitation has not been carried out. Actions to rectify this are in progress. Refer to **Table 4.**	**Compliant**

3. Correcting Non-Compliances

Six non-compliances with the conditions of the EPBC approval and nine non-compliances with the BGWMP were recorded for Holcim during the 2022 reporting period, progress towards rectification during 2023 reporting period is included in the table below. No new non-compliances were identified. The identified non-compliances and updated corrective actions and timeframes are presented in Table 4.

Table 4: Correcting Non-compliances

EPBC approval condition/BGWMP requirement	Non-compliance	Date detected	Department notified	Future corrective actions	Tentative timeframe for completion
Condition 11	The offset site being unmanaged for 6 years and associated lost gain of environmental outcomes	September 2021	Holcim and DAWE meeting facilitated by DAWE in September 2021.	DAWE require: • Baseline surveys of the site to establish if the offset site described in the Lynwood Quarry Box Gum Woodland Management Plan 2013 still meets the offset policy and principles to determine changes to the original calculations of offset site quality. o *Completed in 2022* • The resubmission of the Offset Assessment Guide calculators, including evidence to support the data. o *Completed in Feb 2024* • The extent and quality of the Box Gum Woodland onsite and what other previously identified species are present and viable. o *Completed in 2022 and in the 2023 monitoring report*. • Mapping of the erosion and sedimentation extent and the impact	Baseline surveys completed in Spring 2022. Baseline survey report has been prepared and submitted to DCCEEW February 2024.

EPBC approval condition/BGWMP requirement	Non-compliance	Date detected	Department notified	Future corrective actions	Tentative timeframe for completion
				that it currently has on the protected matters, the condition of the fencing and the fire history on the site. ○ *2023 information available in the SLR monitoring report (Appendix F).* • The baseline data to inform the next phase including recalculation of the offset, the viability of the offset, the lost gains and the management of the site. ○ *Surveys completed 2022* • The management plan to be revised and approved prior to Spring 2022. ○ *Expected completion 2024*	
Condition 2(d)	The condition requires the BGWMP to be implemented. Several Regeneration and Revegetation Monitoring Program requirements have not been completed during the 2020 and 2021 reporting period.	September 2021	Holcim and DAWE meeting September 2021	As for Condition 11	As for Condition 11
Condition 3	The offset has not been managed as a conservation area while the agreement is being finalised. DAWE consulted with Holcim and issued a non-compliance in September 2021.	September 2021	Holcim and DAWE meeting September 2021	As for Condition 11	As for Condition 11
Condition 5	Holcim have not complied with Condition 3 and the offset strategy for Box Gum Woodland (BGWMP and Conservation Agreement). Review of whether the strategy meets the	During preparation of 2022 report.	Within the 2022 audit report	As for Condition 11	Mid 2024

EPBC approval condition/BGWMP requirement	Non-compliance	Date detected	Department notified	Future corrective actions	Tentative timeframe for completion
	current Commonwealth EPBC Act Environmental Offsets Policy is currently being carried out in response to the request from DAWE under Condition 11. If any changes are proposed to the Plan, this will be approved in writing by the Minister.				
Condition 10	There has been no management of the offset area for 6 years. DAWE consulted with Holcim in September 2021. Depending upon the outcome of the corrective actions under Condition 11 there may be changes to the Plan.	September 2021	Holcim and DAWE meeting September 2021	As for Condition 11	Management activities will be commenced throughout the next reporting period
BGWMP Regeneration and Revegetation Program Requirements	Planting of tube stock	September 2021	Holcim and DAWE meeting September 2021	Dates for tube stock planting to be confirmed as part of the review of the BGWMP under Condition 11. These dates will then be incorporated into the compliance register and completed.	31/12/24
BGWMP Regeneration and Revegetation Program Requirements	Tube stock propagation	September 2021	Holcim and DAWE meeting September 2021	Dates for tube stock propagation to be confirmed as part of the review of the BGWMP under Condition 11. These dates will then be incorporated into the compliance register and completed.	31/12/24
BGWMP Regeneration and Revegetation Program Requirements	Site preparation for tube stock planting	September 2021	Holcim and DAWE meeting September 2021	Dates for site preparation to be confirmed as part of the review of the BGWMP under Condition 11. These dates will then be incorporated into the compliance register and completed.	31/12/24

EPBC approval condition/BGWMP requirement	Non-compliance	Date detected	Department notified	Future corrective actions	Tentative timeframe for completion
BGWMP Regeneration and Revegetation Program Requirements	Monitoring of revegetation/ regeneration area	September 2021	Holcim and DAWE meeting September 2021	Monitoring was carried out in 2023, final results were reported February 2024 (**Appendix F**).	Complete
BGWMP Monitoring Program Requirements	Weed Management	March 2023	Within the 2023 audit report	Active weed management actions to be carried out within the Offset Site in accordance with the condition assessment were not carried out during the 2021 reporting period, the 2022 or the 2023 reporting period.	Prior to Spring 2024
BGWMP Monitoring Program Requirements	Feral animals	During preparation of this report	During preparation of this report	Monitoring was carried out in 2023 by SLR, final results were reported February 2024 (**Appendix F**).	Prior to Spring 2024
BGWMP Monitoring Program Requirements	Revegetation Areas	September 2021	Holcim and DAWE meeting September 2021	Following revegetation works, Holcim will re-establish monitoring in the 2024 reporting period as required.	31/12/24
BGWMP Monitoring Program Requirements	Revegetation Areas (cont)	September 2021	Holcim and DAWE meeting September 2021	Following revegetation works, Holcim will re-establish monitoring in the 2024 reporting period as required.	31/12/24
BGWMP Monitoring Program Requirements	Box Gum Woodland	During preparation of this report.	Within this report	Monitoring was carried out in 2023, final results were reported February 2024 (**Appendix F**). Monitoring of revegetation did not occur during the 2023 period as works had not been completed.	31/12/24

Holcim will endeavour to restore full compliance with the EPBC Act Approval and BGWMP during 2024. As part of improving compliance management as it relates to the EPBC Act Approval and BGWMP, Holcim will continue to update their compliance schedule outlining compliance conditions, actions to be completed, due dates, outcomes and sign off in 2024.

4. New Environmental Risks

No new environmental risks are noted for the next reporting period.

5. Declaration of Accuracy

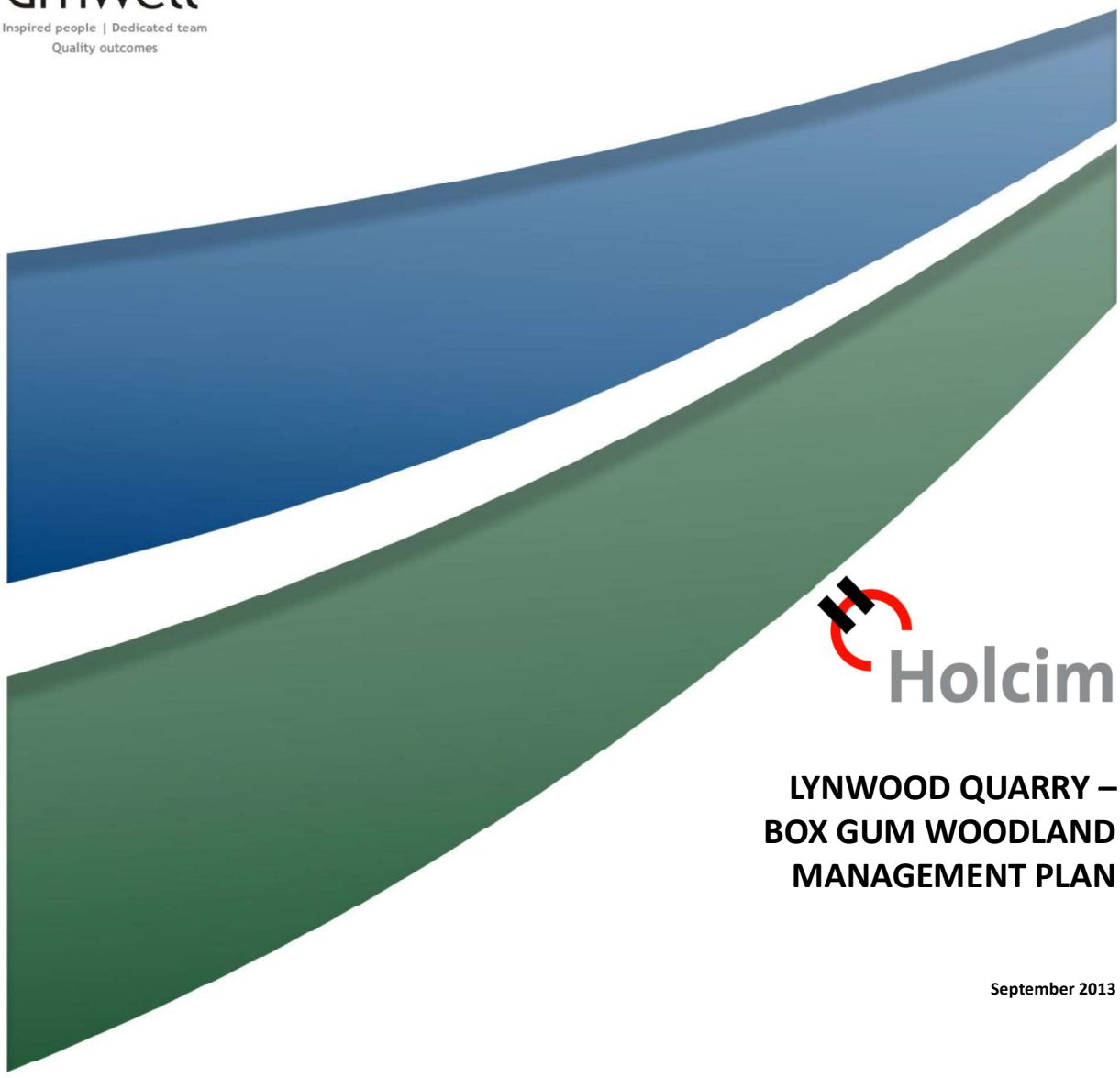
In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. 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	Andrew Whitford
Position	Manager, Restoration Ecology and Land Management
Organisation	Eco Logical Australia
Date	13 March 2024

Appendix A Box Gum Woodland Management Plan

umwelt

Inspired people | Dedicated team
Quality outcomes



Holcim

LYNWOOD QUARRY – BOX GUM WOODLAND MANAGEMENT PLAN

September 2013

LYNWOOD QUARRY – BOX GUM WOODLAND MANAGEMENT PLAN

September 2013

Prepared by
Umwelt (Australia) Pty Limited

on behalf of
Holcim (Australia) Pty Ltd

Project Director:	**John Merrell**
Project Manager:	**Gabrielle Allan**
Report No.	**2999/R12/FINAL**
Date:	**September 2013**

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FIGURES

APPENDICES

Glossary of Terms

BGW	Box Gum Woodland
BGWMP	Box Gum Woodland Management Plan
Box Gum Woodland	'White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland' Critically Endangered Ecological Community
CEEC	Critically Endangered Ecological Community
DECCW	Department of Environment, Climate Change and Water (now Office of Environment and Heritage)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
Ha	Hectares
Holcim Australia	Holcim (Australia) Pty Ltd
The Minister	Minister administering the EPBC Act (includes a delegate of the Minister)
MNES	Matters of National Environmental Significance
Mtpa	Million tonnes per annum
NSW	New South Wales
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)

1.0 Introduction

Lynwood Quarry (the quarry) is a hard rock quarry currently under construction west of Marulan in the Southern Tablelands region of NSW (refer to **Figure 1.1**). Holcim (Australia) Pty Ltd (Holcim Australia) was granted development consent in December 2005 by the NSW Minister for Planning to construct and operate the quarry with a production rate of up to 5 million tonnes per annum (Mtpa) (refer to **Figure 1.2**). Holcim Australia commenced construction of the quarry in late 2010, with operation of the quarry planned to commence in the last quarter of 2014.

During construction, ecological matters of national environmental significance (MNES) were identified within the site. In September 2012, the future works associated with construction and operation of the quarry were referred to the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 25 October 2012, the project was deemed to be a controlled action requiring assessment and approval under the EPBC Act. The project was assessed by preliminary documentation and on 13 September 2013 the project was granted approval under the EPBC Act (EPBC Ref: 2012/6560) subject to conditions.

This Box Gum Woodland Management Plan (BGWMP) has been developed to meet the requirements of the approval decision for the Lynwood Quarry. As stipulated in Condition 2 of the approval decision, which is described in **Section 1.3**, and summarised below, this management plan includes:

- management actions;
- regeneration and revegetation strategies; and
- an ecological monitoring program for box gum woodland.

1.1 Background

Ecological impacts associated with the development of the quarry include impacts on ecological MNES, specifically, the removal of 7.9 hectares of the EPBC-listed critically endangered ecological community (CEEC), White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (hereafter referred to as box gum woodland); and around 160 individuals of the EPBC-listed endangered plant species hoary sunray (*Leucochrysum albicans var. tricolor*), out of a very large total population of approximately 558,000 plants (refer to **Figure 1.3**).

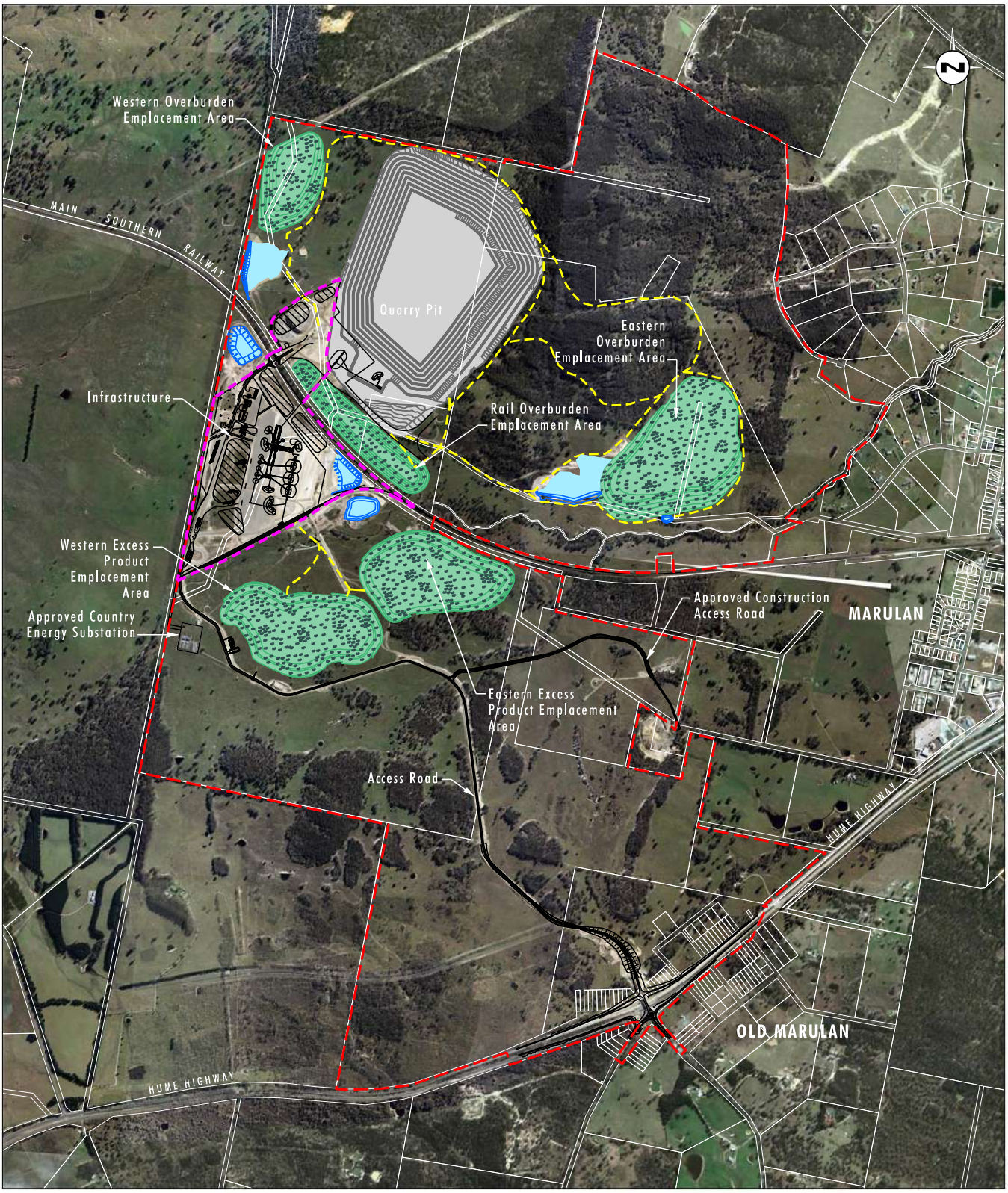
A range of measures to avoid or mitigate impacts on MNES will be implemented as part of the project, however due to residual and unavoidable impacts on box gum woodland, a Biodiversity Offset Package is required.

As shown in **Figure 1.3**, box gum woodland occurs in three discreet locations within the project area. In addition to the 7.9 hectare patch impacted by the action, there is also a small 1.4 hectare patch located to the north of the site access road, near Marulan Creek (refer to **Section 4.2**), and approximately 27 hectares to the south of the proposed access road which will be incorporated into the proposed Biodiversity Offset Area.

The Biodiversity Offset Package will comprise two components; a 185 hectare direct land offset (the Biodiversity Offset Area) in the south western part of Holcim Australia's holdings (refer to **Figure 1.4**) which will protect all box gum woodland to the south of the access road; and a package of direct actions (non-land) which will enhance quality and resilience of the Biodiversity Offset Area. These components are detailed in **Section 2.0**.

FIGURE 1.1

Locality Plan



Base Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)

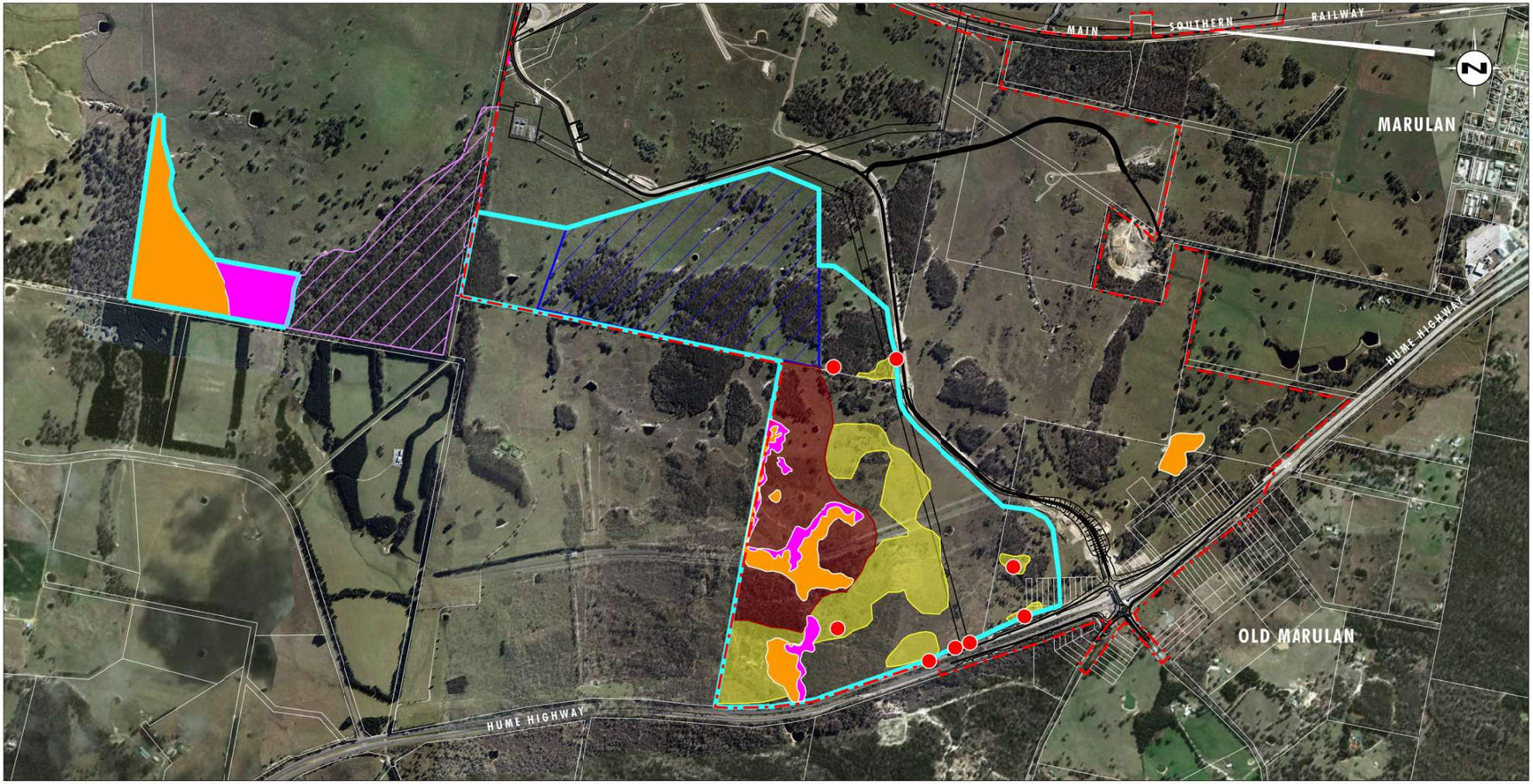
0 0.5 1 1.25km
1:25 000

Legend

- Project Area
- Infrastructure Area
- Haul Road
- NSW EP&A Act Approved Disturbance Area
- Quarry Pit
- Emplacement Area
- Rehabilitated Area
- Dam

FIGURE 1.2

Lynwood Quarry Project
- Indicative Year 30 Quarry Plan



Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)

0 0.25 0.5 1.0km
1:20 000

Legend

- Project Area
- Biodiversity Offset Area

DIRECT LAND OFFSETS:

- Box Gum Woodland Derived Native Grassland (CEEC)
- Box Gum Woodland (CEEC)
- Hoary Sunray Habitat
- Location of Hoary Sunray

DIRECT ACTIONS:

- Box Gum Woodland CEEC Regeneration Area

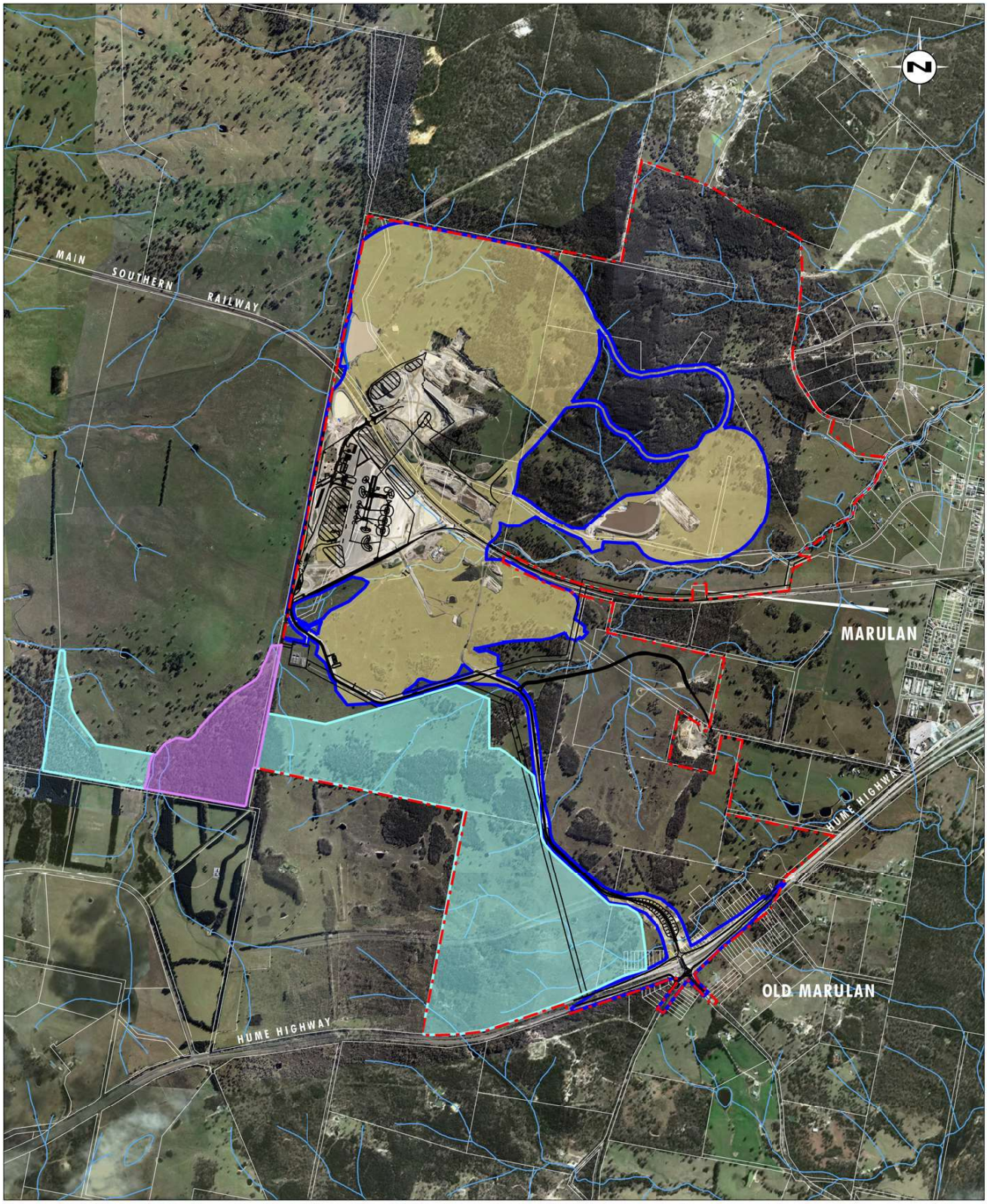
COMPLEMENTARY ACTIONS:

- Habitat Management Area
- Cultural Heritage Management Zone

FIGURE 1.3

Box Gum Woodland and Hoary Sunray Distribution, and Biodiversity Offset Area

File Name (A4): R12/2999_125.dgn
20130924 15.22



Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)

0 0.5 1 1.5km
1:30 000

Legend

- Project Area
- NSW EP&A Act Approved Disturbance Area
- EPBC Act Controlled Action Disturbance Area
- Biodiversity Offset Area
- Habitat Management Area
- Drainage

FIGURE 1.4

Overview of Biodiversity Offset Area

1.2 Purpose and Scope

The purpose of this BGWMP is to provide a framework for the implementation of ecological management actions, regeneration and revegetation strategies, procedures, controls and monitoring programs for the Biodiversity Offset Area. Specifically, the strategy aims to protect and enhance the extent and condition of critically endangered box gum woodland, provide protection for hoary sunray habitat, increase local and regional biodiversity connectivity and protect sites of cultural heritage significance.

This BGWMP has been developed for a 185 hectare area in the south western part of Holcim Australia's Marulan holdings identified as the proposed Biodiversity Offset Area in EPBC Referral 2012/6560 and described further in **Section 2.0** of this BGWMP. The Biodiversity Offset Area was identified due not only to it being able to specifically target the MNES significantly impacted by the proposal, but it also adds further protection to other MNES and heritage values in addition to enhancing connectivity by protecting non-MNES remnant vegetation as part of an overall strategy to optimise biodiversity values.

The action must not commence until this BGWMP has been approved by the Minister. The approved BGWMP must be implemented (EPBC Approval Condition no. 2).

1.3 Regulatory Requirements

The Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) deemed the project to be a 'controlled action' under the EPBC Act as it was likely to result in significant impacts on EPBC-listed threatened species and ecological communities. The project was assessed by preliminary documentation and on 13 September 2013 the project was granted approval under the EPBC Act (EPBC Ref: 2012/6560) subject to the preparation and approval of a BGWMP and related actions, as summarised below:

Approval Condition 2.

To assist in mitigating the impacts of the proposal on White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland (box gum woodland), the person taking the action must prepare and submit a Box Gum Woodland Management Plan (BGWMP) for the Minister's written approval prior to commencement of the Action. This BGWMP must include:

a. *management actions designed to improve the ecological quality of box gum woodland on the project area (refer to Map at Schedule 1) and proposed biodiversity offset area and protect it from degradation for the duration of the action's impact on box gum woodland.*
b. *regeneration and revegetation strategies for box gum woodland on the project area and the proposed biodiversity offset area (refer to Map at Schedule 1) to improve the ecological quality of these areas of box gum woodland.*
c. *an ecological monitoring program to monitor the success of the management actions in the BGWMP and define measureable targets of management actions, performance indicators and an adaptive management framework for the duration of the action's impact on box gum woodland.*
d. *Management of the offset site as above from commencement of the action.*

The action must not commence until the BGWMP is approved by the Minister. The approved BGWMP must be implemented.

Approval Condition 3.

To compensate for the loss of 7.9 hectares of box gum woodland, Holcim must secure the lands identified as the 'Proposed Biodiversity Offset Area' in the Map at Schedule 1 of this notice as a biodiversity offset and protect the lands for the duration of the action's impact through a conservation agreement under section 69 of the NSW National Parks and Wildlife Act 1979. The conservation agreement must state: 'This agreement must not be terminated without the written consent of 'The Minister Administering the Commonwealth Environment Protection and Biodiversity Conservation Act 1999'.

Other relevant conditions of approval are referred to within this plan and in the summary of commitments in **Section 8.0**. A copy of the conditions of approval is also presented in **Appendix 1**.

An assessment of the consistency of the Biodiversity Offset Area with the EPBC Offset Policy released in October 2012, and the accompanying Offset Assessment Guide, has been undertaken and is included in **Section 2.0**.

1.4 Authority Consultation

Consultation with SEWPaC has been undertaken as part of the EPBC Referral process and the BGWMP will be subject to Commonwealth review and approval.

In addition, Holcim Australia will consult with the NSW Office of Environment and Heritage (OEH) in relation to the preparation of a Conservation Agreement under Section 69 the NSW *National Parks and Wildlife Act 1974* (NPW Act) to provide for the long term conservation of the proposed Biodiversity Offset Area. The Conservation Agreement will be registered on the title of the land and would therefore be transferred should any future sale of the land occur.

1.5 Roles and Responsibility

Roles and responsibilities associated with the implementation of this BGWMP are presented in **Table 1.1** below.

Table 1.1 – Roles and Responsibilities

Title	Roles and Responsibilities
Operations Manager	• ensure that sufficient resources are allocated for the implementation of the BGWMP • authorising internal and external reporting requirements as well as subsequent revisions of the BGWMP • implementation of the BGWMP to ensure compliance

Table 1.1 – Roles and Responsibilities (cont.)

Title	Roles and Responsibilities
Environmental Officer	• coordinate the day to day implementation of the BGWMP, including the design and implementation of all ecological management and rehabilitation activities • ensure that sufficient time and resources are allocated to allow for the implementation of ecological management and rehabilitation strategies for the Biodiversity Offset Area • ensure that sufficient resources and time are allocated to implement the BGWMP monitoring programs • ensure that the results of the BGWMP monitoring programs are utilised to refine completion criteria for the site as well as to evaluate the effectiveness of regeneration/rehabilitation practices so as to facilitate continual improvement • periodically review progress against condition improvement targets • ensure all internal and external reporting requirements are met • facilitate that all relevant records are effectively maintained on site • ensure that personnel involved in carrying out and monitoring the BGWMP activities are appropriately qualified, licensed and experienced to undertake the task • manage/control access to biodiversity offset area • ensure staff and contractors are informed and trained where relevant in relation to controls on activities within the Biodiversity Offset Area
Holcim Staff and Contractors	• receive training regarding controls on activities within the Biodiversity Offset Area • observe boundaries of Biodiversity Offset Area when undertaking work on site • undertake activities in Biodiversity Offset Area in line with directions from Operations Manager and Environmental Officer

2.0 Offset Description

The Biodiversity Offset Package comprises two components. A direct land offset (the Biodiversity Offset Area), as described by **Section 2.1** and a package of direct actions (non-land) described in **Section 2.2**, which will enhance quality and resilience of the Biodiversity Offset Area.

2.1 Direct Land Offset

The Biodiversity Offset Area is shown on **Figure 1.4** and consists of a 185 hectare area located in the south western part of Holcim Australia's holdings. The Biodiversity Offset Area contains both land directly targeting box gum woodland, as well as complementary areas that include non-target MNES, cultural heritage and native vegetation management areas.

The Biodiversity Offset Area consists of two patches of box gum woodland, each containing both woodland and grassland forms of the community; a large patch of hoary sunray habitat; as well as a habitat management area and cultural heritage management area linking the two patches together, which comprise the complementary actions discussed in **Section 2.3**.

The Biodiversity Offset Area was identified as the preferred offset for the following reasons:

- the area specifically targets the MNES significantly affected by the proposal;
- adds further protection to other MNES and heritage values; and
- enhances connectivity with other habitat and riparian management areas, by protecting non-MNES remnant vegetation as part of an overall strategy to optimise biodiversity values.

The following table provides a summary of the key features of the Biodiversity Offset Area and the offset values as presented in the EPBC Referral. The Biodiversity Offset Area as described in this BGWMP is considered to be consistent with the requirements of the EPBC Environment Offsets Policy (SEWPaC 2012)[1].

Table 2.1 – Offset Statistics

Aspect	**Quantity**
Total area of offset	185 Ha
Area of BGW (Woodland form)	18.9 Ha
Area of BGW (Grassland form)	8.3 Ha
Total extant BGW in offset	27.2 Ha
Area of native pasture to be rehabilitated to BGW	22.0 Ha
Other MNES	
Hoary sunray habitat	27.3 Ha
Hoary sunray estimated numbers	200,000 individual plants
Summary	
Total impact to BGW	7.9 hectares comprised of: 7.4 Ha woodland form; and 0.5 Ha grassland form
Resulting offset ratio (extant vegetation)	27.2 Ha ÷ 7.9 Ha = **3.4**
Resulting offset ratio, inclusive of rehabilitation	27.2 Ha + 22.0 Ha = **49.2 Ha** 49.2 Ha ÷ 7.9 Ha = **6.2**

[1] Australian Government (2012) *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*, Department of Sustainability, Environment, Water, Population and Communities (October 2012).

2.2 Additional Direct Actions

In addition to the direct land offsets shown in **Table 2.1**, a number of additional direct actions will be undertaken to improve the quality and resilience of the MNES protected within the land offsets. These are summarised in **Table 2.2**, and are detailed in the Offset Management Program in **Section 5.3**.

Table 2.2 – Summary of Direct Actions

Action	Description
Fencing and establishment of exclusion zones	Fence entire Biodiversity Offset Area and map on operational plans.
	Implement staged removal of grazing stock from Biodiversity Offset Areas supporting box gum woodland. Guide stock removal by outcomes of regeneration and weed monitoring.
Weed management	Undertake weed suppression
Regeneration and revegetation	Undertake natural regeneration of box gum woodland derived native grassland through the exclusion of stock.
	Revegetate 11 hectares of the 22 hectare proposed regeneration area (existing native pasture) within the Biodiversity Offset Area with direct seeding and also tube stock propagated from local provenance seed targeting box gum woodland species consistent with the community species list (Australian Government 2006a)[2].

2.3 Complementary Actions

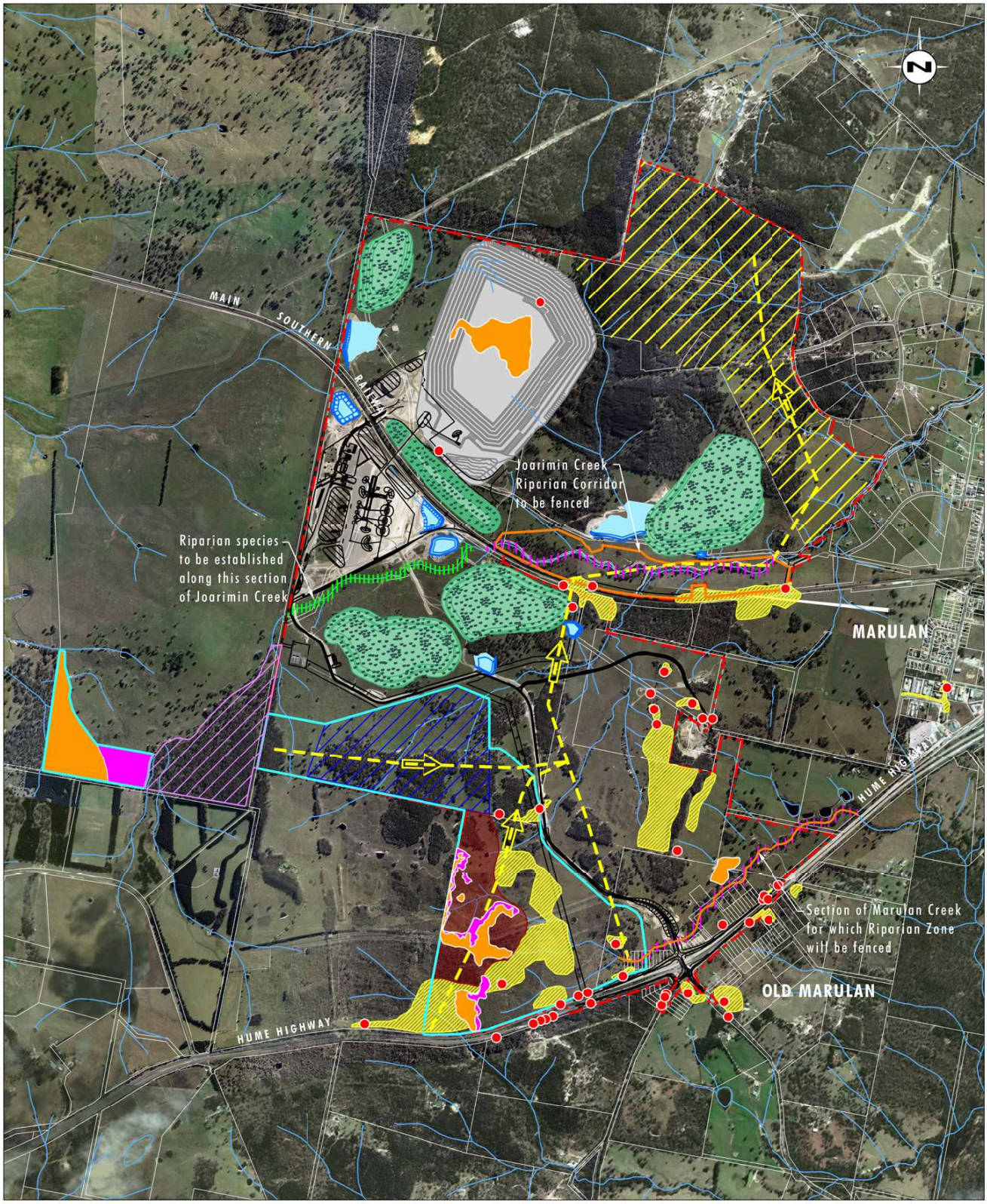
In addition to the areas of the offset targeting box gum woodland, the offset also includes a significant area of hoary sunray habitat, as well as patches of non-MNES vegetation and an existing cultural heritage management zone. The offset creates a contiguous corridor through the south of Holcim Australia's holdings, which links to existing habitat management areas and stepping stone corridors (refer to **Figure 2.1**) that have been established under previous planning approvals.

The corridor that results from implementation of this offset package will provide further enhanced connectivity within the area south of Marulan. The Biodiversity Offset Area will be under consistent long-term management and along with the habitat and cultural heritage management areas already committed to by Holcim Australia, represents an important link from a regional perspective.

These areas will perform a significant connectivity role that will enhance the viability and value of the Biodiversity Offset Area.

The Biodiversity Offset Area also includes the existing cultural heritage management zone. This area forms part of the corridor linking the two patches of box gum woodland and the habitat management area. The cultural heritage management zone will continue to be managed in accordance with the existing Lynwood Quarry Aboriginal Heritage Management Plan (Umwelt 2011a)[3]; in addition to the existing Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b)[4].

[2] Australian Government (2006a) *Species List for the EPBC Act Policy Statement – White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands,* Department of the Environment and Heritage, Canberra (May 2006).
[3] Umwelt (Australia) Pty Limited (2011a*) Caring for Country Lynwood Quarry, Marulan Aboriginal Heritage Management Plan Revision 2,* Report prepared for Holcim (Australia) Pty Limited.
[4] Umwelt (Australia) Pty Limited (2011b) *Lynwood Quarry Rehabilitation and Landscape Management Plan Revision 2,* Report prepared for Holcim (Australia) Pty Limited.



Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)

0 0.5 1 1.5km
1:30 000

Legend

- Project Area
- Existing Approved Habitat Management Area
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Stepping-Stone Corridor
- Box Gum Woodland Derived Native Grassland (CEEC)
- Box Gum Woodland (CEEC)
- Hoary Sunray Habitat
- Location of Hoary Sunray
- Biodiversity Offset Area
- Box Gum Woodland CEEC Regeneration
- Habitat Management Area
- Drainage

FIGURE 2.1

Biodiversity Offset Area and Habitat Management Features

2.4 Process for Establishing the Offset

Holcim Australia will prepare a Conservation Agreement under Section 69 of the NPW Act to provide for the long term conservation of the proposed Biodiversity Offset Area. The lands must be protected for the duration of the action's impact. The Conservation Agreement will be registered on the title of the land and would therefore be transferred should any future sale of the land occur. This will require consultation with the NSW Office of Environment and Heritage (OEH).

As per EPBC Approval Condition no. 3, the Conservation Agreement must state *'This agreement must not be terminated without the written consent of the Minister administering the Commonwealth Environment Protection and Biodiversity Conservation Act 1999'*.

Holcim Australia must provide evidence to SEWPaC that it owns the offset land, provide SEWPaC with attribute information and maps and evidence that it has lodged a conservation agreement application form with OEH prior to the commencement of the action (EPBC Approval Condition no. 4).

3.0 Objectives and Targets

Consistent with the EPBC Environment Offsets Policy (SEWPaC 2012), the Biodiversity Offset Area is to provide 'an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed development'. In this case the 'aspect of the environment' is box gum woodland as a matter of national environmental significance.

Holcim Australia commit to the following objectives and targets to ensure the maintenance or improvement of box gum woodland.

3.1 Objectives

The key management actions designed to enhance the quality and extent of box gum woodland include active and passive regeneration and revegetation initiatives. The specific objectives for revegetation and regeneration activities to be implemented to offset significant impacts as a result of the quarry include the following:

- enhance the ecological quality of existing box gum woodland within the Biodiversity Offset Area and protect it from degradation for the duration of the action's impact on box gum woodland;
- re-establish box gum woodland through regeneration and revegetation strategies in areas of native pasture that are consistent with the structure and floristics of the listed community; and
- improve connectivity between remnants of woodland within the Biodiversity Offset Area.

3.2 Targets

The following targets have been developed so that the required works are completed in accordance with this BGWMP, the conditions of approval and rehabilitation and biodiversity management objectives are achieved. Timeframes for targets are identified in **Section 4.4**.

General Management Targets

- no more than 7.9 hectares of box gum woodland has been cleared (EPBC Approval Condition no. 1);
- the Biodiversity Offset Area has been fenced;
- the Biodiversity Offset Area has been appropriately separated from ongoing quarry operations;
- an adaptive management process has been developed and implemented;
- the monitoring program is being implemented in line with **Section 6.0**; and
- a Conservation Management Agreement has been registered for the site under Section 69 of the NPW Act.

3.3 Performance Indicators

The following performance indicators are to be used to assess the findings of the monitoring program against the approval conditions.

- revegetation areas within the Biodiversity Offset Area contain a flora species assemblage characteristic of the EPBC listed box gum woodland community, including a range of vegetation structural elements such as trees, shrubs, ground cover forbs and grasses, and litter as per the box gum woodland listing advice (Australian Government 2006b)[5] and recovery plan (DECCW 2011)[6];
- success of the revegetation is in keeping with targets established under the *Lynwood Quarry Rehabilitation and Landscape Management Plan* (Umwelt 2011b) as summarised below:
  - vegetation has been established;
  - the rehabilitated area is stable;
  - the area is free of significant weed or feral animal problems;
  - the rehabilitated community is representative of the targeted vegetation community;
  - monitoring has indicated that natural regeneration is occurring; and
  - the area has been appropriately separated from ongoing quarry operations;
- success of the revegetation is in keeping with targets which have been developed for box gum woodland regeneration and revegetation areas:
  - no less than 75 percent of planted and regenerating trees are healthy and growing as determined by monitoring;
  - weeds comprise less than 5 percent (foliage cover) of the perennial ground storey; and
  - bare ground comprises no more than 15 percent of the ground layer;
- natural regeneration of the dominant overstorey species (white box, yellow box or Blakely's red gum) within the Biodiversity Offset Area regeneration zones (refer to **Figure 2.1**) is present as determined through monitoring;
- there is no evidence of pest animal infestation within offset area that are adversely impacting vegetation quality (e.g. rabbit warrens, fox dens, competition for hollows from wasps, bees, mynas, etc.); and
- accurate records are being maintained substantiating all activities associated with the BGWMP and approval conditions (EPBC Approval Condition no. 7).

[5] Australian Government (2006b) *White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands Listing Advice,* Department of the Environment and Heritage, Canberra.
[6] Department of Environment, Climate Change and Water NSW (2011) *National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland,* Department of Environment, Climate Change and Water NSW, Sydney (May 2011).

3.4 Process for Review and Refinement of Targets

The preliminary targets as described in **Section 3.2** will be reviewed annually (during the annual reporting process) and revised as appropriate throughout the life of the quarry with the targets to be used as the basis for further refinement following:

- the commencement of ecological management activities; and
- consideration of the results of monitoring programs.

It is envisaged that this process will occur as part of subsequent reviews of the BGWMP and throughout the adaptive management process.

Progress against the targets will be assessed and discussed in an annual report to SEWPaC (refer to **Section 6.0**), which will include the identification of any failures of the criteria, and corrective measures taken to address any such issue or to improve offset management techniques. The monitoring program developed to assess the performance of the Offset Area is outlined in **Section 5.0**.

4.0 Management Actions

4.1 Existing Management Commitments

The existing State planning approval for the Lynwood Quarry required Holcim Australia to implement a range of management and improvement actions which are complementary to the management of the Biodiversity Offset Area. This BGWMP assumes the application of all existing management plans (as summarised in **Sections 4.1.1** to **4.1.3**) to the proposed Biodiversity Offset Area in addition to further measures to enhance or rehabilitate box gum woodland as described in **Section 4.4**.

All box gum woodland within the Biodiversity Offset Area would be subject to revegetation or rehabilitation, and ongoing management in accordance with the BGWMP.

All other box gum woodland within Holcim Australia's Lynwood Quarry holdings would be managed in accordance with existing management plans and approvals (refer to **Section 4.2**).

In the event of any inconsistency between this BGWMP and any other existing management plans, this BGWMP prevails to the extent of the inconsistency within the area subject to this plan.

4.1.1 General Native Vegetation Management

The Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b) commits to a number of activities for the management of native vegetation which would be applied to the Biodiversity Offset Area and the Habitat Management Area. These are listed below:

- exclusion of stock from operational and sensitive areas, including the Habitat Management Area, Cultural Heritage Management Zone and core riparian areas;
- feral animal and noxious weed control;
- management of erosion and sedimentation;
- management of fire regimes;
- rehabilitation of disturbed areas with local indigenous species;
- use of local indigenous species in landscaped areas and the linkage and integration of new areas with existing vegetated areas to improve ecological function and provide habitat;
- management of surface water;
- adaptive management, as required, if a previously unrecorded or assessed threatened species is identified in the Project Area during construction or operation;
- ongoing monitoring and maintenance of all revegetation works and habitat enhancement activities; and
- creation of habitat corridors linking isolated remnant vegetation stands.

4.1.2 Habitat Management Areas

An additional 29.8 hectare Habitat Management Area will form part of the corridor between the eastern and western portions of the Biodiversity Offset Area. Management of this area will involve enhancement of the floristic and fauna habitat values through restriction of access, management and general exclusion of stock, and planting or assisted regeneration of indigenous species in accordance with the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b).

While not necessarily achieving the same level of restoration as the Biodiversity Offset Area, these areas will perform a significant connectivity role that will enhance the viability and value of the Biodiversity Offset Area.

4.1.3 Rehabilitation of Disturbed Areas

Although outside of the Biodiversity Offset Area, land disturbed by the quarry will be rehabilitated in accordance with the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b) using native species with the objective of facilitating development of native vegetation communities comparable in composition to those presently found within the quarry area. Rehabilitation will be undertaken progressively throughout the life of the quarry as areas become available. Rehabilitation practice and staging will be managed in accordance with the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b).

Rehabilitation works will include the spreading of cleared vegetation (including weed-free mulch created during clearing) over the rehabilitated surfaces to provide organic matter and a local seed source, plus seeding of top-soiled areas with native species. A revegetation species list has been developed on the basis of extant vegetation communities and will enable use of species mixes targeted at development of vegetation communities appropriate to the landscape and adjacent remnant communities.

4.2 Management of Box Gum Woodland outside Biodiversity Offset Area

Within the project area, 1.4 hectares of box gum woodland will be retained outside the Biodiversity Offset Area. This patch will not be disturbed by the action, however it has not been included as part of the offset as it is located on the northern side of the access road, and is disconnected from the Biodiversity Offset Area.

This patch will be managed in accordance with existing management plans and approvals, in particular, the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b). As described in **Section 4.1.1**, management of this patch would include (but not be limited to) the following actions:

- exclusion of stock;
- feral animal and noxious weed control;
- management of erosion and sedimentation;
- management of fire regimes; and
- rehabilitation of disturbed areas with local indigenous species.

All other box gum woodland within the project area not disturbed by the action are within the offset area, with the management measures to be implemented for these areas outlined within this BGWMP.

4.3 Adaptive Management

A strong feedback loop between monitoring and management will be established. Adaptive management of the Biodiversity Offset Area will be responsive to any new ecological data that may arise through the monitoring described in **Section 5.0**, legislative change or any other studies completed at the site. This will enable a flexible approach to management requirements of the Biodiversity Offset Area, allowing ongoing feedback and refinement of the management strategy.

Adaptive management will be a key mechanism to address the risks to the successful implementation of this BGWMP (refer to **Section 1.5**). This will involve ongoing evaluation of management measures required to address issues such as weed infestation, bushfire, feral animals and revegetation failure.

The guide to undertaking strategic assessments (Australian Government 2012)[7] describes the framework of adaptive management as a systematic process for continually improving management practices through learning from the outcomes of previous management. **Figure 4.1** is reproduced from the guide and illustrates the process of adaptive management to be implemented in this BGWMP.

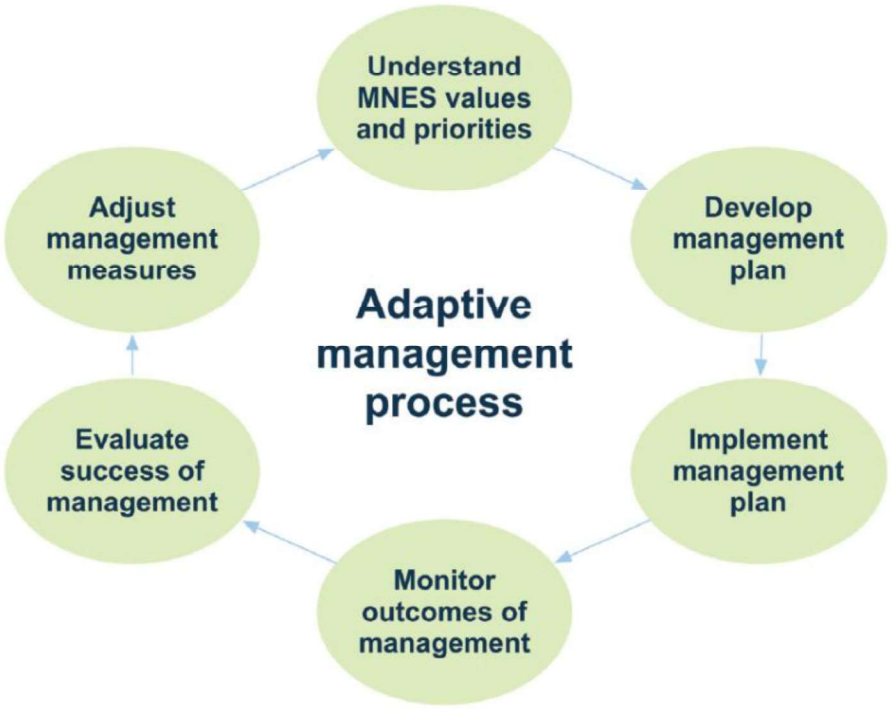


Figure 4.1 – Adaptive Management Process
Source: Figure 2 in Australian Gov't (2012)

[7] Australian Government (2012) *A Guide to Undertaking Strategic Assessments: Environment Protection and Biodiversity Conservation Act 1999*, Department of Sustainability, Environment, Water, Population and Communities (November 2012).

The flowchart presented in **Figure 4.2** provides a summary of the hierarchy of management plans associated with the management of the Biodiversity Offset Area. The overarching management plan is the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b), which links in to the Aboriginal Heritage Management Plan and this BGWMP. The green elements of the flow chart represent components of the BGWMP, while blue elements represent established plans under the NSW State Government Approval.

Key components of the BGWMP will be the adaptive management continual improvement loop between the monitoring and management programs.

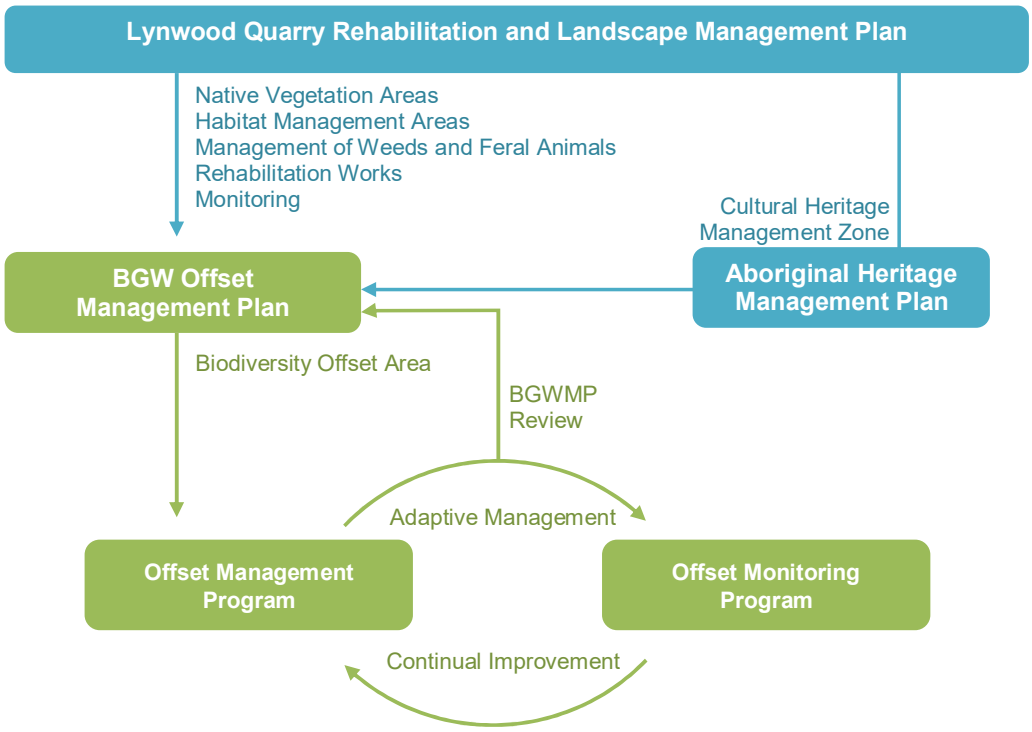


Figure 4.2 – Hierarchy of Management Plans

4.4 Offset Management Program

The Offset Management Program as shown in **Tables 4.1** to **4.4** details the direct actions and an estimate of the associated investment required by Holcim Australia to improve the quality and resilience of box gum woodland in the Biodiversity Offset Area.

Management and rehabilitation activities over an initial five year period estimated to a value of approximately $100,000 (including a 10 percent contingency) will be funded by Holcim Australia.

Table 4.1 – Offset Management Program: Establishment of Biodiversity Offset Area

Activity	Description	Responsibility	Timeframe	Estimated Budget
Fencing	Fence entire Biodiversity Offset Area. Estimated cost includes installation of 2,550 metres of stock proof perimeter fence by fencing contractor.	Operations Manager	2013/14	$38,250.00

Table 4.2 – Offset Management Program: Regeneration and Revegetation

Activity	Description	Responsibility	Timeframe	Estimated Budget
Natural regeneration of derived native grassland	Natural regeneration of derived native grassland through fencing and exclusion of stock.	Operations Manager	2013/14	See **Table 4.1**
Seed collection for direct seeding	Seed collection will target key box gum woodland using local provenance where available. 11 hectares (50%) of the existing native pasture will require active revegetation works in the form of tube stock planting or direct seeding. 5.5 hectares will be direct seeded and the remainder will be planted with tube stock. A seeding rate of 2000g/ha has been used with this mix to be comprised of both canopy and understorey species. It is not considered necessary to include grass species in the seed mix given the quality of existing groundcover.	Environmental Officer	2013/14	$9,240.00
Site preparation for direct seeding	Depending on conditions at the time of seeding, light scarification of the ground surface may be required in order to create niche areas for seeds to germinate. In order to minimise the impact on the existing native grassland. This method will only be used where considered essential to seed germination and establishment.	Environmental Officer	2014/15	$1,600.00
Direct seeding	It is assumed that 5.5 hectares of the site will be revegetated using direct seeding. Seeding will be conducted using a tractor with fertiliser spreader (no fertiliser to be used) and vermiculate (bulking agent).	Environmental Officer	2014/15	$1,600.00

Table 4.2 – Offset Management Program: Regeneration and Revegetation (cont.)

Activity	Description	Responsibility	Timeframe	Estimated Budget
Tube stock propagation (including local provenance seed collection).	5.5 hectares of the existing native pasture will be revegetated using tube stock. The final target rate for box-gum grassy woodlands is 30/40 stems per hectare of canopy species with scattered shrubs (Rawlings et al 2010). In order to allow for seedling mortalities as revegetation areas mature, it is recommended that small trees (trees that have grown to less than 10cm diameter at breast height) have a density of at least 400 stems per hectare. As trees mature to dimensions greater than 10cm diameter and taller than breast height it is considered that 250 stems per hectare is a minimum target density (Rawlings et al 2010). In order to account for mortality of seedlings a planting rate of 600 stems per hectare has been allowed.	Environmental Officer	2013/14	$5,940.00
Site preparation for tube stock planting	Slashing/mowing of 5.5 hectare site prior to planting.	Environmental Officer	2014/15	$800.00
Planting of tube stock	It is assumed that 5.5 hectares of the site will be revegetated using tube stock and a planting rate of 600 stems per hectare has been allowed. Given that the native grasslands at the site are considered to be in good health no allowance has been made for deep ripping of the substrate. It is considered that deep ripping may expose the disturbed ground to infestation of exotic grass and broadleaf species.	Environmental Officer	2014/15	$6,600.00

Table 4.3 – Offset Management Program: Operational Management Actions

Activity	Description	Responsibility	Timeframe	Estimated Budget
Weed management within revegetation/regeneration area	Weed density is considered to be low to moderate within the Biodiversity Offset Area. It is considered that weed management will be required to be undertaken on a biennial basis across 30% (approximately 7 hectares) of the Biodiversity Offset Area. Spraying will be timed to occur prior to flowering of weed species with follow up spraying to be conducted after the initial round of spraying has taken effect. This approach will ensure that weed management works provide an effective kill of target species. It is considered that 7 hectares could be covered in 1.5 days (3 days per year).	Environmental Officer	6 monthly until 2017/18	$3,000.00 per annum
Monitoring of revegetation/regeneration areas	Annual monitoring will be conducted in order to determine the success or otherwise of revegetation works and the progress of natural regeneration. Permanent monitoring plots will be established within the Biodiversity Offset Area during this first year of monitoring. Includes 8 hours field work for two ecologists and reporting.	Environmental Officer	2015/16 2016/17 2017/18	$3,220.00 per annum

Table 4.4 – Offset Management Program: Contingency Costs

Activity	Description	Responsibility	Timeframe	Estimated Budget
Adaptive management costs	Allowance for further land management works such as weed management, feral fauna control, supplementary direct seeding or tube stock propagation and planting if required.	Operations Manager	2016/17 2017/18	$3,000.00 $2,000.00
Total contingency costs	Allowance of 10% contingency to allow for price increases etc.	Operations Manager	Life of Project	$9,369.00

5.0 Offset Monitoring Program

The Biodiversity Offset Area will be subject to ongoing monitoring and maintenance actions to ensure that the area progresses towards meeting the objectives and targets set out in **Section 3.0** in a timely manner. The monitoring program will monitor the success of the management actions, in addition to compliance with the approval conditions, against performance indicators described in **Section 3.3**.

Monitoring events will identify any corrective actions required or whether assistance is required to achieve targets. Monitoring events will target issues such as progression of regenerating native vegetation and the need for targeted weeding programs.

Monitoring requirements for the Biodiversity Offset Area are detailed in **Table 5.1**.

5.1 Monitoring Schedule

The following monitoring program has been developed to integrate with existing commitments as detailed in the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b).

Monitoring results will be assessed and utilised in the continual improvement of revegetation techniques and management actions, and will be documented as part of the annual reporting.

Table 5.1 – Monitoring Program

Focus	Monitoring	Frequency
Weeds	The Biodiversity Offset Area will be subject to six monthly weed assessments by the Environmental Officer. Outbreaks of weeds, in particular noxious weeds as defined by the *Noxious Weeds Act 1993*, will be controlled using suitable control measures such as spraying, slashing or manual removal. Where appropriate, the local weeds authority and Goulburn-Mulwaree Council will be consulted regarding weed control measures.	6 monthly from establishment of Biodiversity Offset Area.
Feral animals	Feral fauna species will be visually monitored during the Environmental Officer's six monthly inspections and during fauna surveys undertaken once every three years. Measures to control feral species will be implemented as required and in consultation with the Rural Lands Protection Board, where necessary.	Opportunistic and during scheduled 6 monthly and 3 yearly monitoring.
Retained vegetation	The condition of retained vegetation is currently monitored on a three yearly basis by a suitably qualified and experienced ecologist to identify any change in habitat quality (either deterioration or improvement). Permanent plots are located within the northern Habitat Management Area, on Joarimin Creek, and in the Cultural Heritage Management Zone. The permanent 400 m² vegetation plot in the Cultural Heritage Management Zone within the Biodiversity Offset Area will form part of the Offset Monitoring requirements. The following will be recorded on a standard recording sheet: • general health of vegetation; • evidence of natural regeneration; • occurrence and abundance of weed species; • signs of disturbance, either by stock or humans; • evidence of feral animals; and • any observable impacts of the operations, such as the effectiveness of sediment and erosion control structures. At each vegetation plot, species diversity and structural composition of the vegetation will be recorded. This will allow a comparison of flora species and abundance over time. Photo monitoring will also be taken from established photo monitoring points at each monitoring site. Fauna will also be monitored at these sites. Details of fauna surveys are included in the Lynwood Quarry Rehabilitation and Landscape Management Plan (Umwelt 2011b).	3 yearly.

Table 5.1 – Monitoring Program (cont.)

Focus	Monitoring	Frequency
Revegetation areas	Following revegetation works, monitoring will be undertaken to assess the progress of the revegetation program with the aim of monitoring plant health and the need for implementation of management works or replacement planting or seeding. The Biodiversity Offset Area will be included in the existing monitoring schedule for revegetation areas. Specifically, the monitoring inspections will assess: • the extent of the vegetative cover and species diversity, and any requirement for additional revegetation works to be undertaken; • the general health of the vegetation; • any occurrences of weed species in the revegetation area and any requirements for weed control activities; • feral animals and the need for control; • erosion and the need for repair of eroded areas; • fire management; • any signs of disturbance, either by animals or humans; and • the success of any management programs implemented following previous monitoring inspections. In addition to annual monitoring, the Environmental Officer will inspect the Biodiversity Offset Area revegetated areas every three months for the first three years after the completion of rehabilitation works. This inspection will include: • the general health of the vegetation and the need for fertilisation; • the growth of the vegetation and the need to replace any dead plants; • any erosion and the need for sediment and erosion controls to be implemented; • any occurrences of weed species in the revegetation area and any requirements for weed control activities; and • signs of disturbance and the need to access controls.	Three monthly for first three years following completion of rehabilitation works. Annually thereafter.
Box gum woodland	Ecological monitoring of retained box gum woodland patches will be undertaken annually against benchmark sites for a period of 5 years with the monitoring frequency to be reassessed after that time. This monitoring will assess the condition and recovery of box gum woodland at the site and provide data to drive the adaptive management of these areas to aid recovery. To allow for comparison between monitoring events, permanent plots and photographic monitoring points will be established. The purpose of the permanent monitoring plots will be to target natural regeneration and determine ground layer vegetation changes. Success of planting and other management actions will be monitored by estimation of growth and survival rates across a representative sample of the relevant areas.	Annually for years 0-5 following establishment of Biodiversity Offset Area. Biannually for years 5-11 (or for 6 years following successful implementation of rehabilitation).

5.2 Risks to the Implementation of the BGWMP

A risk based approach to the implementation of this BGWMP has been considered such that risks to the establishment and management of the Biodiversity Offset Area are identified and a strategy developed to avoid or minimise the potential for them to occur. **Table 5.2** summarises the risks identified and sections of this BGWMP where they are discussed.

Table 5.2 – Risk Assessment for Implementation of BGWMP

		CONSEQUENCE (C)				
		Insignificant (F)	Minor (I)	Moderate (D)	Major (J)	Significant (S)
LIKELIHOOD (L)	Remote (R)	Negligible (N)	Negligible (N)	Very Low (L)	Low (W)	Medium (M)
	Unlikely (U)	Negligible (N)	Very Low (L)	Low (W)	Medium (M)	High (H)
	Possible (P)	Very Low (L)	Low (W)	Medium (M)	High (H)	Very High (V)
	Likely (L)	Low (W)	Medium (M)	High (H)	Very High (V)	Extreme (E)
	Almost Certain (C)	Medium (M)	High (H)	Very High (V)	Extreme (E)	Extreme (E)

Risk	L	C	Rating	Addressed?
Inadequate resourcing to implement the management strategy	P	J	H	Section 4.4
Inadequate resourcing to meet the monitoring and reporting requirements	P	J	H	Section 4.4
Weed infestation within Biodiversity Offset Area leading to degradation of biodiversity values	P	D	M	Section 4 and 5
Pest and feral fauna species within Biodiversity Offset Area leading to degradation of biodiversity values	P	D	M	Section 4 and 5
Failure to meet revegetation targets within Biodiversity Offset Area	P	D	M	Section 4.3 and 5.3
Unauthorised/uncontrolled access to Biodiversity Offset Area leading to damage	L	D	H	Section 4.4
Biomass management impacting on offset values (e.g. grazing, stocking rates etc)	P	I	W	Section 4.4

5.3 Corrective Actions

As identified in the preceding section, there are a range of uncertainties associated with implementation of the BGWMP. In order to ensure delivery of the stated outcomes, and compliance with the approval conditions, a range of further actions are to be undertaken in the event it becomes apparent that performance indicators are not being met. Examples where this may occur include:

- habitat improvement targets are not achieved;
- habitat values as determined by regular monitoring and reporting identifies a declining trend; and
- populations of MNES decline.

The results of monitoring will feed into the adaptive management process (**Section 4.3**). The Environmental Officer will utilise the results of the monitoring activities to identify any corrective actions required to meet the objectives and targets specified in **Section 3.0**. An example of this is shown in **Figure 5.1** below.

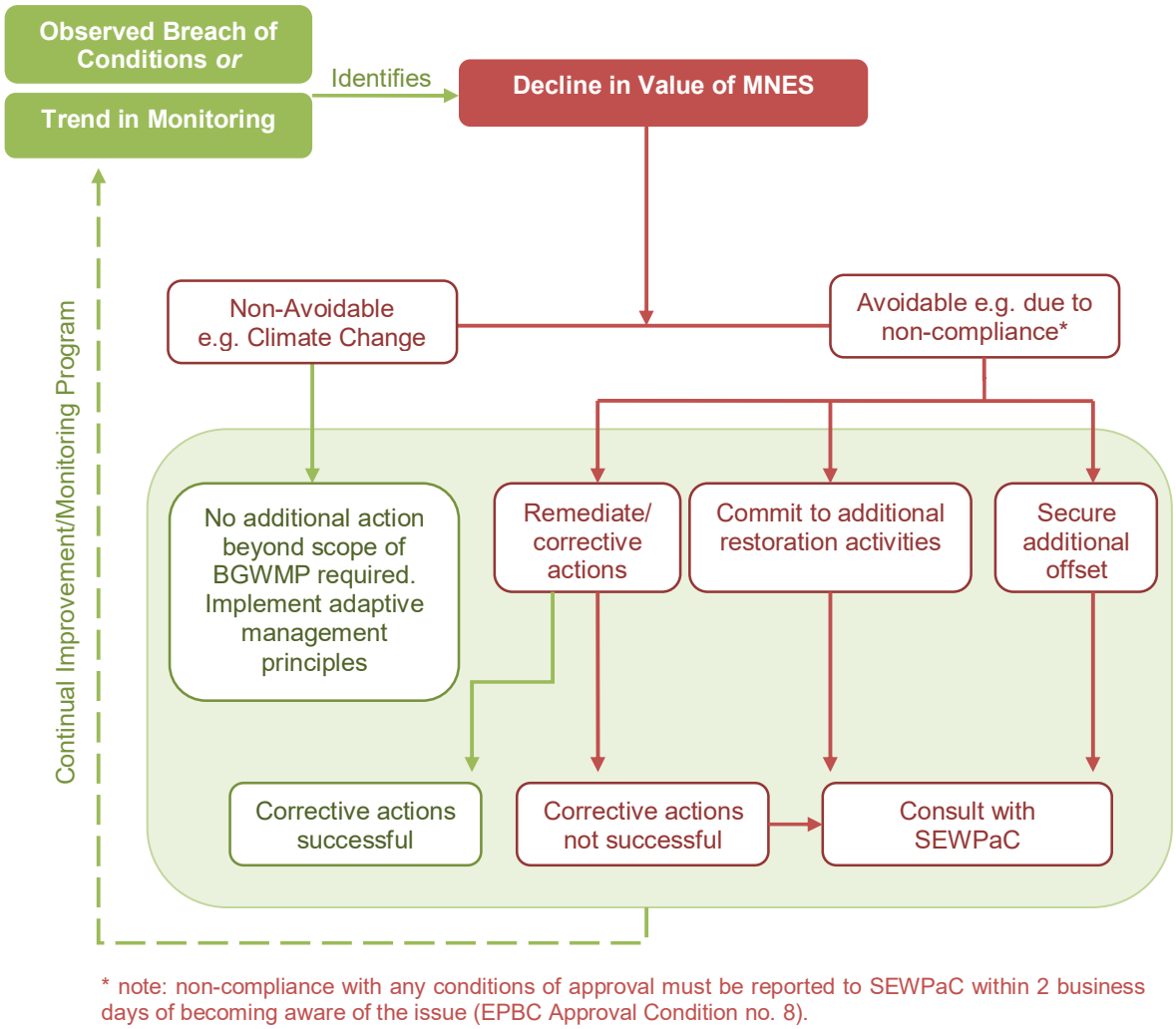


Figure 5.1 – Identifying the Need for Corrective Actions

The following indicative triggers and corrective actions have been identified however would be subject to review based on the adaptive management process.

Table 5.3 – Corrective Action Measures[8]

Issue Identified by Monitoring	Potential Corrective Actions
Species Composition/Weed Infestation	
No regeneration of plants, or indicator species missing	• fence site and exclude grazing • use fire or smoke-water to stimulate germination • control exotic weeds to reduce competition • plant seedlings grown from quality seed
Low species diversity	• revegetate with high diversity patches
Exotic annual grasses dominate	• herbicide control of grasses • strategic burning • strategic grazing • nutrient removal by harvesting, scalping or carbohydrate addition • revegetate with native perennial grasses • 'no kill' cropping • dense tree revegetation to shade out weeds, followed by thinning
Exotic broadleaf weeds abundant or dominant	• use broadleaf herbicides • hand weed or chip • use bush regeneration principles to manage
Patches of perennial grass weeds occurring	• spot spray or dig out small clumps • crash graze periodically • manage grazing to stimulate native pasture • spring burn • monitor and maintain control
Patches of annual grass weeds	• crash graze or burn patches in spring to stop seed set of annual grasses • light grazing in autumn and winter to maintain native grass vigour • apply carbohydrate and sow *Themeda* • monitor and maintain control
Structure and Habitat	
Dense tree or shrub regeneration	• assess whether thinning is necessary • leave if patches are small and plants are native • thin with fire • thin manually
Low habitat value for wildlife	• add logs or branches • increase the number of vegetation layers in the patch • place nesting boxes for target species • control feral predators

[8] Rawlings, K., Freudenberger, D. and Carr, D. (2010) *A guide to managing box gum grassy woodlands*, Department of the Environment, Water, Heritage and the Arts, Canberra (2010).

Table 5.3 – Corrective Action Measures[9] (cont.)

Issue Identified by Monitoring	Potential Corrective Actions
Damage from Pest Species, Livestock etc	
Grazing and browsing damage to plants	• fence to exclude domestic, feral and native animals as necessary • change grazing regimes • control feral species
Soil disturbance from animals	• control feral species • reduce total grazing pressure to maintain groundcover
Feral predators killing or competing with wildlife	• control feral species at a landscape scale • remove exotic berry bushes providing habitat (hawthorn, pyracantha, cotoneaster, etc.)
Tree dieback from insect pressure, herbicide drift, water stress	• prevent stock camping beneath trees • scalp soil beneath tree canopy to remove nutrients; sow with natives such as red grass or *poa* • fence to prevent bark browsing • increase patch size through revegetation • re-vegetate with dense shrubs to increase diversity and insectivorous birds • do not fertilise and prevent fertiliser drift • avoid using defoliants near woodlands when windy

Note: Refer to Rawlings *et al*, 2010 for appropriate application of controls.

[9] Rawlings, K., Freudenberger, D. and Carr, D. (2010) *A guide to managing box gum grassy woodlands*, Department of the Environment, Water, Heritage and the Arts, Canberra (2010).

6.0 Reporting Requirements

6.1 Record Keeping

As per EPBC Approval Condition no. 7, Holcim Australia will maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the Biodiversity Offset Area and the BGWMP.

These records may be subject to audit by SEWPaC or an independent auditor, as described in **Section 6.3**.

6.2 Annual Report

Within three months of every 12 month anniversary of the commencement of the action, Holcim Australia will publish an annual report on its website. Documentary evidence providing proof of date of publication must also be provided to SEWPaC at the time of publishing (EPBC Approval Condition no. 8).

The annual report will contain the following information:

- compliance with each of the conditions of approval;
- description of implementation of the BGWMP as specified in the conditions of approval;
- rehabilitation and management activities undertaken within the reporting period, including estimated costs;
- results of monitoring events for the reporting period; and
- required amendments to the management or monitoring processes as identified by the adaptive management mechanism.

Utilising the adaptive management mechanism outlined in **Section 4.3**, the results of monitoring and management works undertaken will be utilised to inform updates to the management controls to be undertaken in the Biodiversity Offset Area.

Annual reporting and monitoring will continue for six years after the successful implementation of rehabilitation, i.e. all the targets in **Section 3.2** are met consistently for 6 consecutive years. Reporting thereafter will be in accordance with the commitments identified in **Section 8.0**.

6.3 Independent Audit

If directed by the Minister, Holcim Australia must ensure that an independent audit of compliance with the conditions of approval is conducted, and a report submitted to the Minister. The auditor must be approved by the Minister prior to the commencement of the audit (EPBC Approval Condition no. 9).

7.0 Review of Management Plan

This BGWMP will be reviewed internally every 3 years. The BGWMP may be updated in between this period if:

- updated management techniques are identified; or
- the adaptive management framework identifies that current management methods are not effective and require amendment.

Amendments to the BGWMP in response to adaptive management and continual improvement requirements that are not inconsistent with the conditions of approval (EPBC 2012/6560) do not need to be submitted to SEWPaC for approval. Notwithstanding this, if Holcim Australia wish to undertake any activities other than in accordance with the BGWMP as specified in the conditions of approval, a revised version of the BGWMP must be submitted to SEWPaC for the Minister's written approval (EPBC Approval Condition no. 10).

The Minister may also request specific revisions be made to the BGWMP if they believe that it is necessary or convenient for the better protection of the listed ecological community. This revised BGWMP must be submitted to SEWPaC for the Minister's written approval (EPBC Approval Condition no. 11).

8.0 Summary of Commitments

The following **Table 8.1** summarises the commitments made in this BGWMP.

Table 8.1 – Summary of Commitments

Action	Commitment
Publically publish the BGWMP	This BGWMP will be published on Holcim Australia's website within one month of approval by SEWPaC (unless agreed otherwise by the Minister).
Long term conservation of the Biodiversity Offset Area	Establishment of a conservation agreement under Section 69 the NSW *National Parks and Wildlife Act 1974* which would then be listed on the title of the land to ensure it is transferred with any future land sale. Evidence that the conservation agreement application form has been lodged with OEH must be provided to SEWPaC prior to commencement of action.
Direct land offset of 27.2 hectares of box gum woodland	Set aside and fence Biodiversity Offset Area and commence management activities in first year of offset establishment.
Rehabilitation of 22 hectares of native pasture to box gum woodland	Focus on re-establishment of a canopy and removal of weed species with a secondary objective of enhancing understorey diversity. Commence rehabilitation works including reseeding/tube stock planting, and active weed management in first year of offset establishment.
Direct actions to benefit land offsets	Undertake regeneration activities, management and monitoring as per the Offset Management Program in **Section 4.4**.
Enhancement of connectivity between patches of EPBC box gum woodland through management of non-EPBC vegetation	Re-establish continuous canopy connectivity between the eastern and western ends of the Biodiversity Offset Area through habitat management and rehabilitation activities.
Monitoring of Biodiversity Offset Area	0-5 years after establishment. Annual monitoring and reporting to determine success of rehabilitation and general condition including weed and pest animal presence, presence of hoary sunray and other MNES.
	5-11 years (or for 6 years following successful implementation of rehabilitation). Biennial monitoring of condition and performance of rehabilitation.
	12 years+. Monitoring and reporting as per the Rehabilitation and Landscape Management Plan (Umwelt 2011b).
Adaptive management	Implement an adaptive management element into ongoing management of Biodiversity Offset Area.
Annual Reporting	Annual report published on website, and evidence of proof of publication to SEWPaC within 3 months of the anniversary of commencement of the action.
Reporting non-compliances	All non-compliances with the conditions of approval must be reported to SEWPaC within 2 business days.
Record keeping	Holcim Australia will maintain records of all activities undertaken in relation to the Biodiversity Offset Area and BGWMP.
Independent audit	If requested by the Minister, Holcim Australia must ensure that an independent audit of compliance with the conditions of approval is conducted.
Update of BGWMP	Every three years or as required based on adaptive management program. For any activity not consistent with the conditions of approval, a revised BGWMP must be provided to SEWPaC for review and approval.
Resourcing	Holcim Australia to commit to provide funding for ongoing resources to ensure compliance with BGWMP.

9.0 References

Australian Government 2006a. *Species List for the EPBC Act Policy Statement - White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands,* Department of the Environment and Heritage, Canberra (May 2006).

Australian Government 2006b. *White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands Listing Advice,* Department of the Environment and Heritage, Canberra (2006).

Australian Government 2012. *A Guide to Undertaking Strategic Assessments: Environment Protection and Biodiversity Conservation Act 1999*, Department of Sustainability, Environment, Water, Population and Communities (November 2012).

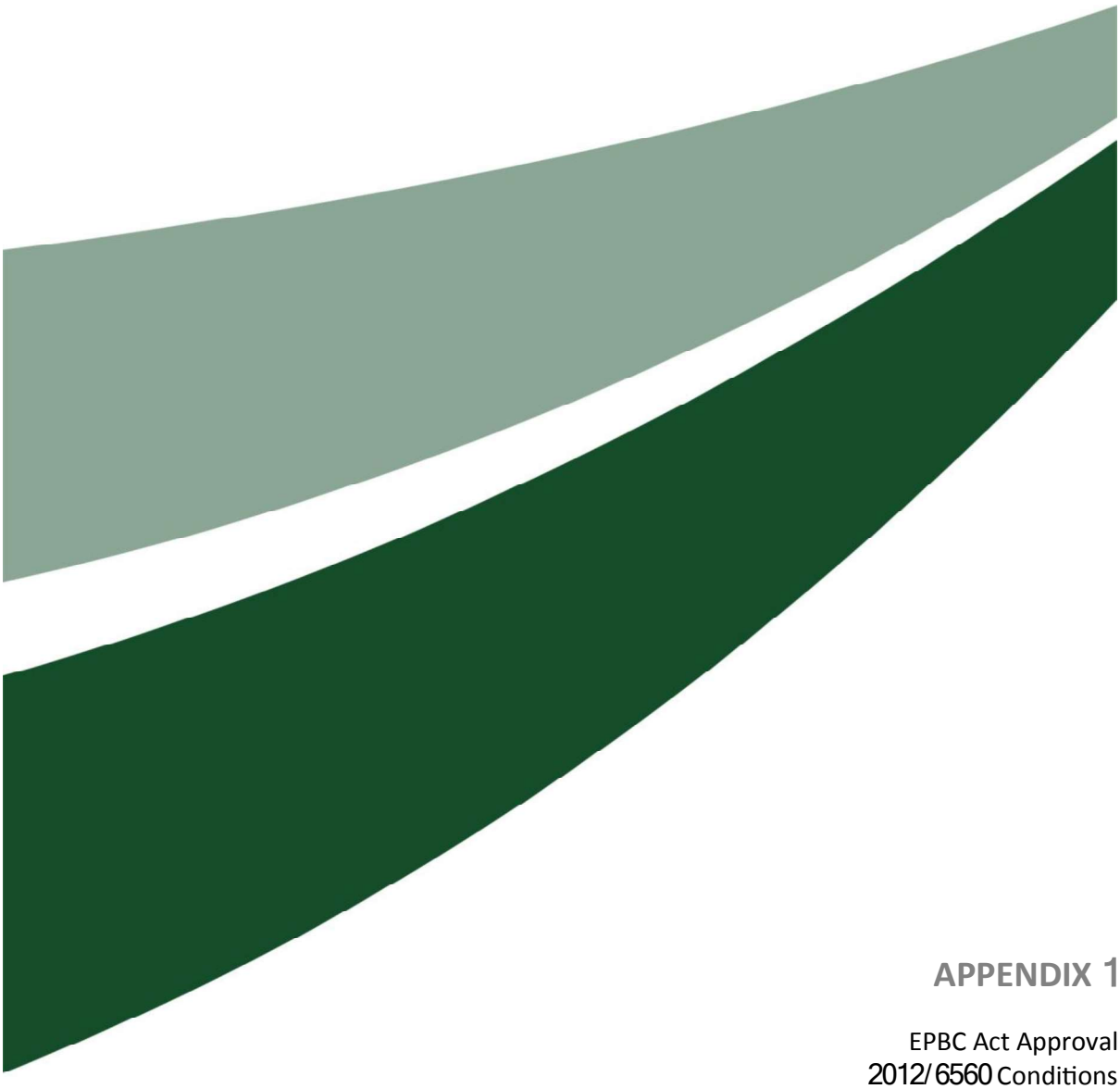
Department of Environment, Climate Change and Water NSW 2011. *National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland,* Department of Environment, Climate Change and Water NSW, Sydney (May 2011).

Department of Sustainability, Environment, Water, Population and Communities 2012. *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*, (October 2012).

Rawlings, K., Freudenberger, D. and Carr, D. 2010. *A guide to managing box gum grassy woodlands*, Department of the Environment, Water, Heritage and the Arts, Canberra.

Umwelt (Australia) Pty Limited 2011a. *Caring for Country Lynwood Quarry, Marulan Aboriginal Heritage Management Plan Revision 2,* Report prepared for Holcim (Australia) Pty Limited.

Umwelt (Australia) Pty Limited 2011b. *Lynwood Quarry Rehabilitation and Landscape Management Plan Revision 2,* Report prepared for Holcim (Australia) Pty Limited.



APPENDIX 1

EPBC Act Approval
2012/6560 Conditions

EPBC Ref: 2012/6560

Mr Stephen Mossie
General Manager – NSW & ACT Aggregates
Holcim (Australia) Pty Ltd
PO Box 5697
WEST CHATSWOOD NSW 1515

Dear Mr Mossie

Decision on Approval
Lynwood Quarry, NSW (EPBC 2012/6560)

I am writing to you in relation to a proposal to expand and operate an existing quarry pit and construct internal haul roads and rail spur and loading facility located approximately 1km west of the township of Marulan NSW.

I have considered the proposal in accordance with Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and have decided to grant an approval to Holcim (Australia) Pty Ltd. The details of my decision are attached. The proposal must be undertaken in accordance with the conditions specified in the approval.

I would appreciate your assistance by informing me when you provide the information specified in the conditions and who will be the contact person responsible for the administration of the approval decision.

You should also note that this EPBC Act approval does not affect obligations to comply with any other laws of the Commonwealth, state or territory that are applicable to the action. Neither does this approval confer any right, title or interest that may be required to access land or waters to take the action.

The department has an active audit program for proposals that have been referred or approved under the EPBC Act. The audit program aims to ensure that proposals are implemented as planned and that there is a high degree of compliance with any associated conditions. Please note that your project may be selected for audit by the department at any time and all related records and documents may be subject to scrutiny. Information about the department's compliance monitoring and auditing program is enclosed.

The department has recently published an *Environmental Impact Assessment Client Service Charter* (the Charter) which outlines the department's commitments when undertaking environmental impact assessments under the EPBC Act. A copy of the Charter can be found at: http://www.environment.gov.au/epbc/publications/index.html.

If you have any questions about this decision, please contact the project manager, Pat Guinane, by email to Patrick.Guinane@environment.gov.au, or telephone (02) 6275 9010 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

James Tregurtha
Assistant Secretary
South-Eastern Australia Environment Assessments
13 September 2013

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

Approval

Lynwood Quarry, Marulan NSW (EPBC 2012/6560)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Holcim (Australia) Pty Ltd
proponent's ACN	099 732 297
proposed action	To establish and operate a quarry pit, construct internal haul roads, and a rail spur and loading facility at Marulan, NSW (see EPBC Act referral 2012/6560).

DECISION to approve:

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approve
Listed migratory species (sections 20 & 20A)	Approve

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 1 January 2038

Decision-maker

name and position

James Tregurtha
Assistant Secretary
South-Eastern Australia Environment Assessments

Signature

date of decision 13 September 2013

Proposed Conditions of Approval:

1. The person taking the action must not clear more than 7.9 hectares of the ecological community *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*.

2. To assist in mitigating the impacts of the proposal on *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (box gum woodland), the person taking the action must prepare and submit a Box Gum Woodland Management Plan (BGWMP) for Minister's written approval prior to commencement of the action. The BGWMP must include;

    a. Management actions designed to improve the ecological quality of box gum woodland on the project area (refer to Map at Schedule 1) and proposed biodiversity offset area and protect it from degradation for the duration of the action's impact on box gum woodland.

    b. Regeneration and revegetation strategies for box gum woodland on the project area and the proposed biodiversity offset area (refer to Map at Schedule 1) to improve the ecological quality of these areas of box gum woodland.

    c. An ecological monitoring program to monitor the success of the management actions in the BGWMP and define measurable targets of management actions, performance indicators, and an adaptive management framework for the duration of the action's impact on box gum woodland.

    d. Management of the offset site as above from commencement of the action.

    The action must not commence until the BGWMP is approved by the Minister. The approved BGWMP must be implemented.

3. To compensate for the loss of 7.9 hectares of box gum woodland the person taking the action must secure the lands identified as the *'Proposed Biodiversity Offset Area'* in the Map at Schedule 1 of this notice as a biodiversity offset and protect the lands for the duration of the action's impact through a conservation agreement under section 69 of the NSW *National Parks and Wildlife Act 1974*. The conservation agreement must state; *'This agreement must not be terminated without the written consent of 'The Minister Administering the Commonwealth Environment Protection and Biodiversity Conservation Act 1999'.*

4. Prior to the commencement of the action the person taking the action must provide evidence to the Department of;

    a. Their ownership of the offset lands described in Condition 3 along with offset attributes, shapefiles and textual descriptions and maps to clearly define the location and boundaries of the offset sites.

    b. Lodgement of the section 69 conservation agreement application form with the NSW Office of Environment & Heritage.

5. If the person taking the action is unable to comply with Conditions 3 and 4 above they must propose an alternative offset strategy for box gum woodland that meets the current Commonwealth EPBC Act Environmental Offsets Policy. The proposed action must not commence until the alternative proposed offset has been approved in writing by the Minister.

6. Within 30 days after the commencement of the action, the person taking the action must advise the Department in writing of the actual date of commencement.

7. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to these conditions of approval, including measures taken to implement the offset and BGWMP, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.

8. Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the BGWMP as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published. Non-compliance with any of the conditions of this approval must be reported to the Department within 2 business days of becoming aware of the non-compliance.

9. Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.

10. If the person taking the action wishes to carry out any activity otherwise than in accordance with the Plan as specified in the conditions, the person taking the action must submit to the Department for the Minister's written approval a revised version of that Plan. The varied activity shall not commence until the Minister has approved the varied Plan in writing. The Minister will not approve a varied Plan unless the revised Plan would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised Plan, that Plan must be implemented in place of the Plan originally approved.

11. If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities to do so, the Minister may request that the person taking the action make specified revisions to the Plan specified in the conditions and submit the revised Plan for the Minister's written approval. The person taking the action must comply with any such request. The revised approved Plan must be implemented. Unless the Minister has approved the revised Plan then the person taking the action must continue to implement the Plan originally approved.

12. If, at any time after 5 years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.

13. Unless otherwise agreed to in writing by the Minister, the person taking the action must publish the Plan and Program referred to in these conditions of approval on their website. The Plan and Program must be published on the website within 1 month of being approved.

Definitions

a) Department, the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999*.

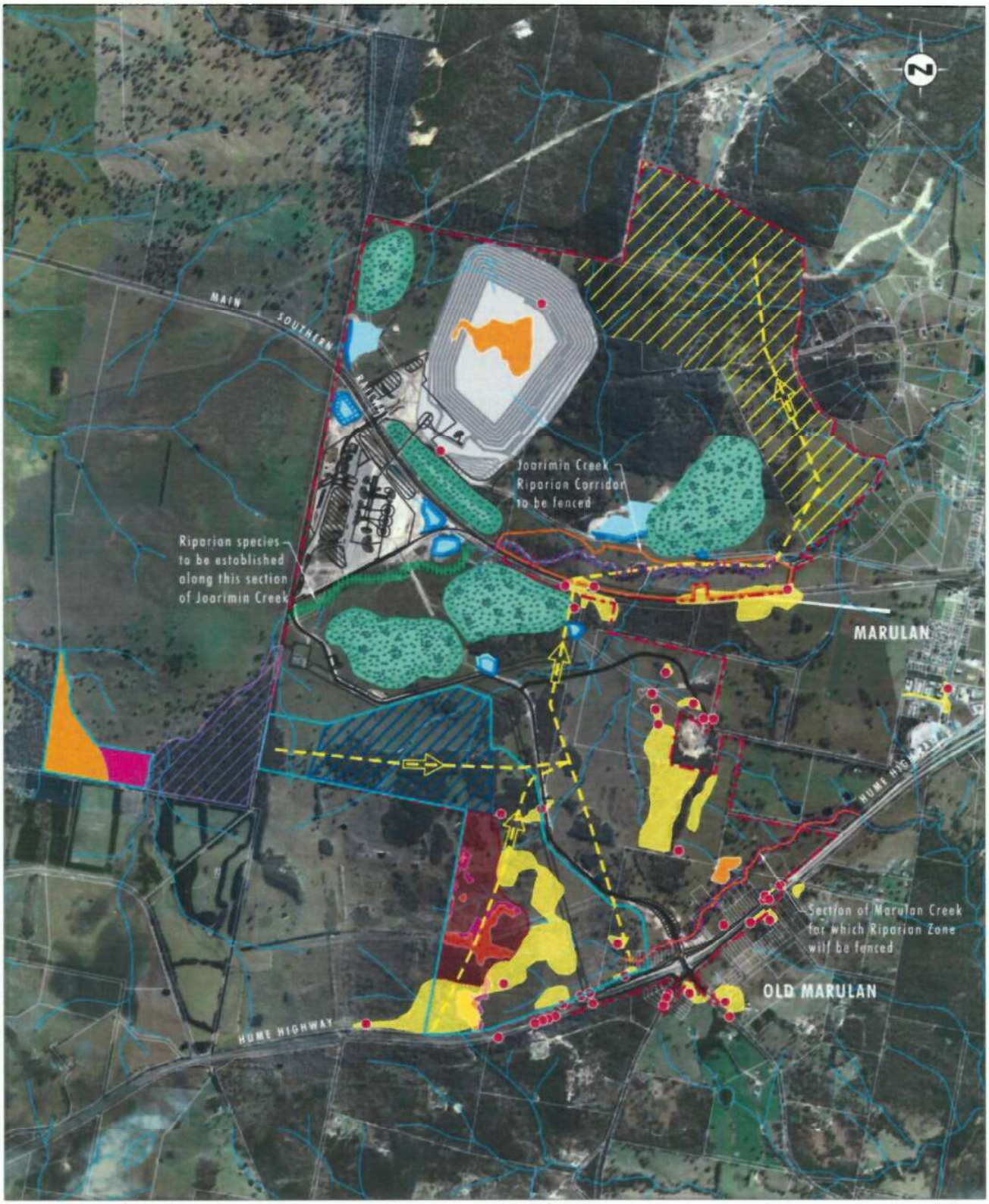
b) Minister, the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

c) Commencement, means the earthworks, vegetation removal or construction of any infrastructure, excluding fences and signage, associated with the proposed action.

d) Offset attributes, mean an '.xls' file capturing relevant attributes of the Offset Area, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC protected matters that the offset compensates for, any additional EPBC protected matters that are benefiting from the offset, and the size of the offset in hectares.

e) Shapefiles, means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the Offset Area, including the shape, EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

Schedule 1



Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)

0 0.5 1 1.5km
1 30 000

Legend

- Project Area
- Existing Approved Habitat Management Area
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Stepping-Stone Corridor
- Box Gum Woodland Derived Native Grassland (CEEC)
- Box Gum Woodland (CEEC)
- Hoary Sunray Habitat
- Location of Hoary Sunray
- Proposed Biodiversity Offset Area
- Proposed Box Gum Woodland CEEC Regeneration
- Proposed Habitat Management Area
- Drainage

FIGURE 3.2

Proposed Biodiversity Offset Area and Habitat Management Features

Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

www.umwelt.com.au

Appendix B Lynwood Quarry, Marulan NSW EPBC Approval 2012/6560

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

EPBC Ref: 2012/6560

Mr Stephen Mossie
General Manager – NSW & ACT Aggregates
Holcim (Australia) Pty Ltd
PO Box 5697
WEST CHATSWOOD NSW 1515

Dear Mr Mossie

Decision on Approval
Lynwood Quarry, NSW (EPBC 2012/6560)

I am writing to you in relation to a proposal to expand and operate an existing quarry pit and construct internal haul roads and rail spur and loading facility located approximately 1km west of the township of Marulan NSW.

I have considered the proposal in accordance with Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and have decided to grant an approval to Holcim (Australia) Pty Ltd. The details of my decision are attached. The proposal must be undertaken in accordance with the conditions specified in the approval.

I would appreciate your assistance by informing me when you provide the information specified in the conditions and who will be the contact person responsible for the administration of the approval decision.

You should also note that this EPBC Act approval does not affect obligations to comply with any other laws of the Commonwealth, state or territory that are applicable to the action. Neither does this approval confer any right, title or interest that may be required to access land or waters to take the action.

The department has an active audit program for proposals that have been referred or approved under the EPBC Act. The audit program aims to ensure that proposals are implemented as planned and that there is a high degree of compliance with any associated conditions. Please note that your project may be selected for audit by the department at any time and all related records and documents may be subject to scrutiny. Information about the department's compliance monitoring and auditing program is enclosed.

GPO Box 787 Canberra ACT 2601 • Telephone 02 6274 1111 • Facsimile 02 6274 1666
www.environment.gov.au

The department has recently published an *Environmental Impact Assessment Client Service Charter* (the Charter) which outlines the department's commitments when undertaking environmental impact assessments under the EPBC Act. A copy of the Charter can be found at: http://www.environment.gov.au/epbc/publications/index.html.

If you have any questions about this decision, please contact the project manager, Pat Guinane, by email to Patrick.Guinane@environment.gov.au, or telephone (02) 6275 9010 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

James Tregurtha
Assistant Secretary
South-Eastern Australia Environment Assessments
13 September 2013

2

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

Approval

Lynwood Quarry, Marulan NSW (EPBC 2012/6560)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Holcim (Australia) Pty Ltd
proponent's ACN	099 732 297
proposed action	To establish and operate a quarry pit, construct internal haul roads, and a rail spur and loading facility at Marulan, NSW (see EPBC Act referral 2012/6560).

DECISION to approve:

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approve
Listed migratory species (sections 20 & 20A)	Approve

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 1 January 2038

Decision-maker

name and position

James Tregurtha
Assistant Secretary
South-Eastern Australia Environment Assessments

Signature

date of decision 13 September 2013

Proposed Conditions of Approval:

1. The person taking the action must not clear more than 7.9 hectares of the ecological community *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*.

2. To assist in mitigating the impacts of the proposal on *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (box gum woodland), the person taking the action must prepare and submit a Box Gum Woodland Management Plan (BGWMP) for Minister's written approval prior to commencement of the action. The BGWMP must include;

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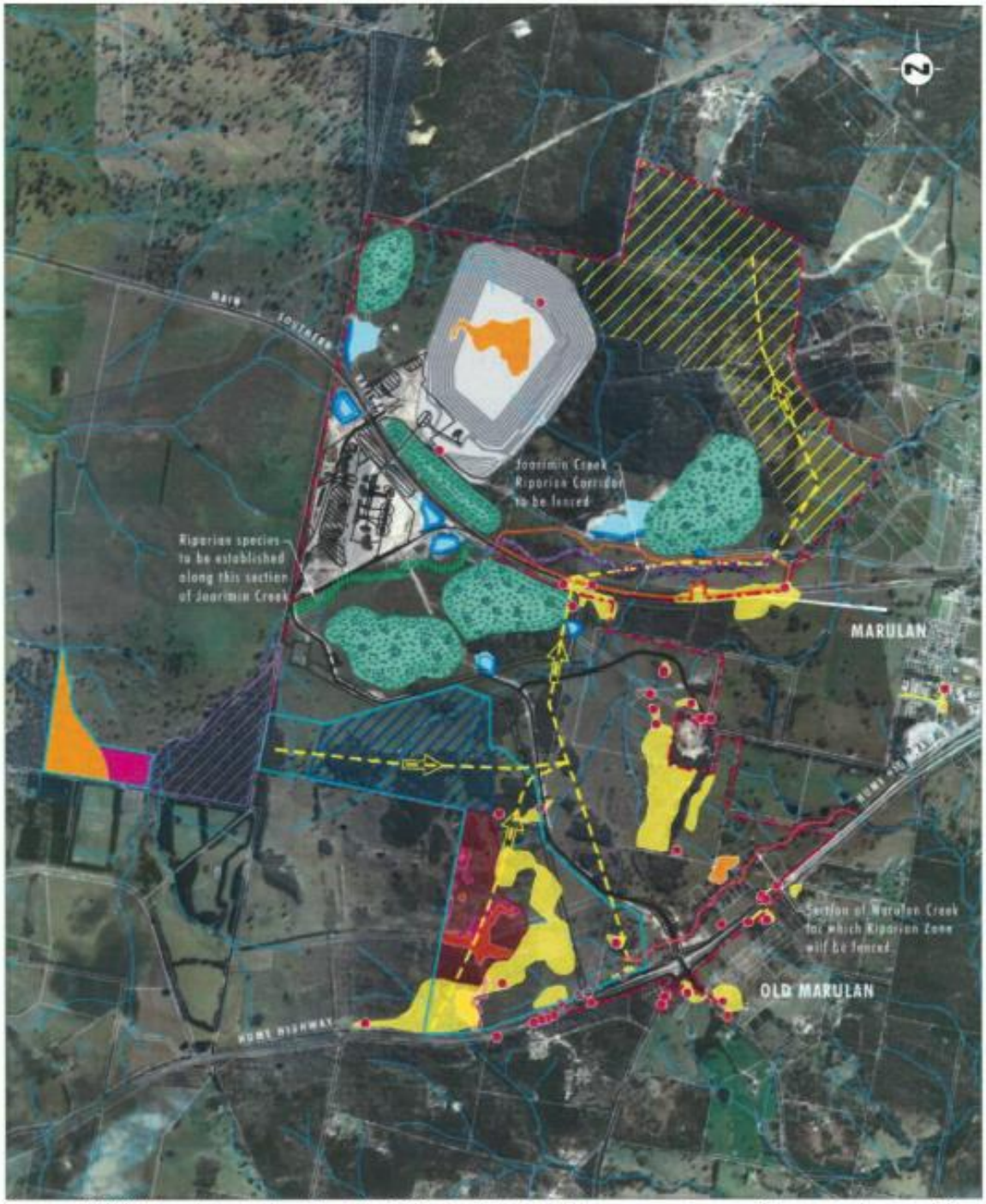
Schedule 1



Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)

0 0.5 1 1.5km
1:30,000

Legend

- Project Area
- Existing Approved Habitat Management Area
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Stepping Stone Corridor
- Box Gum Woodland Derived Native Grassland (CEEC)
- Box Gum Woodland (CEEC)
- Heavy Sunray Habitat
- Location of Heavy Sunray
- Proposed Biodiversity Offset Area
- Proposed Box Gum Woodland CEEC Regeneration
- Proposed Habitat Management Area
- Drainage

FIGURE 3.2

Proposed Biodiversity Offset Area and Habitat Management Features

Appendix C Draft Conservation Agreement Lodgement 2013

CONSERVATION AGREEMENT

BETWEEN

THE MINISTER ADMINISTERING
THE NATIONAL PARKS AND WILDLIFE ACT 1974 (NSW)

AND

Holcim (Australia) Pty Ltd

FOR

Lynwood Quarry Conservation Agreement

_____
Holcim (Australia) Pty Ltd Director (Print name and sign)

_____
Holcim (Australia) Pty Ltd Secretary (Print name and sign)

_____
Chief Executive OEH (Print name and Sign)

<<This page to be signed by all parties to the Agreement>>

CONSERVATION AGREEMENT UNDER PART 4 DIVISION 12 OF THE NATIONAL PARKS AND WILDLIFE ACT 1974

THIS AGREEMENT is between the **Minister** administering the *National Parks and Wildlife Act 1974* (**Minister**) and **Holcim (Australia) Pty Ltd** the owner of the following lots (and part lots), being the property known as Lynwood Quarry Conservation Area:

- Part Lot 3 in Deposited Plan 1107232,
- Part Lot 2 in Deposited Plan 1116876,
- Part Lot 3 in Deposited Plan 1140546,
- Part Lot 3 in Deposited Plan 1074107,
- Part Lot 508 in Deposited Plan 1208430,
- Lot 2/5 Sec 5 in Deposited Plan 758653,
- Lot 3/5 Sec 5 in Deposited Plan 758653, and
- Lot 4/5 Sec 5 in Deposited Plan 758653.

BACKGROUND

A The Owner is the registered proprietor of the Land. That part of the Land shown by hatching on Diagram A of Annexure A to the Conservation Agreement is the conservation area (Conservation Area). The Conservation Area is approximately 215.89 hectares in size.

B The Conservation Agreement satisfies a commitment made to secure a biodiversity offset relating to *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* (CEEC) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) relating to impacts associated with the Lynwood Quarry (EPBC Ref 2012/6560).

C Management of the Lynwood Quarry Conservation Area is undertaken in accordance with the Box Gum Woodland Management Plan.

D It is the intention of the parties that the Conservation Area will not be used as a biodiversity offset or other conservation measure related to any future development or activity, consistent with current NSW Government policy.

E The Conservation Area is to be managed to restore and protect the Conservation Values.

F The Owner and the Minister recognise:

i) The Conservation Area contains Yellow Box – Blakely's Red Gum Grassy Woodland on the Tablelands, South Eastern Highlands Bioregion (PCT 1330) and Red Stringybark – Brittle Gum – Inland Scribbly Gum, dry open forest of the Tablelands and South Eastern Highlands Bioregion (PCT 1093).

ii) The Conservation Area contains areas of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland endangered ecological community (EEC) under the NSW *Biodiversity Conservation Act 2016* (BC Act) and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC under the EPBC Act and a population of the threatened hoary sunray (*Leucochrysum albicans* var. *tricolor*), listed as endangered under the EPBC Act.

iii) The Conservation Area contains suitable habitat for 35 threatened fauna species and 11 threatened flora species. The Conservation Area contains known records (being from site surveys and/or BioNet) of eight threatened fauna species and two threatened flora species listed under the BC Act and/or the EPBC Act. (refer to Table 3 Annexure B)

iv) The Conservation Area contains vegetation communities heavily modified by past agricultural activities. Broad vegetated corridors exist in near proximity through adjacent Holcim land. These are isolated remnants of vegetation running from the Conservation Area in the south, through to Joarimin Creek and up to the Habitat Management Area in the north. There are a number of large

conservation reserves near the Conservation Area, including Morton National Park, Tarlo River National Park and Bungonia National Park and State Conservation Area (SCA).

1 DEFINITIONS AND INTERPRETATION

1.1 Definitions

In the Conservation Agreement, unless the contrary intention appears:

"**Aboriginal Object**" has the same meaning as in section 5 of the NPW Act;

"**Aboriginal Place**" has the same meaning as in section 5 of the NPW Act;

"**BC Act**" means the *Biodiversity Conservation Act 2016* and regulations in force thereunder;

"**Chief-Executive**" means the Chief-Executive of OEH or a person or organisation to whom the Chief-Executive's rights and duties under this Conservation Agreement have been delegated;

Commented [RV1]: More recent agreements have reference to BCT rather than the Chief-executive – so there may be a new template. Need to check throughout and resolve.

"**Commencement date**" means the date on which the Minister signs the Conservation Agreement;

"**Conservation Agreement**" means this Conservation Agreement entered into under section 69B of the NPW Act;

"**Conservation Area**" means that part of the Land shown by hatching on Diagram A of Annexure A to the Conservation Agreement;

"**Conservation Values**" means the biodiversity values of the Conservation Area specified in Annexure B to the Conservation Agreement;

"**control**", in relation to the Land, means lawful occupation, possession or management of the Conservation Area;

"**controlled burning**" means the controlled application of fire under specified environmental and weather conditions to a predetermined area and at the time, intensity and rate of spread required to attain planned resource management objectives;

"**critical habitat**" has the same meaning as in section 4 of the BC Act;

"**cultural heritage**" refers to the aesthetic, historic, scientific, social, spiritual or other values of a place and associated physical evidence and traditions held by past, present or future generations of peoples, including Aboriginal peoples;

"**damage**" has the same meaning as in section 5 of the NPW Act;

"**development**" has the same meaning as in section 69A of the NPW Act;

"**EPBC Act**" refers to the *Environment Protection and Biodiversity Conservation Act* 1999 (Commonwealth);

"**exotic plant**" means an introduced, alien, exotic, non-indigenous, non-native or a plant species living outside its native distributional range;

"**fauna**" has the same meaning as in section 5 of the NPW Act;

"**geo-heritage**" means any karst environment and any geological deposits and landforms that provide habitat for indigenous fauna and includes values identified as geo-heritage under the heading Conservation Values in Annexure B to the Conservation Agreement;

"**harm**" has the same meaning as in section 5 of the NPW Act;

"**indigenous fauna**" means a species of animal that was established in, or started regularly migrating to New South Wales prior to European settlement and includes fauna listed in Annexure B to the Conservation Agreement;

"**indigenous plants**" means a species of plant that was established in New South Wales prior to European settlement and includes plants listed in Annexure B to the Conservation Agreement;

"**Land**" means the land in folio identifier Part Lot 3 in Deposited Plan 1107232, Part Lot 2 in Deposited Plan 1116876, Part Lot 3 in DP 1140546, Part Lot 3 in Deposited Plan 1074107, Part Lot 508 in Deposited Plan 1208430, Lot 2 Sec5 in Deposited Plan 758653, Lot 3 Sec 5 in Deposited Plan 758653, and Lot 4 Sec 5 in Deposited Plan 758653;

"**Lessee**" means person leasing the land that is secured by real property indicated in the folio identifier Lot 3 Deposited Plan 1107232 at the date of this Conservation Agreement, being **Ranken Group Pty Limited** (previously Vireba Pty Limited) and includes its successors in title and any person appointed as its attorney or receiver in relation to that real property;

"**Minister**" means the Minister for the time being administering the NPW Act and where not repugnant to the context includes the servants, agents and delegates of the Minister;

"**NPW Act**" means the *National Parks and Wildlife Act 1974* (NSW) and any regulations from time to time in force thereunder;

"**native fauna**" has the same meaning as "protected fauna" in section 5 of the NPW Act;

"**native plant**" has the same meaning as in section 5 of the NPW Act;

"**native vegetation**" has the same meaning as in the *Native Vegetation Act 2003* (NSW);

"**DPIE**" means the Department of Planning, Industry and Environment, the NSW Government Public Service agency responsible for administering the NPW Act or a person or organisation to whom DPIE rights and duties under this Conservation Agreement have been delegated;

"**Owner**" means the registered proprietor of the Land from time to time, being **Holcim (Australia) Pty Ltd** as at the date of the Conservation Agreement, and includes any successors in title within the meaning of section 69E of the NPW Act;

"**pest animal**" means any non-native animal having, or with the potential to have, an adverse economic, environmental or social impact on the Conservation Area;

"**pesticide**" has the same meaning as in section 5 of the *Pesticides Act 1999* (NSW);

"**reasonable**" in relation to carrying out an activity, means making a legitimate effort and carrying out the activity in such a way as to have a minimal negative impact on the Conservation Values of the Conservation Area;

"**recovery plan**" means a recovery plan as defined in section 4 of the TSC Act, or a biodiversity conservation program established in accordance with Part 4 Division 6 of the BC Act;

"**road**" allows the passage of vehicles and persons and may be of more developed construction and surface improvement;

"**threatened species, populations and ecological communities**" and "**threatened species, population or ecological community**" have the same meaning as in the BC Act;

"**TSC Act**" means the *Threatened Species Conservation Act 1995* (NSW);

"**track**" allows non-vehicular access only;

"**trail**" allows the passage of vehicles and persons and is of minimal construction, being of limited width and minimal surface improvement; and

"**Year 1**" means twelve month period following the Commencement date.

1.2 **Interpretation**

In the Conservation Agreement, except where the context otherwise requires:

(a) words importing the singular number shall include the plural and masculine gender the feminine or neuter and vice versa; and

(b) any reference to a person shall be deemed to include a corporate body and vice versa.

2 CONSERVATION AGREEMENT UNDER THE NPW ACT

2.1 The Minister enters into the Conservation Agreement relating to the Land with the Owner under section 69B of the NPW Act and clause 17 (2) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*.

2.2 The Owner acknowledges that the Minister, the Chief Executive or DPIE may delegate some or all of their roles or duties under the Conservation Agreement to another person or organisation, including the Biodiversity Conservation Trust established under the BC Act. The Minister, the Chief Executive or DPIE may give the Owner notice in writing of any change to their address for service of notices, and the Owner must use the address set out in any such notice.

3 TERM

The Conservation Agreement shall operate in perpetuity.

3.1 This agreement must not be terminated without the written consent of the Minister administering the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

4 OBTAINING OF CONSENTS, PERMITS AND AUTHORISATIONS

The Owner is responsible for obtaining all necessary licenses, consents, authorisations, permits or approvals in order to lawfully comply with and carry out its obligations under the Conservation Agreement or to undertake or enable any other identified action or development under clauses 5 or 6.

5 USE OF THE CONSERVATION AREA

The Owner must not undertake, consent to or permit the following activities on or in the Conservation Area, unless provided for under the Conservation Agreement or with prior written consent of the Chief-Executive:

(a) the sowing or planting of trees, grasses or other plants;

(b) the introduction of any non-indigenous plants or non-indigenous fauna;

(c) the entry of domestic animals including pets (except for the Owner's domestic pets, and only if kept under control/on a leash) and domestic livestock;

(d) the use or application of fertilizers or pesticides;

(e) the use of trail bikes, four wheel drive vehicles or any other vehicle off any formed road (except for management purposes, research, firefighting and/or any emergency requirements);

(f) any works, especially any revegetation work, or any development which has the potential to adversely impact on any of the Conservation Values;

(g) the removal of any biological or inorganic component of the Conservation Area;

(h) any works which will adversely affect the natural flows of water;

(i) grazing of domestic livestock;

(j) any act or omission that may harm any native fauna, native plants, their habitats, cultural heritage or geo-heritage in the Conservation Area or the Conservation Values;

(k) the construction of any new road, access track, trail, building or internal fencing; and

(l) subdivide the Conservation Area.

Commented [RM2]: What about for purposes of weed management?

6 MANAGEMENT OF THE CONSERVATION AREA

6.1 The Owner must undertake the management actions and achieve aims listed in Item 1 of Annexure C to the Conservation Agreement on or in the Conservation Area, at the times specified in Item 1 of Annexure C to the Conservation Agreement, for a minimum period of 10 years from the Commencement date.

6.2 The Owner must undertake the management actions listed in Item 2 of Annexure C to the Conservation Agreement on or in the Conservation Area, from Year 11 for the duration of the Conservation Agreement.

6.3 The Owner must undertake the management actions specified above (in clauses 6.1 and 6.2) according to the permissions and guidelines specified in Item 3 of Annexure C.

6.4 The Owner may undertake additional management actions (not specified in clauses 6.1 and 6.2 above) listed in Item 3 of Annexure C to the Conservation Agreement on or in the Conservation Area, if carried out in the manner prescribed in Item 3 of Annexure C to the Conservation Agreement.

7 MONITORING

7.1 The Owner must engage a suitably qualified person (such as an ecologist) to undertake the monitoring program as set out in Annexure D to the Conservation Agreement (Monitoring Program).

7.2 The Monitoring Program must be undertaken for a minimum 10 year period after commencement of the Conservation Agreement.

7.3 The Monitoring Program may be reviewed and varied after the commencement date of the Conservation Agreement with written approval from DPIE.

8 REPORTING OBLIGATIONS

8.1 The Owner must notify the Chief-Executive in writing as soon as possible after becoming aware of the deterioration of any of the Conservation Values specified in Annexure B, or any threat to the Conservation Values specified in Annexure B.

8.2 Following completion of the Monitoring Program the Owner should (at least every three years) submit to DPIE basic photo point photos for the purpose of identifying changes occurring in the Conservation Area. At the time of submitting the photos, the Owner must also report any unforeseen deterioration of any of the Conservation Values specified in Annexure B, or any threat to the Conservation Values specified in Annexure B. This will form the basis for decisions about ongoing management actions for the Conservation Area. A copy of all monitoring reports should be forwarded to DPIE.

9 USE OF THE CONSERVATION AREA BY SERVANTS, AGENTS, LESSEES OR LICENSEES

The Owner must incorporate the terms of the Conservation Agreement in any lease or licence issued over the Conservation Area, and at all times ensure that any servant, contractor, consultant, agent, lessee, licensee occupying the Conservation Area shall be aware of the relevant provisions of the Conservation Agreement.

10 CHANGE OF OWNERSHIP

10.1 The Owner must notify the Chief-Executive in writing of any change of ownership or control of the Land within twenty-eight (28) days after the change of ownership or control. The notice must include the name and address of the new Owner of the Land or person in control of the Land.

10.2 If the Land is sold or ownership transferred within the first 10 years of this Agreement, the management actions listed in Item 1 of Annexure C and Monitoring Program detailed in Annexure D must be carried out by the new owner for the remaining period.

11 RIGHT TO INSPECT

The Minister may, at any time upon first giving reasonable notice to the Owner, enter upon the Conservation Area to inspect the condition of the Conservation Area and ensure compliance with the Conservation Agreement.

12 OBLIGATIONS OF THE MINISTER

12.1 The Minister agrees to notify the Registrar General when the Conservation Agreement has been entered into so that the Registrar General can carry out his or her responsibilities under section 69G of the NPW Act.

12.2 The Minister will arrange for the provision of technical advice and any other assistance to the Owner as the Minister deems necessary to assist with the implementation of the Conservation Agreement.

13 NON-COMPLIANCE

In the event that the Owner fails to comply with the Conservation Agreement, including, without limitation, damaging or causing damage to the Conservation Area, DPIE may issue a written notice to the Owner requiring the Owner to remedy the non-compliance or damage within a specified time period. This clause does not affect any rights of the parties under section 69G of the NPW Act.

14 DISPUTE RESOLUTION

14.1 Where there is a dispute, difference or claim (dispute), the party raising the dispute must notify the other party in writing of the nature of the dispute, including the factual and legal basis of the dispute (written notice).

14.2 Within fourteen (14) days of the written notice, the Chief-Executive of DPIE and the Owner, or nominated senior representatives of the parties, must attempt to resolve the dispute. If the dispute cannot be resolved within twenty-one (21) days of the written notice, the Chief-Executive of DPIE and the Owner will refer the matter to mediation.

14.3 The parties will agree on the terms of appointment of the mediator and the terms of the mediation in writing within twenty-eight (28) days, failing which the mediation will be at an end and either party may commence court proceedings in respect of the dispute.

14.4 If the matter has not been resolved within twenty-eight (28) days of the appointment of the mediator, the mediation process will be at an end and either party may commence court proceedings in respect of the dispute.

15 COSTS

The Owner will bear costs of, and incidental to, the preparation of the Conservation Agreement, including survey and legal costs.

16 COMMENCEMENT

The Conservation Agreement shall have effect from the day the Minister executes the Conservation Agreement.

Executed as an agreement

SIGNED by
The Chief Executive, Office of Environment and Heritage, as the Minister's delegate under Section 21(1) of the *National Parks and Wildlife Act 1974*

_____
Chief Executive

_____
Print Name

_____
Witness

_____
Date

_____
Witness Name and address

_____
Date

SIGNED by the **OWNER** Executed by **Holcim (Australia) Pty Ltd** pursuant to Section 127 of the *Corporations Act 2001* (Commonwealth).

_____	_____
Director: Holcim (Australia) Pty Ltd	Secretary: Holcim (Australia) Pty Ltd
_____	_____
Date	Date
_____	_____
Witness signature	Witness signature
_____	_____
_____	_____
Witness Name and Address	Witness Name and Address
_____	_____
Date	Date

Address for service of notices on the Owner:

Holcim (Australia) Pty Ltd
799 Pacific Highway
Chatswood, NSW, 2067

Address for service of notices on the Chief Executive DPIE

The Chief Executive
C/O NSW Biodiversity Conservation Trust
PO Box A290 Sydney South NSW 1232

Address for service of notices on the Minister:

NSW Minister for the Environment
GPO Box 5341 Sydney NSW 2001.

Ranken Group Pty Limited (previously Vireba Pty Limited**),** the lessee of Lot 3 DP 1107232 of the Conservation Area, consents to this Agreement.

Date: _____

Witness: _____

Date: _____

ANNEXURE A DIAGRAM A1 – Lynwood Quarry Conservation Area

_____ _____
Director: Holcim (Australia) Pty Ltd) Chief Executive

_____
Secretary: Holcim (Australia) Pty Ltd)

Insert Survey Diagram here that meets NSW LPI specifications shown here

ANNEXURE B - CONSERVATION VALUES

1. CONSERVATION VALUES

The Owner and the Minister recognise that the Conservation Area contains the following conservation values:

A The Conservation Area contains the following plant community types (PCTs):

- PCT 1330 – Yellow Box – Blakely's Red Gum Grassy Woodland on th Tablelands, South Eastern Highlands Bioregion in the following conditions:
    - Moderate to Good
    - Moderate to God – Derived Native Grassland
    - Low Condition Grassland
- PCT 1093 – Red Stringybark – Brittle Gum – Inland Scribbly Gum, dry open forest of the Tablelands, South Eastern Highlands Bioregion in the following conditions:
    - Moderate to Good
    - Low Condition Grassland

Descriptions of each of these communities are provided below.

PCT 1330 – Yellow Box – Blakely's Red Gum Grassy Woodland on the Tablelands, South Eastern Highlands Bioregion

This community is a tall woodland or grassland that occupies fertile lower parts of the landscape where resources such as water and nutrients are more available. This PCT contains areas of both the grassy woodland and derived native grassland components of the community. The woodland component in the Conservation Area is dominated by Blakely's red gum (*Eucalyptus blakelyi*) and Yellow box (*Eucalyptus melliodora*), with occurrences of Bundy (*Eucalyptus goniocalyx*), Apple box (*Eucalyptus bridgesiana*), Argyle Apple (*Eucalyptus cinerea*) and Red stringybark (*Eucalyptus macrorhyncha*). A small tree layer of Black she-oak (*Allocasuarina littoralis*) is sometimes present. Common shrubs include Sifton bush (*Cassinia arcuata*), Peach heath (*Lissanthe strigosa*) and Nodding blue-lily (*Stypandra glauca*). Common groundcover species include Weeping grass (*Microlaena stipoides*), Speargrass (*Austrostipa scabra*), Purple wiregrass (*Aristida ramosa*), *Poa sieberiana*, Stinking pennywort (*Hydrocotyle laxiflora*), Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*), *Gonocarpus tetragynus* and Ivy goodenia (*Goodenia hederacea* subsp. *hederacea*).

The grassland component is located within the previously cleared lower slopes and drainage areas. At the woodland interface, regeneration of canopy species is common. The grassland component has been split into two condition types, comprising moderate to good condition derived native grassland and low condition grassland. The moderate to good condition derived native grassland is dominated by a variety of native species, including Sifton bush (*Cassinia arcuata*), Peach heath (*Lissanthe strigosa*), Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*), Poison rock fern (*Cheilanthes sieberi* subsp. *sieberi*), *Gonocarpus tetragynus*, Ivy goodenia (*Goodenia hederacea* subsp. *hederacea*), Speargrass (*Austrostipa scabra*) and Weeping grass (*Microlaena stipoides*). Hoary sunray (*Leucochrysum albicans* var. *tricolor*), listed as endangered under the EPBC Act was recorded at the permanent monitoring plot established in the moderate to good condition derived native grassland.

The low condition grassland form of this PCT comprises a mixture of exotic and native species. Weed cover is high, consisting of Catsear (*Hypochaeris radicata*), Fireweed (*Senecio madagascariensis*), Serrated tussock (*Nassella trichotoma*), *Setaria parviflora* and Sheep sorrel (*Acetosella vulgaris*). Common native groundcover species include Purple wiregrass (*Aristida ramosa*), Weeping grass (*Microlaena stipoides*), Peach heath (*Lissanthe strigosa*) and *Gonocarpus tetragynus*. A high number of likely Blakely's red gum (*Eucalyptus blakelyi*) and Yellow box (*Eucalyptus melliodora*) seedlings are

present as a result of recent active revegetation works. Parramatta wattle (*Acacia parramattensis*) is dispersed throughout the low condition grasslands.

The Conservation Area contains approximately 68.83 hectares of PCT 1330 Yellow Box – Blakely's Red Gum Grassy Woodland on the Tablelands, South Eastern Highlands Bioregion.

PCT 1093 – Red Stringybark – Brittle Gum – Inland Scribbly Gum, dry open forest of the Tablelands, South Eastern Highlands Bioregion

This vegetation community occurs on poor soils usually on a rocky substrate. Common canopy species include Inland scribbly gum (*Eucalyptus rossii*), Red stringybark (*Eucalyptus macrorhyncha*), Blue-leaved stringybark (*Eucalyptus agglomerata*), Bundy (*Eucalyptus goniocalyx*) and Brittle gum (*Eucalyptus mannifera subsp. mannifera*). There are also occurrences of Broad-leaved peppermint (*Eucalyptus dives*), Argyle apple (*Eucalyptus cinerea*) and Silvertop ash (*Eucalyptus sieberi*). The understorey is open through to entirely absent with characteristic shrub species comprising *Brachyloma daphnoides*, Sifton bush (*Cassinia arcuata*) and Peach heath (*Lissanthe strigosa*). The ground layer is typically sparse and dominated by a range of sedges, grasses and forbs such as Nodding blue-lily (*Stypandra glauca*) and Speargrass (*Austrostipa scabra*). Other common species included Ivy goodenia (*Goodenia hederacea*), *Dianella revoluta*, Twisted mat-rush (*Lomandra obliqua*), *Gonocarpus tetragynus*, Many-flowered mat-rush (*Lomandra multiflora*) and Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*).

The grassland component is considered to be in low condition as it has a high cover of exotic grasses such as Serrated tussock (*Nassella trichotoma*) and Phalaris (*Phalaris aquatica*). Other common weeds included Catsear (*Hypochaeris radicata*) and Sheep sorrel (*Acetosella vulgaris*). Native species occur at low abundance, including *Leptospermum* sp., Many-flowered mat-rush (*Lomandra multiflora* subsp. *multiflora*), Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and Hairy panic (*Panicum effusum*). Scattered Peach heath (*Lissanthe strigosa*) and Sifton bush (*Cassinia arcuata*) are present in the broader area of this zone. The potential former identity of these low condition grasslands has been determined from landscape position and adjacent intact woodland areas.

The Conservation Area contains approximately 146.51 hectares of PCT 1093 Red Stringybark – Brittle Gum – Inland Scribbly Gum, dry open forest of the Tablelands, South Eastern Highlands Bioregion.

Table 1 shows the area of each plant community type by condition state (refer also to Diagram B1).

Table 1: PCTs present in the Lynwood Quarry Conservation Area

PCT	Condition	Area (ha)
1330 Yellow Box – Blakely's Red Gum Grassy Woodland on the Tablelands, South Eastern Highlands Bioregion	Moderate to Good	23.59
	Moderate to Good - Derived Native Grassland	3.50
	Low Condition Grassland	41.74
1093 Red Stringybark – Brittle Gum – Inland Scribbly Gum, dry open forest of the Tablelands, South Eastern Highlands Bioregion	Moderate to Good	91.86
	Low Condition Grassland	54.65

PCT	Condition	Area (ha)
Dams	N/A	0.55
TOTAL		**215.89**

Note: Values are subject to minor mapping/GIS-based variation

B The Conservation Area contains following threatened ecological communities (TECs) and threatened species:

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC under the EPBC Act and White Box Yellow Box Blakely's Red Gum Woodland EEC under the BC Act

This community occurs along the western slopes and tablelands of the Great Dividing Range from southern Queensland through New South Wales and the Australian Capital Territory to Victoria. It is listed as a critically endangered ecological community under the EPBC Act and an endangered ecological community under the BC Act. It is characterised by a species-rich understory of native tussock grasses, herbs and scattered shrubs (where shrub cover comprises less than 30% cover) and a dominance or prior dominance of White box (*Eucalyptus albens*) and/or Yellow box (*Eucalyptus melliodora*) and/or Blakely's red gum (*Eucalyptus blakelyi*) trees. Grey box (*Eucalyptus microcarpa* or *Eucalyptus moluccana*) may also be dominant or co-dominant. In the woodland state, tree cover is generally discontinuous and of medium height with canopies that are clearly separated.

Within the Conservation Area this community occurs at the lower footslopes of low rocky hills or the upper margins of valleys extensively modified as a result of agricultural activities. This is where the better soils of the valley meet the poorer soils of the low hills. Blakely's red gum (*Eucalyptus blakelyi*) and Yellow box (*Eucalyptus melliodora*) are the dominant trees and were likely to have been in the grassland areas prior to clearing. Blakely's red gum (*Eucalyptus blakelyi*) is replaced by a dominance of Scribbly gum (*Eucalyptus rossii*), Red stringybark (*Eucalyptus macrorhyncha*), Blue-leaved stringybark (*Eucalyptus agglomerata*), Bundy (*Eucalyptus goniocalyx*) and Brittle gum (*Eucalyptus mannifera* subsp. *mannifera*) woodland on the low hills. The community occurs as grassy woodland and derived native grassland with varying levels of woodland dominance. The Conservation Area is known to contain approximately 23.59 hectares of grassy woodland form and 3.50 hectares of the derived native grassland form. The area of the two condition types present within the Conservation Area is shown in **Table 2** and illustrated in **Diagram B1**).

Table 2: Threatened ecological communities present in the Conservation Area

Threatened Ecological Community	Condition	BC Listed (ha)	EPBC Listed (ha)
White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands CEEC	Intact	-	23.59
	DNG	-	3.50
White Box - Yellow Box Blakely's Red Gum Woodland EEC	Intact	23.59	
Total		**23.59**	**27.09**

The areas of Box Gum Woodland CEEC/EEC mapped in the Conservation Area generally correspond with map unit 3 Tableland Grassy Box-Gum Woodland as previously mapped by Umwelt (2005). This map unit was derived from the vegetation classification and mapping project by Tindall *et al.* (2004), which has since been updated in Tozer *et al.* (2010). According to the revised vegetation classification

and mapping project, the mapped patches of Box Gum Woodland are modelled as map unit p24 Tableland Grassy Box-Gum Woodland. This community is described as having the potential to form part of the Box Gum Woodland CEEC/EEC (Tozer *et al.* 2010), which specifically states that '*no map units are directly equivalent to this CEEC/EEC described, however some areas of p24 Tableland Grassy Box-Gum Woodland may match the CEEC/EEC description*'. This community is described by Tozer *et al.* (2010) as containing up to nine different species of eucalypts, so depending on the proportions of a given patch, it may or may not conform to the definition of the Box Gum Woodland CEEC/EEC. Therefore, while the site contains large areas of p24 Tableland Grassy Box-Gum Woodland, only certain areas represent the Box Gum Woodland CEEC/EEC, which is driven by the local biophysical attributes of a given area.

Some areas of the Conservation Area which may have once supported the Box Gum Woodland CEEC/EEC have been modified such that they no longer conform to the definition of Box Gum Woodland CEEC/EEC. For example, some areas have a highly modified understory and are dominated by exotic species.

Threatened Flora Species

Two threatened flora species listed under the BC and/or EPBC Act have been recorded in the Conservation Area, being Hoary sunray (*Leucochrysum albicans* var. *tricolor*) listed as endangered under the EPBC Act and Camden woollybutt (*Eucalyptus macarthurii*) listed as endangered under the BC and EPBC Acts.

Hoary sunray (*Leucochrysum albicans* var. *tricolor*) occurs in localised areas in the eastern portion of the Conservation Area. The population of Hoary sunray (*Leucochrysum albicans* var. *tricolor*) which had previously not been observed despite extensive ecological survey between 2003 and 2004 became apparent in 2011 in large numbers. This followed a period of above average rainfall immediately after an extensive period of drought and the removal of grazing stock in 2010. Approximately 200,000 Hoary sunray (*Leucochrysum albicans* var. *tricolor*) individuals have been recorded in the habitats of the Conservation Area with up to 27.3 hectares of habitat identified (refer to **Diagram B4**).

One record of Camden woollybutt (*Eucalyptus macarthurii*) occurs in the eastern portion of the Conservation Area according to the DPIE BioNet Atlas of NSW Wildlife (refer to **Diagram B4**). This record occurs from 2004 with an estimated accuracy of location of 100 km. It is noted that a stand of planted Camden woollybutt (*Eucalyptus macarthurii*) previously occurred within the disturbance footprint of the approved Lynwood Quarry Project. It was determined in consultation with DPIE (formerly Office of Environment and Heritage) as part of the assessment process for Lynwood Quarry in 2005 that this species was planted on Lynwood Quarry site. It is unknown whether this other record plotted within the Conservation Area actually occurs within the boundaries of the Conservation Area as it has not been relocated.

A list of the threatened species recorded within 10 km of the Conservation Area with the potential to occur based on suitable habitat, is included in **Annexure B**.

Threatened Fauna Species

The Conservation Area contain known records (being from site surveys and/or BioNet) of the following eight threatened fauna species listed under the BC Act (refer to **Diagram B4**):

- Speckled warbler (*Chthonicola sagittata*),
- Varied sittella (*Daphoenositta chrysoptera*),
- Scarlet robin (*Petroica boodang*),
- Dusky woodswallow (*Artamus cyanopterus cyanopterus*),
- Squirrel glider (*Petaurus norfolcensis*),
- Eastern bentwing-bat (*Miniopterus orianae oceanensis*),

- East-coast freetail-bat (*Micronomus norfolkensis*), and
- Eastern false pipistrelle (*Falsistrellus tasmaniensis*).

The Conservation Area contains four broad habitat formations which provide different habitat characteristics that influence the fauna habitat value and the range of species likely to utilise each habitat type. The broad habitat formations were woodland, grassland, riparian and aquatic habitats.

A list of the threatened species recorded within 10 km of the Conservation Area, that have the potential to occur based on suitable habitat is included in **Annexure B**.

C The Conservation Area contains connectivity to adjacent reserves and or bushland areas at local and regional scale.

The remaining areas of remnant woodland occurring within the Holcim lands include dense patches of native woodland as well as scattered trees and vegetated riparian areas. The vegetation communities in the Conservation Area and the wider locality have been heavily modified by agricultural activities. The broad vegetation types include box-gum woodlands, low open forests, riparian woodlands, derived native grasslands and disturbed pasture. Widespread grazing across the region has resulted in the fragmentation and subsequent high disturbance and degradation of these communities.

Broad vegetated corridors in the Holcim lands in the locality include isolated remnants of vegetation from the Conservation Area in the south to Joarimin Creek through to the Habitat Management Area in the north (refer to **Diagram B3**). The corridor occurs to the north of the Main Southern Railway linking remnant vegetation along Joarimin Creek with the Habitat Management Area and adjoining habitat areas to the north. Linkages to this corridor area are provided by a 'stepping stone' habitat to the south of the Main Southern Railway through to the Conservation Area. This section of the corridor is comprised of patches of remnant vegetation crossed by infrastructure in several locations. Despite this, a movement corridor is available for a range of threatened species and fauna generally whilst also supporting pollination and dispersal of local flora.

There are a number of large conservation reserves near the Conservation Area, including Morton National Park, Tarlo River National Park and Bungonia National Park and State Conservation Area (SCA). These areas form large patches of native vegetation in a relatively disturbed agricultural landscape and provide habitat refuges and connectivity for dispersing species.

D The Conservation Area contains sites/objects of high Aboriginal cultural and archaeological value.

The Conservation Area contains 22 Aboriginal sites including eight isolated finds, eight artefact scatters with potential archaeological deposit, five scarred trees and one stone arrangement. Of these Aboriginal sites, two isolated finds, four artefact scatters, five scarred trees and one stone arrangement are within a Cultural Heritage Management Zone set aside for long-term conservation. This area is of especially high Aboriginal cultural and archaeological value as it contains a rare site complex related to male initiation. All of the Aboriginal sites within the Conservation Area are protected and managed in accordance with the Lynwood Quarry Aboriginal Heritage Management Plan and the Conditions of DPIE Aboriginal Heritage Impact Permit #1100264. In compliance with the Aboriginal Heritage Management Plan the sites are fenced with appropriate signage and are subject to monitoring on an annual or triennial basis (refer to **Diagram B7**).

ANNEXURE B

TABLE 3: Threatened species found within 10km radius of site which may occur within the Conservation Area due to the presence of suitable habitat.

Common Species Name	Scientific Species Name	BC Act Listing	EPBC Act Listing	Confirmed on site Y/N
Fauna Species				
Little eagle	*Hieraaetus morphnoides*	V	-	N
White-bellied sea-eagle	*Haliaeetus leucogaster*	V	-	N
Square-tailed kite	*Lophoictinia isura*	V	-	N
Gang-gang cockatoo	*Callocephalon fimbriatum*	V	-	N
Glossy black-cockatoo	*Calyptorhynchus lathami*	V	-	N
Little lorikeet	*Glossopsitta pusilla*	V	-	N
Swift parrot	*Lathamus discolor*	E	CE	N
Powerful owl	*Ninox strenua*	V	-	N
Masked owl	*Tyto novaehollandiae*	V	-	N
Sooty owl	*Tyto tenebricosa*	V	-	N
Brown treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	-	N
Speckled warbler	*Chthonicola sagittata*	V	-	Y
Regent honeyeater	*Anthochaera phrygia*	CE	CE	N
Black-chinned honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	V	-	N
Varied sittella	*Daphoenositta chrysoptera*	V	-	Y
Dusky woodswallow	*Artamus cyanopterus cyanopterus*	V	-	Y
Hooded robin (south-eastern form)	*Melanodryas cucullata cucullata*	V	-	N
Scarlet robin	*Petroica boodang*	V	-	Y
Flame robin	*Petroica phoenicea*	V	-	N
Diamond firetail	*Stagonopleura guttata*	V	-	N
Spotted-tailed quoll	*Dasyurus maculatus*	V	E	N
Koala	*Phascolarctos cinereus*	V	V	N

Common Species Name	Scientific Species Name	BC Act Listing	EPBC Act Listing	Confirmed on site Y/N
Yellow-bellied glider	*Petaurus australis*	V	-	N
Squirrel glider	*Petaurus norfolcensis*	V	-	Y
Greater glider	*Petauroides volans*	-	V	N
Brush-tailed rock-wallaby	*Petrogale penicillata*	E	V	N
Grey-headed flying-fox	*Pteropus poliocephalus*	V	V	N
Yellow-bellied sheathtail-bat	*Saccolaimus flaviventris*	V	-	N
East-coast freetail-bat	*Micronomus norfolkensis*	V	-	Y
Large-eared pied bat	*Chalinolobus dwyeri*	V	V	N
Eastern false pipistrelle	*Falsistrellus tasmaniensis*	V	-	Y
Little bentwing-bat	*Miniopterus australis*	V	-	N
Eastern bentwing-bat	*Miniopterus orianae oceanensis*	V	-	Y
Southern myotis	*Myotis macropus*	V	-	N
Greater broad-nosed bat	*Scoteanax rueppellii*	V	-	N
Fauna Species				
Hoary sunray	*Leucochrysum albicans* var. *tricolor*	-	E	Y
Matted bush-pea	*Pultenaea pedunculata*	E	-	N
Dwarf kerrawang	*Commersonia prostrata*	E	E	N
Black gum	*Eucalyptus aggregata*	V	V	N
Camden woollybutt	*Eucalyptus macarthurii*	E	E	Y^
Tallong midge orchid	*Genoplesium plumosum*	CE	E	N
Wingello grevillea	*Grevillea molyneuxii*	V	E	N
Cotoneaster pomaderris	*Pomaderris cotoneaster*	E	E	N
Pale pomaderris	*Pomaderris pallida*	V	V	N
	Solanum celatum	E	-	N
Bungonia rice-flower	*Pimelea axiflora* subsp. *pubescens*	E	-	N

V= Vulnerable, E= Endangered, CE= Critically Endangered, ^ = Record not confirmed in the Conservation Area.

ANNEXURE B DIAGRAM B1 - VEGETATION COMMUNITIES AND LOCATION OF BIOBANKING PLOTS AND PHOTO POINTS

ANNEXURE B DIAGRAM B2 – REGIONAL SETTING

ANNEXURE B DIAGRAM B3 – BIODIVERSITY CORRIDOR

ANNEXURE B DIAGRAM B4 – THREATENED SPECIES LOCATIONS

ANNEXURE B DIAGRAM B5 – FIRE MANAGEMENT ZONES

ANNEXURE B DIAGRAM B6 – MANAGEMENT ZONES

ANNEXURE B DIAGRAM B7 – LOCATION OF CULTURAL HERITAGE MANAGEMENT ZONE

ANNEXURE B - PHOTO POINT PHOTOGRAPHS

Four photos were taken at each point in a clockwise direction, with the first photo orientated facing north from the north-east corner of the site. Compass directions (magnetic degrees) of each photo from the star picket are given below and GPS reference points for each site are provided in **Annexure D Table 1**.

Photos are presented below.

Biometric Plot 1 - PCT 1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (Moderate to Good Condition)

Biometric Plot 1 is dominated by Inland scribbly gum (*Eucalyptus rossii*) and Blue-leaved stringybark (*Eucalyptus agglomerata*), along with a single Red stringybark (*Eucalyptus macrorhyncha*) tree. Brittle gum (*Eucalyptus mannifera* subsp. *mannifera*), Broad-leaved peppermint (*Eucalyptus dives*) and Argyle apple (*Eucalyptus cinerea*) are common in the immediate area. A mid-storey or shrub layer is absent from **Biometric Plot 1**. Whilst very sparse, dominant **Biometric Plot 1** groundcover species include Speargrass (*Austrostipa scabra*), Ivy goodenia (*Goodenia hederacea*), Many-flowered mat-rush (*Lomandra multiflora*), Twisted mat-rush (*Lomandra obliqua*) and Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*). Weeds are largely absent.

Biometric Plot 1 facing 0º (magnetic)(15/06/2017)

Biometric Plot 1 facing 90º (magnetic) (15/06/2017)

Biometric Plot 1 facing 180º (magnetic) (15/06/2017)

Biometric Plot 1 facing 270º (magnetic) (15/06/2017)

Biometric Plot 2 - PCT 1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (Low Condition Grassland)

Weed cover is high (100 percent) and dense in **Biometric Plot 2** and dominated by Phalaris (*Phalaris aquatica*) and Serrated tussock (*Nassella trichotoma*). Other common weeds include Sheep sorrel (*Acetosella vulgaris*), *Trifolium* sp. and Catsear (*Hypochaeris radicata*). Native species are limited to a single *Leptospermum* sp. shrub and a low abundance of Many-flowered mat-rush (*Lomandra multiflora* subsp. *multiflora*), Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and Hairy panic (*Panicum effusum*). Scattered Peach heath (*Lissanthe strigosa*) and Sifton bush (*Cassinia arcuata*) are also present in the broader area of this zone.

This area has not been subject to any revegetation activities.

Biometric Plot 2 facing 0º (magnetic) (15/06/2017)

Biometric Plot 2 facing 90º (magnetic) (15/06/2017)

Biometric Plot 2 facing 180º (magnetic) (15/06/2017)

Biometric Plot 2 facing 270º (magnetic) (15/06/2017)

Biometric Plot 3 - PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Moderate to Good Condition)

Biometric Plot 3 is dominated by Blakely's red gum (*Eucalyptus blakelyi*) with occurrences of Bundy (*Eucalyptus goniocalyx*) and Red stringybark (*Eucalyptus macrorhyncha*). Apple box (*Eucalyptus bridgesiana*) and Yellow box (*Eucalyptus melliodora*) also occur within this zone. **Biometric Plot 3** contains a small tree layer of Black she-oak (*Allocasuarina littoralis*) and a shrub layer dominated by Sifton bush (*Cassinia arcuata*), Peach heath (*Lissanthe strigosa*) and Nodding blue-lily (*Stypandra glauca*). Common groundcover species include Weeping grass (*Microlaena stipoides*), *Gonocarpus tetragynus*, Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and Speargrass (*Austrostipa scabra*).

Weed cover is generally low and includes Scarlet pimpernel (*Lysimachia arvensis*), Sheep sorrel (*Acetosella vulgaris*), Lawn burweed (*Soliva sessilis*) and Catsear (*Hypochaeris radicata*).

Biometric Plot 3 facing 0º (magnetic) (15/06/2017)

Biometric Plot 3 facing 90º (magnetic) (15/06/2017)

Biometric Plot 3 facing 180º (magnetic) (15/06/2017)

Biometric Plot 3 facing 270º (magnetic) (15/06/2017)

Biometric Plot 4 - PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Derived Native Grassland Condition)

Biometric Plot 4 includes sparse regeneration of the canopy species Blakely's red gum (*Eucalyptus blakelyi*) and Bundy (*Eucalyptus goniocalyx*). The shrub layer is dominated by Sifton bush (*Cassinia arcuata*) and Peach heath (*Lissanthe strigosa*). Common groundcover species include Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*), *Gonocarpus tetragynus*, Speargrass (*Austrostipa scabra*) and Purple wiregrass (*Aristida ramosa*). Approximately 50 individuals of the endangered (EPBC Act) Hoary sunray (*Leucochrysum albicans* var. *tricolor*) were recorded.

Weed cover is low and includes the exotic species Sheep sorrel (*Acetosella vulgaris*) and Catsear (*Hypochaeris radicata*).

Vegetation in **Biometric Plot 4** conforms to *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC* under the EPBC Act and *White Box Yellow Box Blakely's Red Gum Woodland EEC* under the BC Act.

Biometric Plot 4 facing 0º (magnetic) (15/06/2017)

Biometric Plot 4 facing 90º (magnetic) (15/06/2017)

Biometric Plot 4 facing 180º (magnetic) (15/06/2017)

Biometric Plot 4 facing 270º (magnetic) (15/06/2017)

Biometric Plot 5 - PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Low Condition Grassland)

Biometric Plot 5 comprises recent plantings of likely Blakely's red gum (*Eucalyptus blakelyi*) and Yellow box (*Eucalyptus melliodora*) less than 20 cm high (identification of these seedlings will be confirmed during future monitoring when mature material is available). Parramatta wattle (*Acacia parramattensis*) is dispersed throughout the low condition grasslands.

Weed cover is high and consist mainly of Catsear (*Hypochaeris radicata*), Fireweed (*Senecio madagascariensis*), Serrated tussock (*Nassella trichotoma*), *Setaria parviflora* and Sheep sorrel (*Acetosella vulgaris*). Common native groundcover species include Purple wiregrass (*Aristida ramosa*), Weeping grass (*Microlaena stipoides*), Peach heath (*Lissanthe strigosa*) and *Gonocarpus tetragynus*.

This area has been subject to direct seeding activities subsequent to plot establishment.

Biometric Plot 5 facing 0º (magnetic) (15/06/2017)

Biometric Plot 5 facing 90º (magnetic) (15/06/2017)

Biometric Plot 5 facing 180º (magnetic) (15/06/2017)

Biometric Plot 5 facing 270º (magnetic) (15/06/2017)

Photo Point 1 - PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Moderate to Good Condition)

Photo Point 1 comprises intact woodland dominated by Blakely's red gum (*Eucalyptus blakelyi*), Yellow box (*Eucalyptus melliodora*) and Argyle apple (*Eucalyptus cinerea*) with Apple box (*Eucalyptus bridgesiana*) occurring less frequently. The sparse shrub layer is dominated by Sifton bush (*Cassinia arcuata*) and Peach heath (*Lissanthe strigosa*). Common groundcover species include Stinking pennywort (*Hydrocotyle laxiflora*), Wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*), *Poa sieberiana*, *Austrostipa* sp. and Purple wiregrass (*Aristida ramosa*).

Weeds are absent.

Vegetation in Photo Point 1 conforms to *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC* under the EPBC Act and *White Box Yellow Box Blakely's Red Gum Woodland EEC* under the BC Act.

Photo Point 1 facing 0º (magnetic) (16/06/2017)

Photo Point 1 facing 90º (magnetic) (16/06/2017)

Photo Point 1 facing 180º (magnetic) (16/06/2017)

Photo Point 1 facing 270º (magnetic) (16/06/2017)

Photo Point 2 - PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Low Condition Grassland)

Photo Point 2 is dominated by regenerating Blakely's red gum (*Eucalyptus blakelyi*) and Argyle apple (*Eucalyptus cinerea*). The shrub layer is limited to Sifton bush (*Cassinia arcuata*). The ground layer is dominated by the exotic species including Serrated tussock (*Nassella trichotoma*), Catsear (*Hypochaeris radicata*) and *Trifolium* sp. Native groundcover species include Weeping grass (*Microlaena stipoides*) and *Juncus* sp. Weed cover is high.

This area is naturally regenerating.

Photo Point 2 facing 0º (magnetic) (16/06/2017)

Photo Point 2 facing 90º (magnetic) (16/06/2017)

Photo Point 2 facing 180º (magnetic) (16/06/2017)

Photo Point 2 facing 270º (magnetic) (16/06/2017)

ANNEXURE C MANAGEMENT OF THE CONSERVATION AREA

ITEM 1: MANAGEMENT AIMS AND ACTIONS REQUIRED TO BE UNDERTAKEN FOR MINIMUM PERIOD OF 10 YEARS. ALL ACTIONS TO BE UNDERTAKEN IN ACCORDANCE WITH ANNEXURE C ITEM 3 PERMISSIONS AND GUIDELINES.

Aim	Timing	Management action	Indicative minimum cost for management action
Maintenance of active revegetation areas (i.e. weeding, tubestock planting or direct seeding)	Years 1-10	Weed control will be undertaken across the conservation area annually as per a Weed Management Plan that is developed for the site and reviewed every three years post monitoring. Direct seeding completed	**$2,200 per annum** **$22,000 total**
Installation of additional fencing to exclude stock from the Conservation Area	Year 1-5	Install 1,190m of new fence. Cost of new fencing $10/m	**$11,900 total** **Completed**
Removal of Unnecessary Internal Fences	Years 1-5	Remove 2,840 m unnecessary internal fences within Conservation Area. (Does not include the removal of the internal fence surrounding the Cultural Heritage Management Zone).	**$12,496 total** **Completed**
Fence maintenance to exclude stock from the Conservation Area	Years 2-10	Maintain fences as required. Provision of three subsequent rounds of fence maintenance (Years 3, 6 and 9). Total perimeter fence length is 11,950 m. Costing of maintenance based on 1/20th new fencing rate ($10.m).	**$5,975 per round** **$17, 925 total**
Fire management hazard reduction burn (If required) **Undertaken in collaboration with NSW Rural Fire Service or fire management contractor to implement mosaic or partial area hazard reduction burn.**	Year 5 and 10.	Implement hazard reduction burn during low risk fire season. Must take into account the recommended fire intervals given in the *Bush Fire Environmental Assessment Code for New South Wales* (Rural Fire Service February 2006) and the guidelines contained in the *Threatened Species Hazard Reduction Lists for the Bush Fire Environmental Assessment Code* or equivalent replacements. Current recommendations are: • Box-Gum Woodland CEEC should not be subjected to fires more frequently than once every five years. Slashing is permitted for hazard reduction, however	$5,000 per fire round **$10,000 total**

		no trittering or tree removal.	
Plant Tubestock in Conservation Area	Year 2-5	Some areas of existing native pasture will be revegetated using tube stock. The final target rate for box-gum grassy woodlands is 30/40 stems per hectare of canopy species with scattered shrubs (Rawlings et al 2010). In order to allow for seedling mortalities as revegetation areas mature, it is recommended that small trees (trees that have grown to less than 10cm diameter at breast height) have a density of at least 400 stems per hectare. As trees mature to dimensions greater than 10cm diameter and taller than breast height it is considered that 250 stems per hectare is a minimum target density. In order to account for mortality of seedlings a planting rate of 600 stems per hectare has been allowed.	**$33,000 total**
	Site preparation - Year 2 following propagation	Slashing / mowing of tubestock area prior to planting.	**$5,280**
Monitoring of revegetation / regeneration areas and Annual Reports for Monitoring Program	Years 2-10	Annual reports to be prepared according to specifications in Annexure D Monitoring Program. Annual monitoring will be conducted in order to determine the success or otherwise of revegetation works, weed control and the progress of natural regeneration. Permanent monitoring plots have been established within the Conservation Area.	**$10,500** per annum **$94,500** total
Aboriginal Places and Aboriginal Objects	Years 1-10	The Owner must preserve and protect Aboriginal Places and Aboriginal Objects and other sites of cultural heritage significance on or in the Conservation Area and in accordance with the relevant legislation. The Owner must ensure that these protective measures are undertaken in accordance with the management measures provided in the Lynwood Quarry Aboriginal Heritage Management Plan (AHMP) or other approved AHMP	**$11,932 per annum** **$119,320 total**

		This includes requirements to undertake an ongoing monitoring program	
Pest animal monitoring and control (local co-ordination with Local Land Services and DPIE)	Years 1-10	Feral animal control (bait, trapping and/or shooting). Years 3, 6 and 9. Management actions to be undertaken to be determined in consultation with contractor.	**$3,300 per round** **$9,900 total**
Managing visitor impacts (visitors include DPIE inspectors; weed control contractors; fire maintenance contractors; NSW Rural Fire Service; fencing and maintenance contractors and the Owner)	Years 1-10	The Owner must ensure that visitor disturbance to the Conservation Area is minimised by keeping visitors to tracks and trails except for management purposes and ensuring all visitor vehicles and equipment entering the Conservation Area are clean and free from weeds and/or seeds. Guidance specified in Annexure C Item 3 Visitation and research must be used.	N/A
Threatened species, populations and endangered ecological communities (EEC)	Years 1-10	The Owner must follow current best practice advice regarding the management of threatened species when carrying out any activities within the Conservation Area. This advice may be provided by Department of Planning, Industry and the Environment, Local Land Services, the Commonwealth Department of Agriculture, Water and the Environment or subsequent authorities.	N/A
Signage Installation	Years 1-10	Commitment of Aboriginal Heritage Management Plan (AHMP)	**$368 total**
Total indicative cost for 10 year period			**$336,689**

ANNEXURE C MANAGEMENT OF THE CONSERVATION AREA
ITEM 2: MANAGEMENT ACTIONS REQUIRED TO BE UNDERTAKEN FROM YEAR 11 ONWARDS.
ALL ACTIONS TO BE COMPLETED ACCORDING TO ANNEXURE C ITEM 3 PERMISSIONS AND GUIDELINES.

Issue	Management action
Exotic plants	The Owner must take reasonable measures in relation to the control of exotic plants. Techniques specified in Annexure C Item 3 must be used.
Pest animals	The Owner must take reasonable measures in relation to monitoring of pest animals. Techniques specified in Annexure C Item 3 must be used.
Threatened species, populations and endangered ecological communities (EEC)	The Owner must follow current best practice advice regarding the management of threatened species when carrying out any activities within the Conservation Area. This advice may be provided by DPIE, Local Land Services, the Commonwealth Department of Environment and Energy or subsequent authorities.
Managing visitor impacts (visitors include DPIE inspectors; weed control contractors; fire maintenance contractors; NSW Rural Fire Service; fencing and maintenance contractors and the Owner)	The Owner must take reasonable measures to ensure that visitor disturbance to the Conservation Area is minimised by keeping visitors to tracks and trails except for management purposes and ensuring all visitor vehicles and equipment entering the Conservation Area are clean and free from weeds and/or seeds. Guidance specified in Annexure C Item 3 Visitation and research must be used.
Maintain vehicle access to Conservation Area for visitor management, fire management, weed and fencing management	The Owner must take reasonable measures to ensure that vehicle access is maintained by maintaining and repairing access trails as required. Techniques specified in Annexure C Item 3 must be used.
Monitoring and Reporting	The Owner must complete a monitoring report at least every 3 years as described in Clause 8 of the Conservation Agreement.
Livestock	The Owner must remove any livestock which have entered the Conservation Area as soon as practical.
Aboriginal Places and Aboriginal Objects	The Owner must preserve and protect Aboriginal Places and Aboriginal Objects and other sites of cultural heritage significance on or in the Conservation Area and in accordance with the relevant legislation.
Fencing	The Owner must take reasonable measures to construct and maintain fences along the boundaries of the Conservation Area where adjacent land use cause or are likely to cause adverse impacts on or in the Conservation Area. Techniques specified in Annexure C Item 3 must be used.

ANNEXURE C ITEM 3: PERMISSIONS AND GUIDELINES

Control of pest animals and non-indigenous fauna (in addition to pest animal control management actions in Items 1 and 2 of Annexure C to the Conservation Agreement)

a) Participate in community pest animal control programs, and encourage neighbours to implement pest animal control programs. Contact your Local Land Services office or National Parks and Wildlife Service Area office to find out where community control programs are occurring.

b) Methods for pest animal control can include; shooting, trapping and use of poisonous baits consistent with advice from DPIE and Local Land Services. Use control methods identified as 'humane' as defined in the NSW Codes of Practice and Standard Operating Procedures for Humane Pest Vertebrate Control (Control Capture and Destruction of Feral Animals in Australia) as developed by the NSW Department of Primary Industries.

c) Pest animal control activities to be determined based on density and species of pest animals. Methods for monitoring pest animal activity should include:

    i) observations and/or hearing calls,

    ii) the use of standard "sand plots",

    iii) the use of non-poisoned "bait stations",

    iv) scat counts, and

    v) other quantitative techniques which can be designed in discussion with DPIE or Local Land Services.

Control of weeds and exotic plants (in addition to weed control management actions in Items 1 and 2 of Annexure C to the Conservation Agreement)

d) Apply a range of techniques including:

    i) Removal of weeds by hand ensuring that all plant parts which can reproduce are removed and that soils do not become prone to erosion.

    ii) Use of carefully selected herbicide according to label directions and/or current off label permit, ensuring minimal off target damage.

    iii) Use of appropriate control measures as recommended in the Department of Primary Industries Noxious and Environmental Weed Control Handbook 6th Edition 2014 or equivalent replacements for control of weeds, ensuring minimal off target damage.

    iv) Use of forestry mulching or slashing machinery only with prior written permission from DPIE.

    v) Ensure control programs are commenced when timing and extent of weed removal will minimise adverse effects on wildlife (weeds may provide protection or habitat for native fauna). Dense thickets of lantana should be removed gradually in mosaic patterns to minimise disturbance to the habitat of native animals.

    vi) Other weed control methods may only be undertaken with prior written permission of DPIE.

    vii) Contact DPIE if any uncertainty exists regarding weed control methods.

Cultural heritage

e) Recording and management of any newly identified Aboriginal Objects or artefacts, in consultation with DPIE (and the relevant local Aboriginal community where applicable).

Development

f) Carrying out any development as described in the Conservation Agreement and maintaining development (including existing fire trails, access trails and infrastructure), with the following conditions:

i) clear a corridor not greater than 3 metres wide during construction or for maintenance for the installation of fences or other agreed rural structures;

ii) move fallen timber and any other obstructions to maintain access trails, tracks and fences;

iii) where clearing is permitted under the Agreement and necessary, undertake all works in a manner that minimises disturbance to soil and hydrological characteristics.

Fencing, tracks and trails

g) Construction and maintenance of all fences using wildlife friendly materials including plain wire (non-barbed) on top and bottom strands.

h) Construction of any new internal fence, access track or trail only with prior written approval from DPIE.

i) Maintaining existing access walking tracks in the Conservation Area to a maximum width of 2m.

j) Maintaining existing access vehicular trails in the Conservation Area to a maximum width of 4m with 1m either side permissible for clearing.

k) Removal of old fences and closing of unwanted tracks within the Conservation Area and facilitate restoration of indigenous vegetation according to Annexure C Item 3 (points 'n' and 'o' over page).

Fire management (in addition to fire management actions in Item 1 of Annexure C to the Conservation Agreement)

l) Using fire hazard reduction burns and controlled burning which take into account the recommended fire intervals given in the *Bush Fire Environmental Assessment Code for New South Wales* (Rural Fire Service February 2006) and the guidelines contained in the *Threatened Species Hazard Reduction Lists for the Bush Fire Environmental Assessment Code* or equivalent replacements.

Current recommendations are:

PCT	Minimum Interval	Maximum Interval
1330 Yellow Box – Blakely's Red Gum Grassy Woodland on the Tablelands, South Eastern Highlands Bioregion	5	40
1093 Red Stringybark – Brittle Gum – Inland Scribbly Gum, dry open forest of the Tablelands, South Eastern Highlands Bioregion	7	30
Grasslands	2	10

i) Flowering of Hoary sunray (*Leucochrysum albicans* var. *tricolor*) occurs from spring to summer. It is recommended that burns do not occur during this period or within a

minimum of one month following completion of flowering so as not to interfere with seed set.

ii) Box-Gum Woodland CEEC should not be subjected to fires more frequently than once every five years. Slashing is permitted for hazard reduction, however no trittering or tree removal.

iii) wherever possible canopy or crown fires should be avoided.

iv) wherever possible no more than 50% of the Conservation Area should be burnt in any twelve month period.

v) both live and dead trees with hollows should be protected from burning as far as practicable in order to preserve nesting habitat for hollow dwelling animals.

vi) Regenerating/revegetation areas have been classed as grassy woodlands given their expected structural formation over the life of the project. Fire within regenerating/revegetated areas should be excluded for at least 15 years to allow the build up of a soil seed bank.

m) Lighting a fire, or causing a fire to be lit on the Conservation Area if it complies with the *Rural Fires Act 1997* (NSW), and:

i) the lighting of the fire is a necessary component of bush fire hazard reduction work carried out in accordance with a notice served on the Owner under the Rural Fires Act 1997 (NSW) or other applicable legislation; or

ii) life or property is in immediate threat by bush fire and the lighting of the fire is reasonably necessary to protect life or property; or

iii) the fire is a camp fire, subject to the compliance with the Rural Fires Act 1997 (NSW), or

iv) the Chief-Executive gives prior written consent to the lighting of the fire.

Restoration of indigenous vegetation

n) Restoration of native vegetation on the Conservation Area using a preferred method of encouraging and retaining natural regeneration. Preferred methods include:

i) bush regeneration

ii) brush mulching; and/or

iii) direct seeding.

o) Revegetation to establish indigenous plants to maintain the vegetation structure in keeping with the identified vegetation community, using species produced from material sourced locally and without fertilisers, where the ability to regenerate naturally within a reasonable time frame has been lost, or to prevent soil erosion.

Seed collection

p) Collection of seed on the Conservation Area for non-commercial use in accordance with Guidelines and Codes of Practice developed by Florabank (www.florabank.org.au), or subsequent equivalent and with the following limitations and permissions:

i) Collect seed in the Conservation Area only if seed of the particular species and genotype is not available elsewhere, or if the seed collected is intended for seedlings that will be planted within the Conservation Area or adjacent to the Conservation Area.

ii) Seeds may be collected from within endangered ecological communities.

iii) Seeds may not be collected from species individually listed in Schedules 1or 2 to the BC Act without prior written approval from the Chief-Executive, or under a licence granted under section 132C of the NPW Act or Division 3 of the BC Act.

iv) Seeds may be collected from any protected species listed in Schedule 13 to the NPW Act.

v) Seeds may be collected from any other native species.

Thinning of indigenous vegetation

q) Thinning of regenerating indigenous species which are altering the structure of the vegetation in the Conservation Area and/or reducing the Conservation Values only with prior written approval from the Chief-Executive DPIE.

Threatened species

r) Implementing any measures included in recovery plans for any threatened species, population or ecological communities which are or may be found in the Conservation Area.

s) Implementing other specific management advice from DPIE for any threatened species, populations or ecological communities which are or may be found in the Conservation Area.

Visitation and research (in addition to management actions in Items 1 and 2 of Annexure C to the Conservation Agreement)

t) Visitation, research and community use at a level that does not adversely impact on the Conservation Values or the amenity of the Owner. Research projects must be first discussed with DPIE before being carried out.

ANNEXURE D - MONITORING PROGRAM

(a) The Owner must engage a suitably qualified person (such as an ecologist) to undertake a monitoring event in each year, beginning in 2018 (Monitoring Event).

(b) Each Monitoring Event must include:

i) **photo monitoring** – 4 photos are required to be taken at each of the 7 monitoring photo points. Photos must be taken from the exact location and bearing to allow subsequent comparison and assessment. Photo point locations are provided in **Table 1** of Annexure D to the Conservation Agreement (**below**). Baseline photographs are provided in Annexure A to the Conservation Agreement;

ii) **quadrat monitoring** – quadrat data must be collected at each of the 5 floristic quadrat monitoring sites. Quadrat locations are provided in **Table 1** of Annexure D to the Conservation Agreement (**below**). Results must be compared to baseline and benchmark quadrat data which is provided in **Tables 1** and **2** of Annexure D to the Conservation Agreement **below**.

iii) a **walk through assessment** to record opportunistic sightings within the Conservation Area including:

i. fire events or impacts of fire management
ii. weeds (including compiling a list of exotic species and recording new weed infestations including location and extent)
iii. pest animals (species and location must be recorded, including evidence of pest animals such as burrows, scats or disturbance)
iv. visitor impact and vehicle access (including evidence of any recent usage, and the presence of any new access tracks)
v. rubbish dumping
vi. natural regeneration of previously disturbed areas; and
vii. sightings of threatened species.

(c) After each Monitoring Event, the Owner must produce a monitoring report on the Conservation Area by March of each year, beginning in 2018 (Monitoring Report).

The Monitoring Report must include:

i. a description of all completed management actions undertaken in the previous 12 month period;
ii. copies of all receipts from third party contractors engaged by the Owner to undertake management actions listed in items 1 and 2 of Annexure C to the Conservation Agreement;
iii. completed monitoring data sheets (including photographs) using the template provided in **Table 3** of Annexure D to the Conservation Agreement **(below)**;
iv. a discussion of the changes recorded at monitoring points and quadrats;
v. a discussion of the condition of Conservation Values;
vi. a discussion of effectiveness of any management actions implemented; and
vii. recommendations and proposed management actions to be performed in following year(s).

The Monitoring Report must be submitted to DPIE within **21 days** of it being received by the Owner.

(d) The Monitoring Event and the Monitoring Report comprise the monitoring program (Monitoring Program). The Owner must complete the Monitoring Program to the satisfaction of DPIE, for a minimum period of 10 years from the date of the Conservation Agreement.

ANNEXURE D TABLE 1 - MONITORING POINT LOCATIONS AND CORRESPONDING VEGETATION COMMUNITIES REPRESENTED AS AT JUNE 2017

Photo Point	Quadrat N0	Easting/Northing GDA 94 MGA 56		Photo bearing degrees	Vegetation Community Represented
Biometric Plots					
-	**Biometric Plot 1**	0771831	6153851	0º, 90 º, 180º, 270 º	PCT 1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion *Moderate to Good Condition*
-	**Biometric Plot 2**	0771682	6154105	0º, 90 º, 180º, 270 º	PCT 1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion *Low Condition Grassland*
-	**Biometric Plot 3**	0771710	6152950	0º, 90 º, 180º, 270 º	PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion *Moderate to Good Condition*
-	**Biometric Plot 4**	0771834	6152947	0º, 90 º, 180º, 270 º	PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion *Derived Native Grassland Condition (CEEC)*
-	**Biometric Plot 5**	0772257	6152963	0º, 90 º, 180º, 270 º	PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion *Low Condition Grassland*
Photo Points					
Photo Point 1	-	0769654	6153932	0º, 90 º, 180º, 270 º	PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion *Moderate to Good Condition (CEEC)*
Photo Point 2	-	0769738	6153980	0º, 90 º, 180º, 270 º	PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion *Low Condition Grassland*

ANNEXURE D TABLE 2 – BIOMETRIC VEGETATION TYPE BENCHMARKS AND BASELINE QUADRAT SCORES AS AT JUNE 2017

Photo Point	Quadrat No	Native species richness	Overstorey cover %pfc	Mid-storey cover %pfc	Ground cover – grasses %pfc	Ground cover – shrubs %pfc	Ground cover – other %pfc	Proportion oversotrey regen	Exotic cover	Number of Trees with Hollows	Total length of fallen logs
1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion											
Benchmark values^		17	28.5-33.5	0-15	1-10	8-12.5	14.5-18.5	NA	NA	1	50
Biometric Plot 1		13	8.9	3.5	8	0	10	0.8	0	7	85
Biometric Plot 2		8	0	0	6	0	4	0.8	100	0	0
1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion											
Benchmark values^		20	17-27	7.5-12.5	24-30	0-5	12.75-18.75	NA	NA	0	0
Biometric Plot 3		17	4	4.5	76	16	10	0.75	20	1	93
Biometric Plot 4		15	0	0	78	12	16	0.75	4	0	0
Biometric Plot 5		10	0	0	52	0	2	0.75	60	0	1

^Data for the Hawkesbury Nepean CMA as per the Vegetation Information System (VIS) at June 2017.

ANNEXURE D TABLE 3 - MONITORING DATA SHEET

Monitoring Data Sheet			
Monitoring Point Number		**Date**	
Vegetation Community			
1. Site Photo(s)Taken			
2. Floristic BioMetric attributes			
Native cover			
Overstorey:			
Midstorey:			
Groundcover(grass):			
Groundcover (shrub):			
Groundcover (other):			
Native species richness:			
Proportion of canopy species regenerating			
Exotic cover			
Number of trees with hollows			
Total length of fallen logs			
3. Opportunistic observations	**GPS coordinates**	**Photo number**	**Observations**
Natural regeneration of disturbed areas			
Threatened species sightings			
Fire event/fuel			
Weeds			
Pest animals			
Visitor impact/vehicles			
Rubbish dumping			

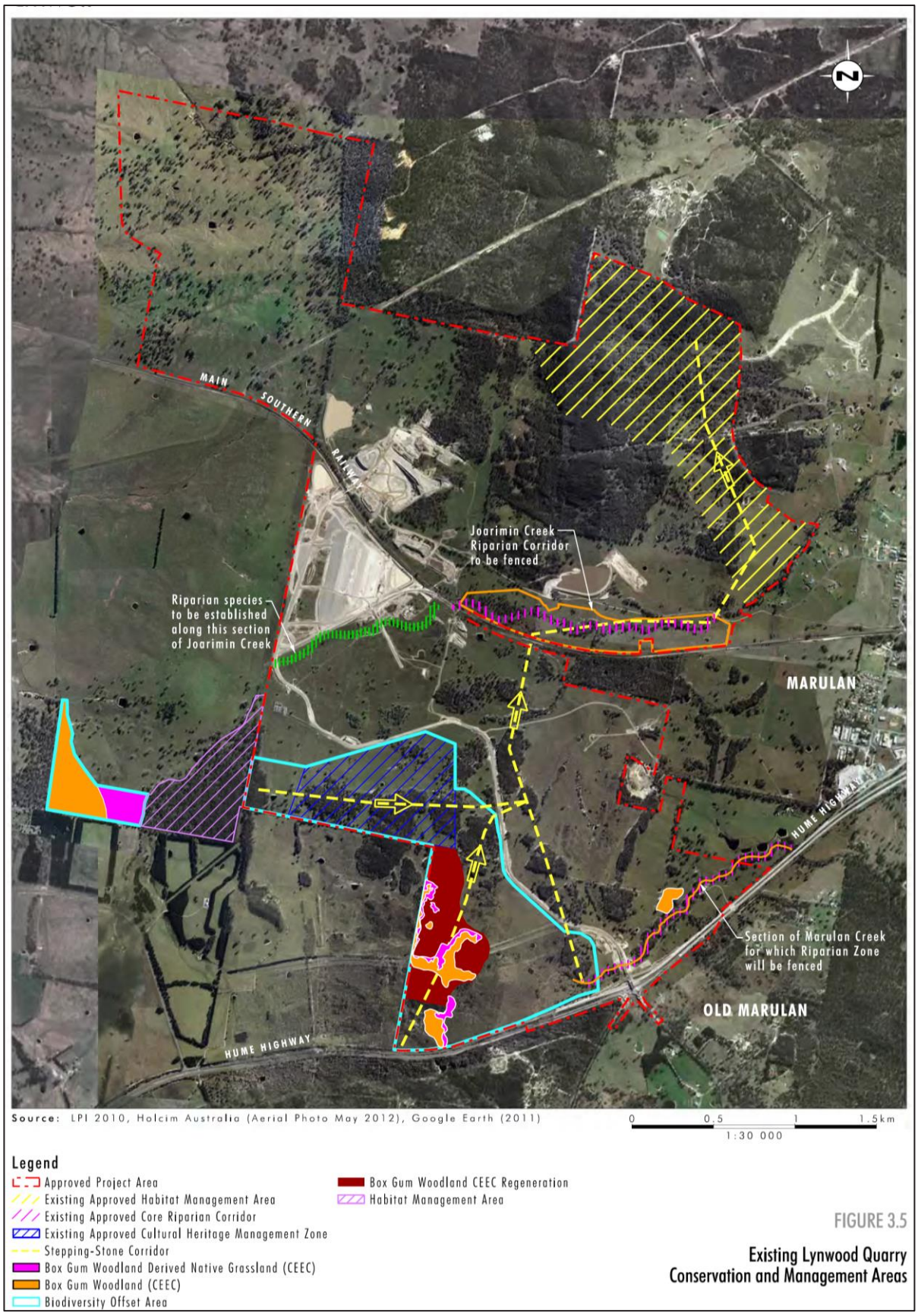
_____
Director: Holcim (Australia) Pty Ltd

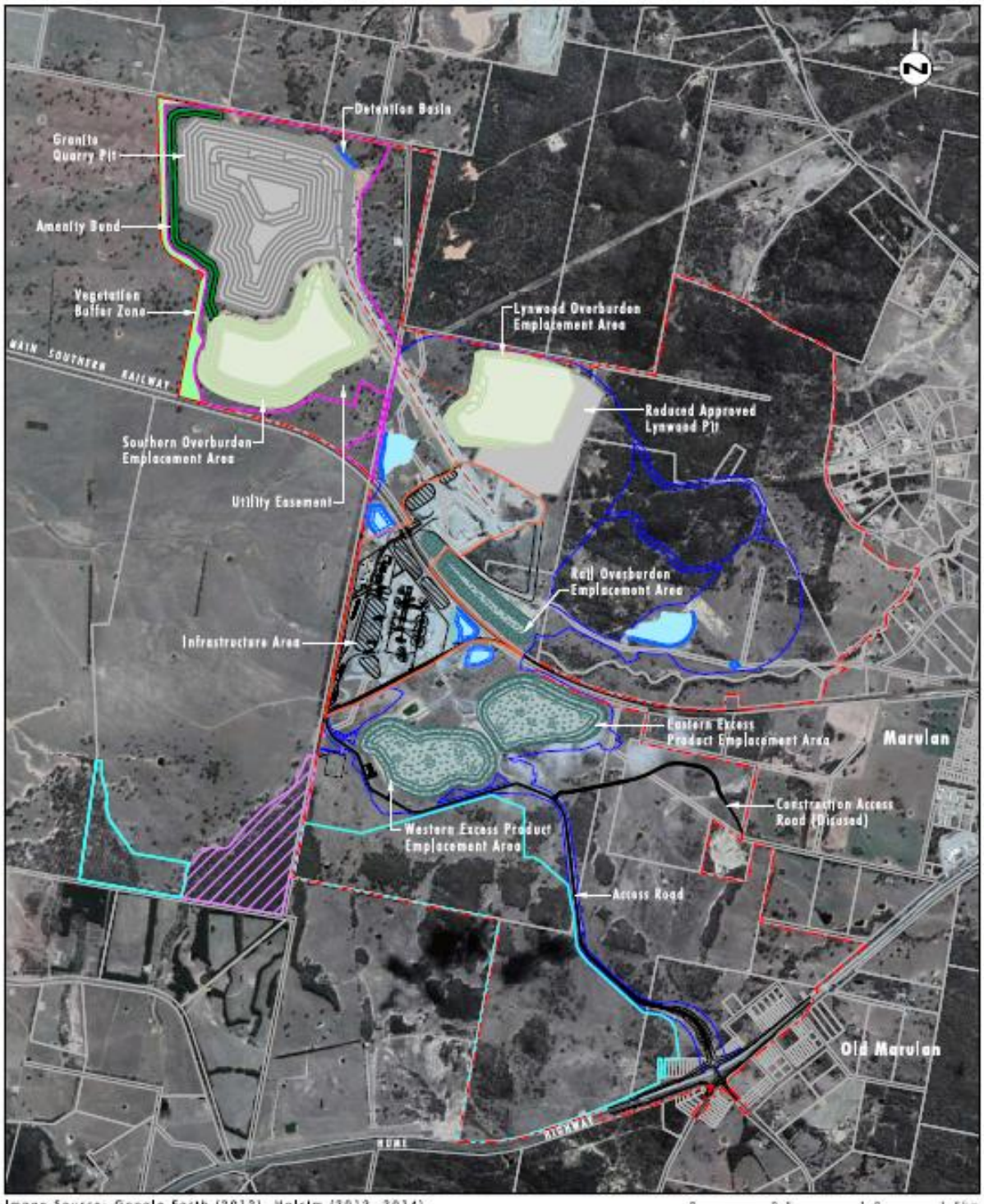
_____
Secretary: Holcim (Australia) Pty Ltd

_____
Chief Executive

<<End of Agreement to be signed by all parties to the Agreement>>

Appendix D Site maps


N
MAIN SOUTHERN RAILWAY
Joarimin Creek Riparian Corridor to be fenced
Riparian species to be established along this section of Joarimin Creek
MARULAN
HUME HIGHWAY
Section of Marulan Creek for which Riparian Zone will be fenced
OLD MARULAN
HUME HIGHWAY
Source: LPI 2010, Holcim Australia (Aerial Photo May 2012), Google Earth (2011)
0 0.5 1 1.5km
1:30 000
Legend
Approved Project Area
Existing Approved Habitat Management Area
Existing Approved Core Riparian Corridor
Existing Approved Cultural Heritage Management Zone
Stepping-Stone Corridor
Box Gum Woodland Derived Native Grassland (CEEC)
Box Gum Woodland (CEEC)
Biodiversity Offset Area
Box Gum Woodland CEEC Regeneration
Habitat Management Area
FIGURE 3.5
Existing Lynwood Quarry
Conservation and Management Areas


Detention Basin
Granite Quarry Pit
Amenity Bund
Vegetation Buffer Zone
MAIN SOUTHERN RAILWAY
Lynwood Overburden Emplacement Area
Reduced Approved Lynwood Pit
Southern Overburden Emplacement Area
Utility Easement
Rail Overburden Emplacement Area
Infrastructure Area
Eastern Excess Product Emplacement Area
Marulan
Construction Access Road (Disused)
Western Excess Product Emplacement Area
Access Road
Old Marulan
HUME
HIGHWAY
Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)
0 0.5 1.0 1.5km
1:30 000
Legend
Approved Project Area
Lynwood Infrastructure Area
Approved Disturbance Footprint
Granite Pit Disturbance Footprint
Lynwood Infrastructure Layout
Habitat Management Area
Biodiversity Offset Area
Quarry Pit
Emplacement Area
Dam
Overburden Emplacement Area
Vegetation Buffer Zone
Amenity Bund
Haul Road
FIGURE 1
Overview of Operations
File Name (A4): 801/4572_001.dgn
20190411 15:30

Appendix E BCT Correspondence

Wayne Beattie <wayne.beattie@holcim.com>

Fwd: Lynwood Quarry Conservation Agreement - request for Commonwealth contact and follow up

2 messages

Shilpa Shashi <shilpa.shashi@holcim.com> Wed, Aug 17, 2022 at 3:19 PM
To: Wayne Beattie <wayne.beattie@holcim.com>

FYI

Shilpa Shashi
Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd
Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067
M +61 427 859 852
E shilpa.shashi@holcim.com

www.holcim.com.au

---------- Forwarded message ---------
From: **Clare Kerr** <Clare.Kerr@environment.nsw.gov.au>
Date: Wed, Jul 13, 2022 at 1:17 PM
Subject: Lynwood Quarry Conservation Agreement - request for Commonwealth contact and follow up
To: Shilpa Shashi <shilpa.shashi@holcim.com>

Hi Shilpa

I have been working with the BCT Agreements and Technical Services (ATS) team about how we can incorporate the wording from the Commonwealth approval into the BCT Conservation Agreement template to satisfy the conditions of consent.

Our ATS team has recommended the inclusion of alternative wording to the statement proposed by Condition 3 in the Commonwealth approval to ensure it works in with the standard clauses of BCT Conservation Agreements as conditions of consent. If you are comfortable I think it would

be easiest to speak with the Commonwealth directly in case they have questions. Do you have a contact I can get in touch with?

Also, has there been any progress with the outstanding points below? I have found that there is a new draft template for reporting and am awaiting a copy. I will forward it to you once received.

Happy to meet or talk over the phone to discuss further if you would like. I am in the office today and then travelling for work for the rest of the week but will be returning to the office again on Monday.

Kind regards

Clare

Clare Kerr

Senior Ecologist – South East Region

NSW Biodiversity Conservation Trust

T 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Clare Kerr
Sent: Tuesday, 10 May 2022 3:44 PM
To: Shilpa Shashi <shilpa.shashi@holcim.com>; Wayne Beattie <wayne.beattie@holcim.com>
Subject: RE: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Shilpa and Wayne

Thank you for your time on Friday. I have reviewed the outstanding items for the draft agreement. As discussed could you please:

- Provide contact email and postal address for the agreement
- Provide copy of AHMP for records (link already provided below won't allow me to access the document)
- Check if any vegetation shapefiles exist for the following yellow area:

- Pursue consent from the Lessee on Lot 3 of DP1107232
- Look into whether there are latitudes and longitudes for what appear to be two infrastructure points near DD8 (I found the points for DD8 in the lists you gave me but not MP2 or the point that appears to be under MP2):

I will continue to refine the management plan and draft Conservation Agreement as well as the maps. I will also continue developing the Site Values Report with current best available information and come back to you with any gaps we can fill with information from the baseline assessment you mentioned is currently underway.

I have attached the guides you requested copies of for your information. I am following up on the latest version of the reporting template and will get back to you on this.

Let me know if you have any questions or need anything else from me at this stage.

Thank you

Clare

Clare Kerr

Senior Ecologist – South East Region

NSW Biodiversity Conservation Trust

T 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Shilpa Shashi <shilpa.shashi@holcim.com>
Sent: Friday, 6 May 2022 10:06 AM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Cc: Wayne Beattie <wayne.beattie@holcim.com>
Subject: Re: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare,

- Date of final approval/consent conditions – I have a couple of versions on file - **Attached 21 Dec 2005 - DA-128-5-2005 (attached)**
- Updated contact details for agreement - **I will circle back. I am the person in contact.**
- Signatories will be a company director and secretary? - **Company Director**
- Copy of cultural heritage mgmt. plan available for records as CA will refer to it? **2018 version . There are few minor changes .. New mp edits are yet to be approved..**
- All cultural heritage site/artefacts reported through AHIMS? Some isolated finds on Umwelt maps are not in the AHIMS reports**.- every time they do the survey .. they find more scattered artefact.**
- Has vegetation mapping been completed for the area excluded from Umwelt mapping? (SE corner of Lot 3 / DP1107232)
- Consent required by Lessee for Lot 3 / DP1107232 (sample consent attached)
- Covenant on Lot 3 / DP1107232 – do you know what this is for? **Yes please proposed condition of approval -EPBC (attached)**

- All fencing and track infrastructure captured? **The only tracks that are marked are access tracks.. Fencing - CHMP. if they need to mapped for repair.. Surveyor required. We will get them updated by a surveyor.**
- Location of dust and any other monitoring points/infrastructure? (Wayne mentioned he could provide a map/shapefile of exact locations) - Map and portal with coordinates
- Draft management plan and actions for the agreement. I have updated into new template (see attached draft CA) - need to run through and clarify some items.

Lynwood Quarry Aboriginal Heriatge Management P...

- Management zones for CA area
- Any questions about agreement template at this stage? **To talk about the EPBC report and rehabilitation.**
- Site values report
- Other items?

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Wed, May 4, 2022 at 2:58 PM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Hi Shilpa

No problem, I haven't created a formal agenda but please see a list of items below for discussion (the list looks long but most points are simple clarifications):

- Date of final approval/consent conditions – I have a couple of versions on file
- Updated contact details for agreement
- Signatories will be a company director and secretary?
- Copy of cultural heritage mgmt. plan available for records as CA will refer to it?
- All cultural heritage site/artefacts reported through AHIMS? Some isolated finds on Umwelt maps are not in the AHIMS reports.
- Has vegetation mapping been completed for the area excluded from Umwelt mapping? (SE corner of Lot 3 / DP1107232)
- Consent required by Lessee for Lot 3 / DP1107232 (sample consent attached)
- Covenant on Lot 3 / DP1107232 – do you know what this is for?
- All fencing and track infrastructure captured?
- Location of dust and any other monitoring points/infrastructure? (Wayne mentioned he could provide a map/shapefile of exact locations)
- Draft management plan and actions for the agreement. I have updated into new template (see attached draft CA) - need to run through and clarify some items.
- Management zones for CA area
- Any questions about agreement template at this stage?
- Site values report
- Other items?

I have attached the draft Conservation Agreement and a draft map of the Conservation Area including the infrastructure we mapped during the site visit for your review and to inform our discussions.

I meant to get to this to you yesterday but had some issues accessing our mapping servers - apologies for the delay.

I am in the field tomorrow but if you have any additions to the list above feel free to send them through or call me on my mobile with any questions.

Kind regards

Clare

Clare Kerr

Senior Ecologist – South East Region

NSW Biodiversity Conservation Trust

T 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Shilpa Shashi <shilpa.shashi@holcim.com>
Sent: Wednesday, 4 May 2022 1:03 PM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Subject: Re: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare,

Thanks for the invite for Friday. Please could you share the agenda or items you would like to go through. I can be prepared then.

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

> On Mon, May 2, 2022 at 4:18 PM Shilpa Shashi <shilpa.shashi@holcim.com> wrote:
>
> > Hi Clare,
> >
> > 10 am is perfect for me.
> >
> > Many thanks,
> >
> > **Shilpa Shashi**
> >
> > Planning and Environment Coordinator NSW / ACT
> >
> > **Holcim (Australia) Pty Ltd**
> >
> > Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067
> >
> > M +61 427 859 852
> >
> > E shilpa.shashi@holcim.com
> >
> > www.holcim.com.au
> >
> >
>
> On Mon, May 2, 2022 at 9:57 AM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:
>
> > Hi Shilpa
> >
> > Great, thank you. Is 10am ok to meet? I will send through a meeting request.

Thank you for the shapefiles.

Kind regards

Clare

Clare Kerr

Senior Ecologist – South East Region

NSW Biodiversity Conservation Trust

T 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Shilpa Shashi <shilpa.shashi@holcim.com>
Sent: Friday, 29 April 2022 4:07 PM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Cc: Wayne Beattie <wayne.beattie@holcim.com>
Subject: Re: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare,

Trust you are well. I am available on Friday the 6th of May. Please see attached shape files that were requested.

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Wed, Apr 20, 2022 at 2:24 PM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Good morning Shilpa
>
> Just catching up on email, I have been travelling for work and away around Easter apologies.
>
> Do any times on Monday 2 May before 1pm, Thursday 5 May or Friday 6 May suit? At this stage I am also relatively free every day the week of 9 May apart from Tuesday 10th.
>
> Kind regards
>
> Clare
>
> **Clare Kerr**
>
> **Senior Ecologist – South East Region**
>
> NSW Biodiversity Conservation Trust
>
> **T** 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Shilpa Shashi <shilpa.shashi@holcim.com>
Sent: Wednesday, 13 April 2022 11:57 AM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Cc: Wayne Beattie <wayne.beattie@holcim.com>
Subject: Re: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare,

Trust you are well. Just following up on the dates. Please could you propose a few dates in May.

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Wed, Apr 6, 2022 at 10:59 AM Shilpa Shashi <shilpa.shashi@holcim.com> wrote:

> Hi Clare,
>
> Thanks for carrying out the site visit. Sorry about the delay in responding to you.
>
> Please let me know your available dates. I am working on obtaining the shapefiles.
>
> Many thanks,
>
> **Shilpa Shashi**
>
> Planning and Environment Coordinator NSW / ACT
>
> **Holcim (Australia) Pty Ltd**
>
> Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067
>
> M +61 427 859 852
>
> E shilpa.shashi@holcim.com
>
> www.holcim.com.au
>
>
>
> On Fri, Mar 25, 2022 at 12:08 PM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

Hi Shilpa and Wayne

Just letting you know that the site visit went well and I am working on migrating all the information from the application and the site visit into the new Conservation Agreement template. I will also refine the maps that will go into the agreement based on data collected during the visit. I am out of the office on Monday so will be in touch at some point later in the week once I have had a chance to complete the new draft.

Wayne – thank you for your time on site, very helpful. Can you please send me the locations of the dust and other monitoring points you mentioned you had to add to the map?

Shilpa – there are a couple of administrative details to work through to set up for execution and registration of the agreement we will need to discuss also. It might be best to have a meeting to discuss all outstanding points late next week/early the following week. Is there a time that would suit you? Also, do you have any shapefiles for the umwelt vegetation mapping and/or cultural heritage area? Do you have a copy of the cultural heritage plan for the site you can share?

Please let me know if you have any questions in the meantime.

Kind regards

Clare Kerr

Senior Ecologist – South East Region

NSW Biodiversity Conservation Trust

T 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Shilpa Shashi <shilpa.shashi@holcim.com>
Sent: Monday, 21 March 2022 3:14 PM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Cc: Wayne Beattie <wayne.beattie@holcim.com>
Subject: Re: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare,

Please find the details of Wayne Beattie (Lynwood's Quarry Manager) below. I have copied Wayne on this email.

Meeting is at 10:30 am at Lynwood Quarry on Wednesday 23rd March . Please let us know if anything changes.

Please feel free to contact me if you have any questions. I will be sharing the documents shortly.

Please could you share the template for the inspection.

Directory profile

wayne.beattie@holcim.com

+61 2 4820 7007 · Work

+61 419 476 900 · Mobile

Hume Highway LYNWOOD NSW 2579 Australia · Work

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

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Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

Please consider the environment before printing this email.

On Fri, Mar 18, 2022 at 3:03 PM Shilpa Shashi <shilpa.shashi@holcim.com> wrote:

> Awesome. Thank you so much Clare.
>
> **Shilpa Shashi**
>
> Planning and Environment Coordinator NSW / ACT
>
> **Holcim (Australia) Pty Ltd**
>
> Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067
>
> M +61 427 859 852
>
> E shilpa.shashi@holcim.com
>
> www.holcim.com.au
>
> Please consider the environment before printing this email.

On Fri, Mar 18, 2022 at 2:10 PM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Hi Shilpa
>
> Yes that is still the plan. I will give you a call early next week to arrange details of time and meeting place.
>
> Thanks
>
> Clare
>
> **Clare Kerr**
>
> **Senior Ecologist – South East Region**
>
> NSW Biodiversity Conservation Trust
>
> **T** 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?
>
> 11 Farrer Place, Queanbeyan NSW 2620
>
> ---
>
> **From:** Shilpa Shashi <shilpa.shashi@holcim.com>
> **Sent:** Friday, 18 March 2022 1:52 PM
> **To:** Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
> **Subject:** Re: Draft Lynwood Quarry Conservation Agreement for Consideration.
>
> Hi Clare,
>
> Trust you are well. Just confirming you are heading to Lynwood Quarry on 23rd March 2022.
>
> Please could you let me know if there are any changes.
>
> Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Wed, Feb 16, 2022 at 9:57 AM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Hi Shilpa
>
> That is no problem if you would prefer to delay. How does Wednesday 23 or Wednesday 30 March suit?
>
> Kind regards
>
> Clare
>
> **Clare Kerr**
>
> **Senior Ecologist – South East Region**

NSW Biodiversity Conservation Trust

T 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?

11 Farrer Place, Queanbeyan NSW 2620

From: Shilpa Shashi <shilpa.shashi@holcim.com>
Sent: Wednesday, 16 February 2022 9:53 AM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Subject: Re: Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare,

Trust you are well. Clare, with the rain we have had recently at the site. The access to these sites are restricted at the moment. Is it possible to differ this to mid to last week of March?

Please let me know your thoughts.

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

Please consider the environment before printing this email.

On Mon, Feb 14, 2022 at 1:40 PM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Hi Shilpa
>
> As mentioned last year, there are some details that the BCT will need to confirm through a site visit. I haven't had capacity to date as I have been working on a targeted project but will have more time in the coming weeks as deadlines for the other project pass. Would anyone be available to meet on site Monday 28 February or Wednesday 2 March? It would be good to mid-morning and I anticipate it may be half a day to have a look at the outstanding items.
>
> Kind regards
>
> Clare
>
> **Clare Kerr**
>
> **Senior Ecologist – South East Region**
>
> NSW Biodiversity Conservation Trust
>
> **T** 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?
>
> 11 Farrer Place, Queanbeyan NSW 2620
>
> ---
>
> **From:** Shilpa Shashi <shilpa.shashi@holcim.com>
> **Sent:** Friday, 11 February 2022 12:37 PM
> **To:** Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
> **Subject:** Re: Draft Lynwood Quarry Conservation Agreement for Consideration.
>
> Hi Clare,

Trust you are well. Is there any additional information you were wanting from me. Is there any update for me.

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Fri, Jan 14, 2022 at 11:49 AM Shilpa Shashi <shilpa.shashi@holcim.com> wrote:

> Hi Clare,
>
> Thank you for the update and email. Happy New Year!
>
> Yes we do have an ABN. Please see below.

ABN 87099732297

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Wed, Dec 1, 2021 at 11:30 AM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Hi Shilpa
>
> Apologies for the delayed response, I have been working out of office in the field the past 3 weeks and will be returning to the office next week.
>
> I have been waiting on the updated template from our Agreements and Technical Services team. I will follow up again and get it to you hopefully by week end or early next week.

I have reviewed the ecological data and mapping during lockdown and think that we will need to schedule a site visit to confirm details of the agreement so we can finalise it. I have been waiting until I know when I will have capacity to come out to get in touch to schedule a time. I am currently working on a targeted conservation tender which has tight deadlines so haven't been able to focus elsewhere recently.

Does the company have an ABN that I can use to finish checks for the agreement in the meantime?

Thank you

Clare Kerr

Sent from my iPhone

> On 30 Nov 2021, at 11:00 am, Shilpa Shashi <shilpa.shashi@holcim.com> wrote:
>
> Hi Clare,
>
> Trust you are well. Please could you let us know if there has been an update for us.
>
> Many thanks,
>
> **Shilpa Shashi**
>
> Planning and Environment Coordinator NSW / ACT
>
> **Holcim (Australia) Pty Ltd**
>
> Level 7 Tower B - 799 Pacific Highway Chatswood NSW 2067
>
> M +61 427 859 852

E shilpa.shashi@holcim.com

www.holcim.com.au

On Tue, Nov 9, 2021 at 2:19 PM Shilpa Shashi <shilpa.shashi@holcim.com> wrote:

> Hi Clare,
>
> Trust you are well. Do you have any update for us please..
>
> Many thanks,
>
> **Shilpa Shashi**
>
> Planning and Environment Coordinator NSW / ACT
>
> **Holcim (Australia) Pty Ltd**
>
> Level 7 Tower B - 799 Pacific Highway Chatswood NSW 2067
>
> M +61 427 859 852
>
> E shilpa.shashi@holcim.com
>
> www.holcim.com.au

Please consider the environment before printing this email.

On Fri, Aug 6, 2021 at 3:27 PM Clare Kerr <Clare.Kerr@environment.nsw.gov.au> wrote:

> Hi Shilpa
>
> Thank you for your time earlier this week and for sending the additional information through. I will review the data and be in touch to discuss further next week.
>
> Have a nice weekend.
>
> Kind regards
>
> Clare
>
> **Clare Kerr**
>
> **Senior Landholder Support Officer – South East Region**
>
> NSW Biodiversity Conservation Trust
>
> **T** 02 9995 6604 | **M** 0408 316 481 | **W** www.bct.nsw.gov.au | Who is the BCT?
>
> 11 Farrer Place, Queanbeyan NSW 2620
>
> ---
>
> **From:** Shilpa Shashi <shilpa.shashi@holcim.com>
> **Sent:** Friday, 6 August 2021 2:56 PM
> **To:** Clare Kerr <Clare.Kerr@environment.nsw.gov.au>; Rebecca Vere <rvere@umwelt.com.au>
> **Cc:** Rebecca MacLean <rebecca.maclean@lafargeholcim.com>
> **Subject:** Draft Lynwood Quarry Conservation Agreement for Consideration.

Hi Clare and Rebecca,

It was really nice talking to the both of you. As discussed earlier this week, please find the Ecology report and the BIRS assessment document attached. This will provide more recent ecology data for the conservation area.

Please feel free to call me if you have any questions.

Lynwood BIRS Report 2019 .pdf

Many thanks,

Shilpa Shashi

Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd

Level 7 Tower B - 799 Pacific Highway Chatswood NSW 2067

M +61 427 859 852

www.holcim.com.au

Please consider the environment before printing this email.

E shilpa.shashi@holcim.com

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Any views expressed in this email are those of the individual sender except where the sender expressly and with authority states them to be the views of the NSW Office of Environment, Energy and Science.

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Shilpa Shashi <shilpa.shashi@holcim.com> Wed, Aug 17, 2022 at 3:24 PM
To: Clare Kerr <Clare.Kerr@environment.nsw.gov.au>
Cc: Wayne Beattie <wayne.beattie@holcim.com>

Hi Clare,

Sorry about the delay in getting back to you. The email addresses are listed below.

elizabeth.cotterell@awe.gov.au
Alexi.Williams@environment.gov.au

This is my last week with Holcim. Please could you liaise with Wayne Beattie (Quarry Manager). Thank you for all your help with this Agreement. Really appreciate it.

Many thanks,

Shilpa Shashi
Planning and Environment Coordinator NSW / ACT

Holcim (Australia) Pty Ltd
Level 8 Tower B - 799 Pacific Highway Chatswood NSW 2067
M +61 427 859 852
E shilpa.shashi@holcim.com

www.holcim.com.au
Please consider the environment before printing this email.

[Quoted text hidden]

Appendix F Monitoring report

Lynwood Quarry, NSW

Ecological Monitoring 2023

Holcim Australia Pty Ltd

PO Box 5697
West Chatswood NSW 1515

Prepared by:

SLR Consulting Australia

10 Kings Road, New Lambton NSW 2305,
Australia

SLR Project No.: 630.V13844.00001

5 March 2024

Revision: v1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
v1.0	5 March 2024	Fiona Iolini	David Conder	Jeremy Pepper

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Holcim Australia Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

1.1 Background

The Lynwood Quarry (the 'site') is a hard rock quarry approximately two kilometres west of Marulan, in the Southern Highland IBRA Region and Bungonia Sub-region of New South Wales (NSW) (see Figure 1). Initial planning consent for the Lynwood Quarry was granted to Cemex (now Holcim) on 21 December 2005 for an approved five million tonnes per annum output. Since the original development approval, five modifications have been approved, with quarrying operations approved until 01 January 2038. Ecological monitoring is a requirement of the project approval and associated ecology reports and management plans.

SLR Consulting Australia Pty Ltd (SLR) was commissioned by Holcim (Australia) Pty Ltd ('Holcim') to undertake ecological and rehabilitation monitoring at the Lynwood Quarry in 2023. SLR has undertaken ecological and rehabilitation monitoring at the quarry since 2020. In 2020, SLR established four retained vegetation monitoring plots (R1-R4) within areas of retained vegetation and baseline flora (BAM plot) and fauna (diurnal and nocturnal fauna census) data was collected at each of these locations. In 2020, SLR also established eleven Hoary Sunray monitoring plots.

In 2021, five rehabilitation monitoring plots (RM1-RM5) were established within areas of rehabilitation and two additional Box-Gum Woodland vegetation monitoring plots (BG1-BG2) were established. In 2022, an additional two core riparian zone monitoring plots (CR1-CR2) were established within riparian corridors of Joarimin and Marulan Creeks.

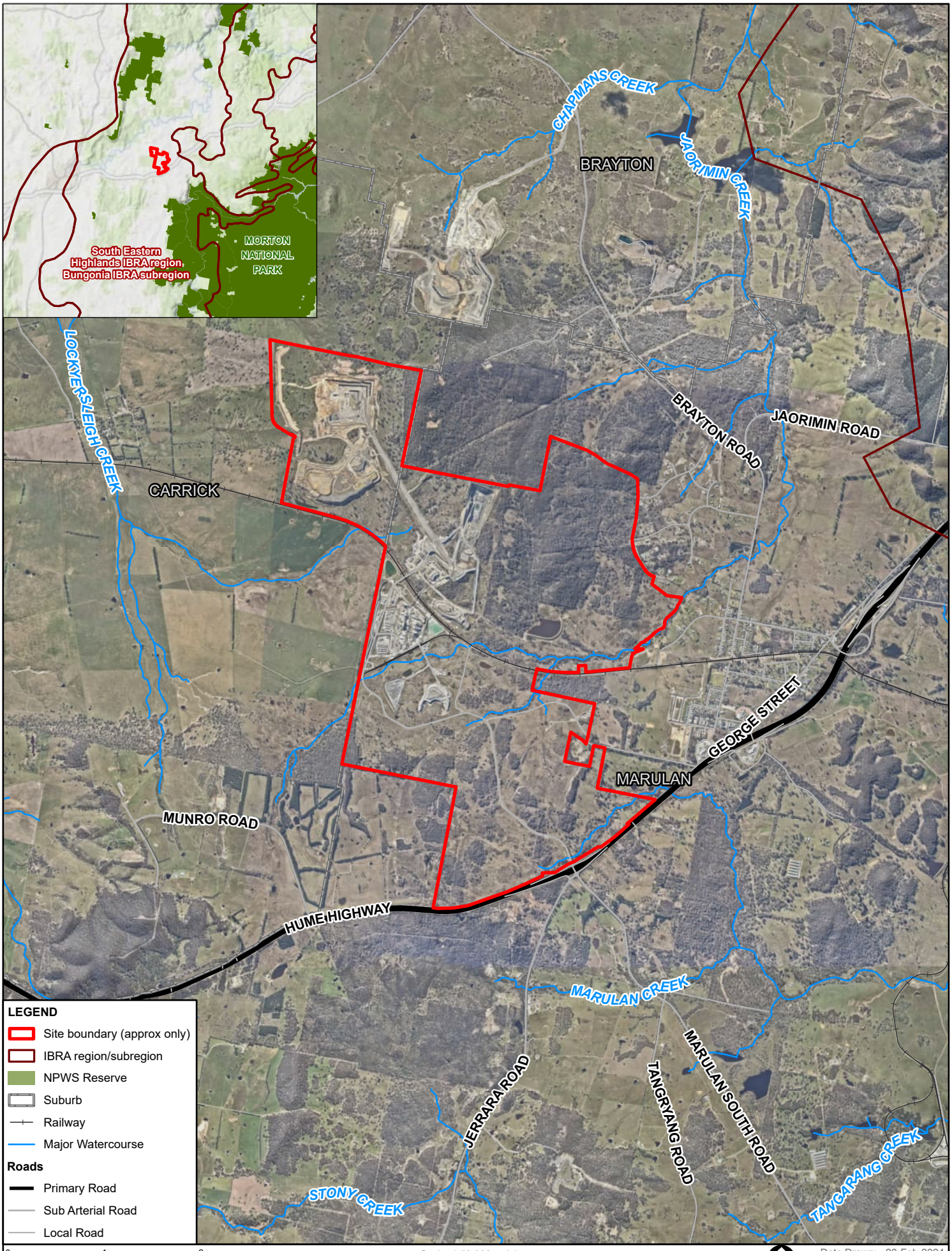
1.2 Previous Ecological Reports

Various documents were prepared during the approval phase of the quarry (Umwelt 2005, 2011, 2013, 2018a, 2018b) and these have been relied upon for background information in relation to the ecology and management of the site. A summary of previous ecological reports is provided below.

1.2.1 Ecological Assessment

Key findings of the *Ecological Assessment* (Umwelt 2005) are as follows:

- Four vegetation types occur across the site: Tableland Low Woodland, Western Tablelands Dry Forest, Tableland Grassy Box-Gum Woodland, Riparian Gum Box-Apple Woodland and Camden Woollybutt Low Open Forest.
- No threatened flora species were recorded; however, potential habitat exists for Buttercup Doubletail *Diuris aequalis*, Pine Donkey Orchid *Diuris tricolor*, Cotoneaster *Pomaderris cotoneaster*, Tallong Midge Orchid *Genoplesium plumosum* and Cambage Kunzea *Kunzea cambagei*.
- Areas of retained vegetation across the site provide habitat for a suite of local fauna species including the following threatened species listed as 'vulnerable' under the *Biodiversity Conservation Act 2016* (BC Act): Speckled Warbler, Squirrel Gilder, Eastern Coastal Free-tailed Bat (previously Eastern Freetail-bat), Eastern False Pipistrelle and Large Bent-winged Bat (previously known as Eastern Bentwing-bat).
- Potential habitat also exists for other BC Act listed threatened fauna species, including Giant Burrowing Frog, Rosenberg's Goanna, Striped Legless Lizard, Blue-billed Duck, Swift Parrot, Barking Owl, Masked Owl, Brown Treecreeper, Regent Honeyeater, Hooded Robin, Diamond Firetail, Spotted-tailed Quoll, Grey-headed Flying-fox and Large-eared Pied Bat.



Scale: 1:50,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 28-Feb-2024
Project Number: 630.V13844

Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (December, 2023)

SLR

SITE LOCATION

FIGURE 1

Path: H:\Projects-SLR\630-SrvNTL\630-NTL\630.V13844.00001 Lynwood Quarry Ecological Moni\06 SLR Data\01 CADGIS\GIS\630V13844_LynwoodEcologicalMonitoring\630V13844_LynwoodEcologicalMonitoring.aprx\630V13844_F01_SiteLocation

- To mitigate the impacts of the development the Ecological Assessment proposed monitoring in retained vegetation on a three-yearly basis involving four monitoring locations to be established within a Habitat Management Area (HMA), Jaorimin Creek Management Area and Cultural Management Area (CMA). The proposed approach was a standard 20 m by 20 m flora quadrat to record species diversity and structural composition, as well as photo monitoring and fauna monitoring targeting threatened species. Nest boxes were also proposed to be installed and monitored on an annual basis for 5 years.

1.2.2 Box-Gum Woodland Management Plan

Key aspects of the *Box-Gum Woodland Management Plan* (Umwelt 2013) are as follows:

- During construction, the site was found to contain a large population of the threatened plant Hoary Sunray *Leucochrysum albicans* var. *tricolor*, which at the time was listed as 'vulnerable', under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as well as areas of White Box – Yellow Box - Blakely's Red Gum Woodland, which at the time was listed as a 'critically endangered ecological community' (CEEC) under the BC Act[1].
- To mitigate and offset the loss of these threatened entities, the plan details management actions, regeneration, and revegetation strategies.
- A Biodiversity Offset Area (BOA) was set aside, which incorporates a 185 ha area in the southwest portion of the site and includes the Cultural Management Area. As such, 3-yearly plot monitoring in the CMA (as previously proposed under the Rehabilitation Plan mentioned below) was deemed suitable to capture the 'retained vegetation' monitoring requirements of the biodiversity offset area.
- The plan also commits to annual monitoring and reporting to determine success of rehabilitation and general condition including weed and pest animal presence, presence of Hoary Sunray and other matters of national environmental significance (MNES).

1.2.3 Rehabilitation and Landscape Management Plan

The relevant ecological and rehabilitation components of the *Rehabilitation and Landscape Management Plan* ('RLMP', Umwelt 2018a) can be summarised as follows:

- The rehabilitation efforts are to be focused on three areas over the first five years of operations: the haul road construction area, the western amenity bund and the southern edge of the overburden emplacement area.
- The key elements of the rehabilitation strategy include:
  - The early, timely and progressive rehabilitation of disturbed areas.
  - The surface of the southern overburden emplacement area and the Lynwood overburden emplacement area will be shaped in a generally irregular landform to resemble a natural surrounding landform wherever possible.
  - Stripped topsoil will be placed in stockpiles no greater in depth than 3 m and seeded with a cover crop if they are to remain in place for longer than six months.

[1] The Hoary Sunray *Leucochrysum albicans* var. *tricolor*, is currently listed as 'endangered', under the EPBC Act, but is not listed under the BC Act. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, is currently listed as a 'critically endangered ecological community' (CEEC) under both the BC Act and the EPBC Act.

  - Shaped areas will be covered with topsoil, seeded with a native species and cover crop mix with intent of achieving mixed grassland and woodland native vegetation communities.
  - Selected surface habitat features consisting of large rocks, logs and trees from clearing undertaken will also be placed across the rehabilitated area. These features will provide potential fauna habitat and will aid in achieving a stable landform.
- Weed control measures consist of a comprehensive weed survey of all areas of the quarry every 4 years, which will advise weed removal. Weed removal is to prioritise noxious[2] species.
- Feral animal control programs are to be implemented as required and include inspections for the presence of significant populations of feral animals.
- The granite pit benches are to be seeded with a native tree species mix and a grass species mix also used on the safety bund.
- Overburden and emplacement areas south of the Main Southern Railway are expected to be seeded with species from the Tableland Low Woodland vegetation community while the overburden emplacement areas to the north of the Main Southern Railway are expected to be seeded with a mixture of Tableland Grassy Box-Gum Woodland and Western Tablelands Dry Forest vegetation communities.
- Rehabilitation of the southern overburden emplacement area and western amenity bund aim to establish PCT1330 Yellow Box - Blakely's Red gum grassy woodland on the tablelands, Southeastern Bioregion.
- Holcim is to establish and maintain the HMA and Jaorimin Creek corridor for the conservation of ecological values. Management includes fencing and signposting the boundary of the management areas and removal of dilapidated fences throughout. The HMA is approximately 130 ha of which 105 ha is presently vegetated and an area of 25 ha is proposed to be rehabilitated via assisted regeneration and plantings.
- Species established will represent the existing vegetation communities within the HMA, being Western Tablelands Dry Forest, Tableland Grassy Box-Gum Woodland and Tableland Low Woodland. The riparian species to be established along the creek line will also include *Acacia mearnsii* and *A. dealbata*.
- The remaining remnant woodland occurring within the project area that is outside the quarry footprint and specific management areas, will also be managed during the life of the project to maintain its ecological values. Strategies will include management of grazing impacts, weed and feral animal control, sediment and erosion control and encouragement of natural regeneration.
- Maintenance and replacement of arboreal habitat is to occur through the relocation of salvaged tree hollows or installation of nest boxes. Nest boxes are to be monitored annually for a period of 5 years, followed by condition inspections every 4 years.
- Ecological monitoring is to include:
  - Annual monitoring of vegetation screens for 4 years
  - 3-yearly monitoring of retained vegetation, moving to 10-yearly if positive for 3 consecutive years

[2] Now known as 'priority weed' species under the *Biosecurity Act 2015*

  - 3-yearly fauna monitoring, moving to 10-yearly where positive for 3 consecutive years
  - Annual nest box monitoring for 5 years, then 4-yearly condition inspections
- Preliminary completion criteria are provided for the key rehabilitation works and HMA (see assessment at Section 4.0).

1.2.4 Riparian Area Management Plan Marulan Creek Catchment Area

The Riparian Area Management Plan for Marulan Creek (Umwelt 2011) provides details in relation to management of impacts to riparian areas of Marulan Creek during construction and operation of Lynwood Quarry. The main impacts in the vicinity of Marulan creek relate to the construction of the access road including the construction compound and the culvert at the location of creek crossing.

In relation to rehabilitation the plan states:

- Holcim propose to implement a program of rehabilitation works along existing drainage lines to reduce the current extent of bank and bed erosion and associated sediment transport, where possible.
- Rehabilitation works will initially include fencing of the third order section of Marulan Creek to prevent cattle access and allow for natural regeneration. This fenced area will be inspected annually for the first 3 years to assess the level of natural regeneration. If natural regeneration is not proceeding to an acceptable level by the third year of annual monitoring, then alternative regeneration measures including supplementary planting in accordance with measure in the RLMP will be considered.
- Lynwood Quarry's Environmental Officer will inspect Marulan Creek within the project area on a quarterly basis (and after severe storm events) to identify the condition of the vegetation and any significant erosion or creek stability issues.
- During the operational phase of the project monitoring of the management measures implemented will be undertaken in accordance with the RLMP.

1.2.5 Riparian Area Management Plan Jaorimin Creek Catchment

The Riparian Area Management Plan for Jaorimin Creek (Umwelt 2018b) provides details in relation to management of impacts to riparian areas of Jaorimin Creek during construction and operation of Lynwood Quarry. The active quarry area and several dams are within the creek catchment and a raft of controls (such as use of sediment devices, seeding and revegetation of disturbed areas, monitoring, limiting work areas) are suggested to limit impacts caused during construction and operation of these features.

The plan includes the objectives in relation to rehabilitation:

- The riparian corridor has been fenced to exclude cattle where required.
- Revegetation works have occurred along Jaorimin Creek south of the Main Southern Railway.
- Nest boxes along Jaorimin Creek have been established, monitored and are being maintained.
- The site is managing significant weed or feral animal infestations with a demonstrable reduction pre-construction.
- Monitoring has indicated that natural regeneration is occurring.

1.3 Ecological and Rehabilitation Monitoring Requirements

Based on the review of previously approved documentation (Umwelt 2005, 2013 and 2018), SLR devised the ecological and rehabilitation monitoring schedule from 2020-2030, as provided Table 1. The monitoring program will require updating as rehabilitation progresses, to add areas of active quarry that become available for rehabilitation (overburden emplacement areas and pits, etc.).

Table 1: Overview of Monitoring Program to 2030

Monitoring Method	Year 2020-2030 (✓ =survey required, ☑ =survey completed, ☒ survey not completed, ✓ additional survey)										
	20	21	22	23	24	25	26	27	28	29	30
1. Nest Box survey	☑	☑	☑	☑	✓						
2. Retained vegetation monitoring*	☑			☑			✓			✓	
3. Hoary Sunray Monitoring	☑			☑	✓		✓			✓	
4. Rehabilitation Monitoring Amenity Bund#		☑	☑	☑	✓						
5. Rehabilitation Monitoring of HMA+		☑	☑	☑	✓	✓					
6. Rehabilitation Monitoring of BOA		☑	☑	☑							
7. Rehabilitation Monitoring of BOA (revegetated)		☑	☑	☑	✓	✓	✓	✓	✓	✓	✓
8. Box-gum Woodland Monitoring (retained)		☑	☑	☑	✓	✓	✓	✓	✓	✓	✓
9. Rehabilitation monitoring of creek corridors^			☑	☑	✓	✓	✓	✓	✓	✓	✓

* After 2029 an assessment is required to determine whether the monitoring can move to 10-yearly intervals

Monitoring may cease after three years if vegetation meets completion criteria

\+ After 2025 an assessment is required to determine whether additional planting is required, if it is monitoring of HMA rehab should be extended

^ Monitor annually for 10 years from planting unless completion criteria are met sooner

The surveys of each monitoring method involve:

1 Usage and maintenance survey of 50 nest boxes is required to be undertaken annually for 5 years.

2 Vegetation and Fauna Monitoring of at four locations within areas of retained vegetation, including BAM plots and a fauna survey (involving diurnal reptile, amphibian and bird surveys, spotlighting, and use of ultrasonic bat-call detection and infrared camera devices) at 3-yearly intervals until at least 2029.

3 Hoary Sunray population estimates including counting the number of Hoary Sunray plants within ten 4 m^2 plots at locations at 3-yearly intervals in perpetuity. An additional survey is recommended in 2024 due to poor results at the 2023 survey.

4 Collection of BAM plot data at one location on the amenity bund annually for 3-years or until rehabilitation completion criteria are met. An additional survey is recommended in 2024 due to poor results at the 2023 survey.

5 Collection of BAM plot data at two locations within the northern Habitat Management Area, annually for 5 years.

6 Collection of BAM plot data at one location within the Biodiversity Offset Area annually for 3 years.

7 Collection of BAM plot data at one location within the regeneration portion of the Biodiversity Offset Area annually in perpetuity.

8 Collection of BAM plot data at two locations within the retained portion of the Box-Gum Woodland annually in perpetuity.

9 Collection of BAM plot at two locations within core riparian corridors, annually for 10 years.

1.4 Objectives

The purpose of the Lynwood ecological monitoring program is to monitor ecological values within rehabilitation and areas of retained vegetation within the site and demonstrate the achievement of objectives in accordance with the *Ecological Assessment* (Umwelt 2005), *Box-Gum Woodland Management Plan* (Umwelt 2013) and RLMP (Umwelt 2018).

The objectives of the 2023 ecological monitoring are to:

- Determine the current condition of rehabilitation and retained vegetation areas through comparison with benchmarks.
- Identify any deterioration or improvement in habitat quality within areas of retained vegetation.
- Assess changes to fauna species assemblages within the areas of retained vegetation.
- Detect any problems with management of natural areas through general opportunistic observations and make recommendations to address these issues, especially at the Biodiversity Offset Area.
- Determine whether nest boxes are being utilised by native fauna and determine whether any nest box maintenance actions are required.
- Detect changes in Hoary Sunray population size and try to determine any potential impacts on the population.

1.5 Climate Data

Temperature and rainfall data for the locality (sourced from Goulburn Airport AWS station 070330, BOM 2024a) are presented in Figure 2 and Figure 3, respectively.

The data indicates that in the months leading up to the survey (July to December 2023), in comparison to the monthly averages since 1994 and since monitoring began in 2020 the locality experienced above average monthly maximum temperatures. Monthly rainfall was lower than average except for November and December 2023 which were above average and higher than all other monitoring years except for 2021.

The temperature and rainfall patterns observed within the locality are generally consistent with those reported by BOM (2024b) for NSW in 2023, as summarised below:

- The state-averaged annual maximum temperature was 1.96°C above the 1961-1990 average, which is the third highest on record (since records began in 1910) and the highest since 2019.
- Maximum temperatures for March, June, August, September, and December were in the top ten warmest on record for their respective months.
- The state-averaged annual rainfall was 428.9 mm, which was 22.9 % below the 1961-1990 average.

Figure 2: Average Monthly Maximum Temperature (°C) Data for Goulburn (BOM 2024)

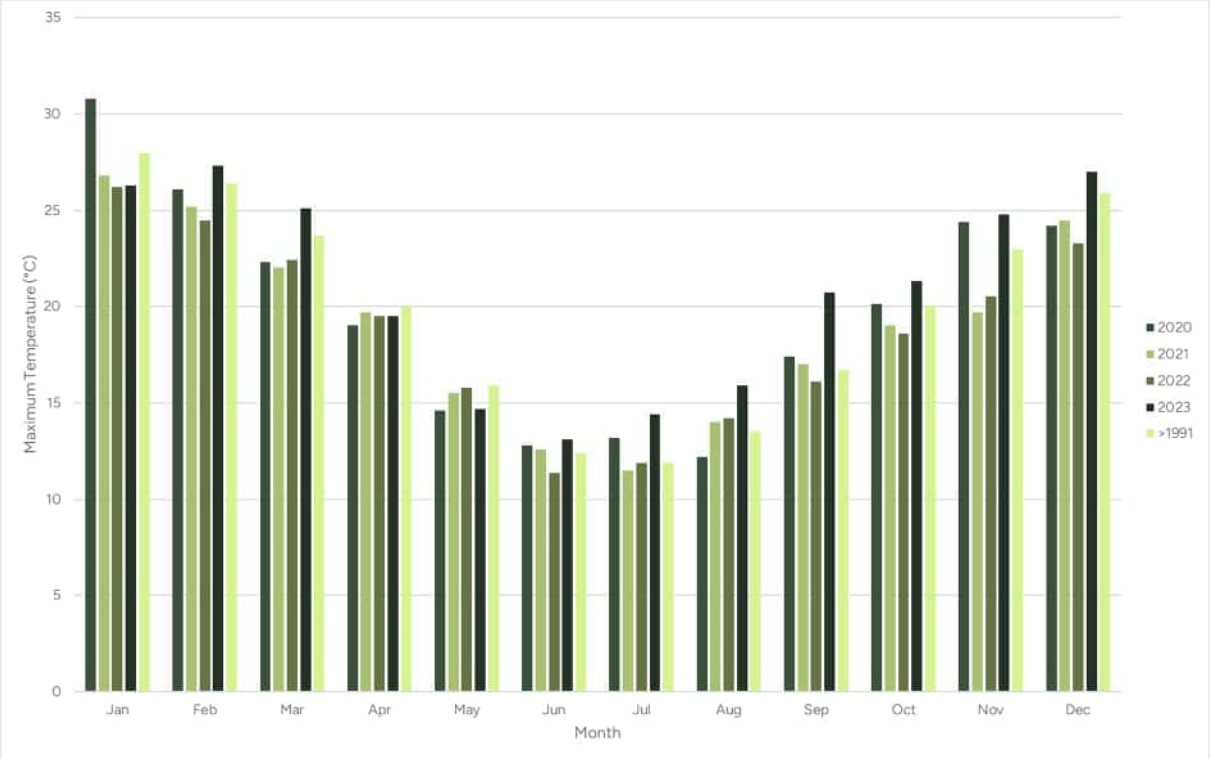
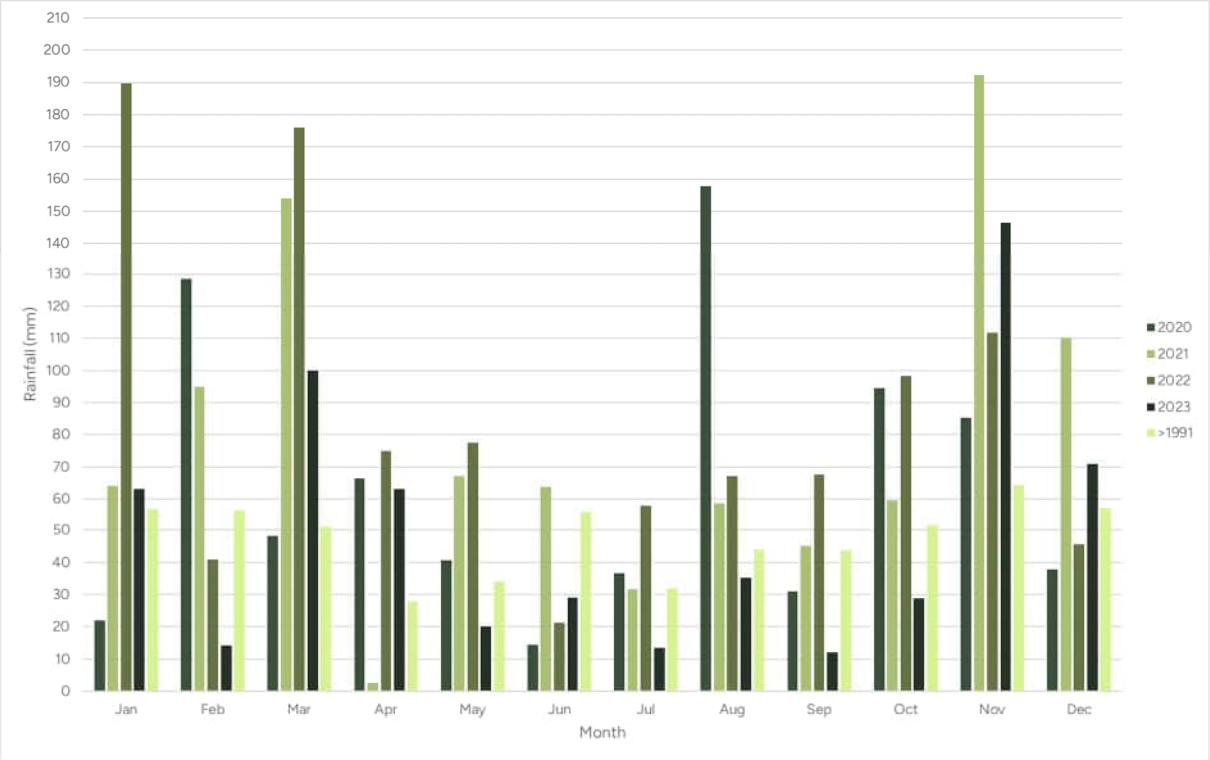


Figure 3: Average Monthly Rainfall (mm) for Goulburn (BOM 2023a)



2.0 Methods

2.1 Vegetation Monitoring Methods

2.1.1 Vegetation Monitoring Plot Selection

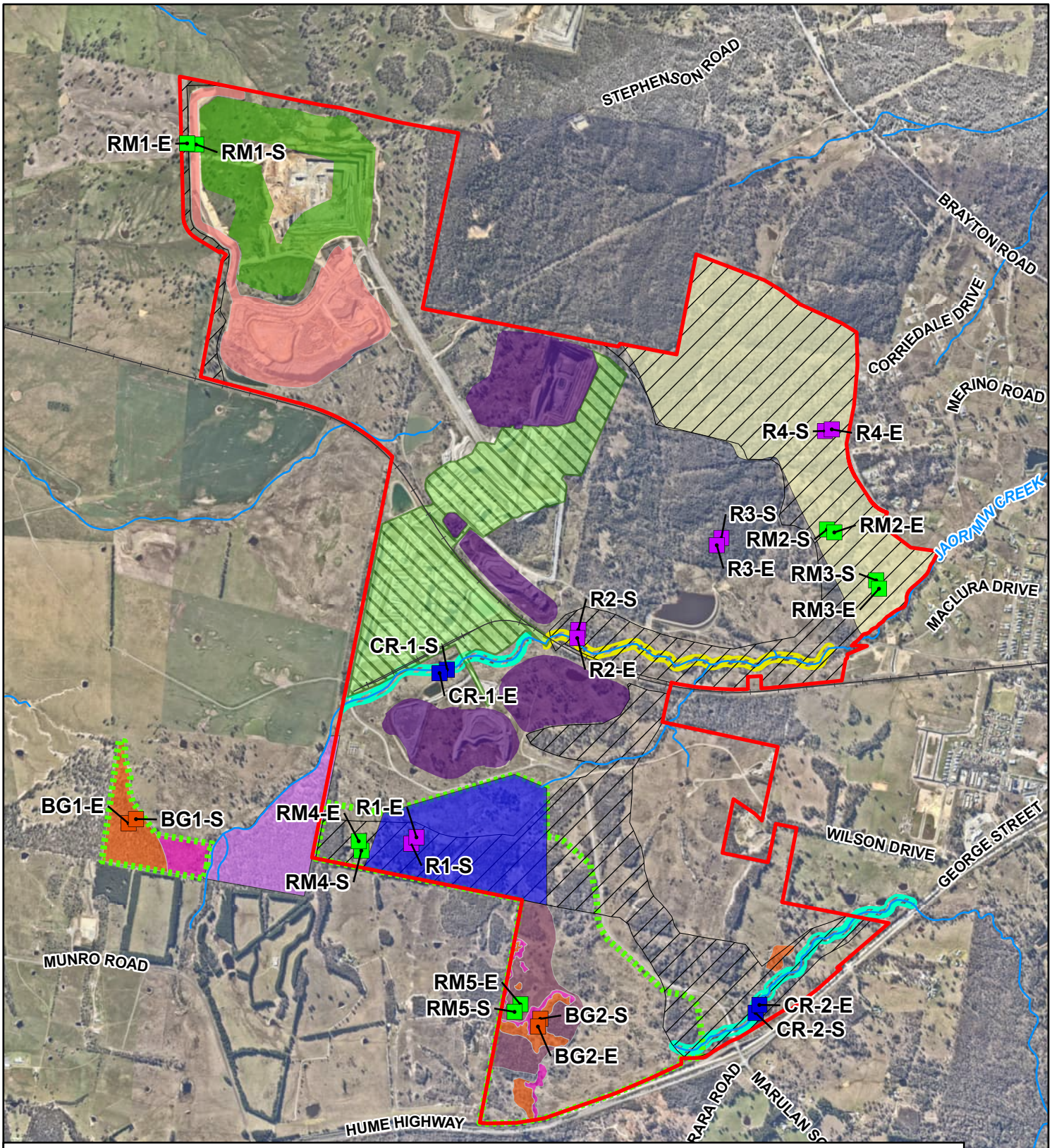
Monitoring plots have been pegged using metal star-pickets fitted with a yellow cap and marked with the plot reference. Two star-pickets were positioned at each plot, one at the start and one at the end of the midline (or 50 m transect) of each BAM plot. The plots were selected randomly whilst in the field, aiming to monitor each of the following areas:

- Amenity bund rehabilitation area - this is an approximate 8 ha revegetation area in the northwest of the site which is one of the areas directly impacted by the proposed quarry operations and which requires prioritised rehabilitation efforts according to the RLMP. One permanent rehabilitation monitoring plot (RM1) was established in this area in 2021.
- Habitat Management Area - this is 130 ha in the northeast of the site, of which 25 ha requires rehabilitation via assisted regeneration and planting according to the RLMP. Two retained vegetation plots were established in this area in 2020 (R3 and R4), and these plots are monitored every 3 years. In 2021 two rehabilitation monitoring plots (RM2 and RM3) were established within previously cleared and managed parts of the HMA. These plots are monitored annual for 5 years to determine whether planting is required.
- Cultural Heritage Management Area – the cultural heritage management area is directly south of the western emplacement area and is to be managed as retained native vegetation. One retained vegetation monitoring plot (R1) was established within this area in 2020.
- Joarimin Creek Management Area – occurs north of the Main Southern Railway and is to be managed as retained native vegetation. One retained vegetation monitoring plot (R2) was established within this area in 2020.
- Biodiversity Offset Area - this is 185 ha in the south of the site, of which 5.5 ha is to be regenerated (via direct seeding and tube-stock planting) according to the RLMP. One permanent rehabilitation monitoring plot (RM4) was established in this area in 2021.
- Box-Gum Woodland CEEC Regeneration - in relation to the 185 ha Biodiversity Offset Area in the south of the site, an additional 22 ha of this area is to be regenerated according to the Box-Gum Woodland Management Plan (Umwelt 2013). One permanent rehabilitation monitoring plot (RM5) was established in this area in 2021.
- Retained Box-Gum Woodland (non-revegetated area) - three additional areas in the south of the Lynwood Quarry site are to be monitored in accordance with the Box-Gum Woodland Management Plan (Umwelt 2013). Two permanent rehabilitation monitoring plots (BG1 and BG2) were established in this area in 2021.
- Core Riparian Corridors - the core riparian corridors of Jaorimin and Marulan Creeks extend as a narrow band through the north and south of the site respectively. These areas are to be rehabilitated including cattle exclusion and passive and active regeneration as required. Two permanent rehabilitation monitoring plots (CR1 and CR2) were established within these areas in 2022.

Location and details of the monitoring plots, vegetation communities (DPE 2022) and management areas are included in Table 2, Figure 4 and Figure 5.

Table 2: Monitoring Plot Location and Details

Management/ Rehabilitation Area	Plot	Transect Start		Transect End		State Vegetation Map (DPE 2022)
		Easting	Northing	Easting	Northing	
Cultural Heritage Management Area	R1	771155.1	6154011	771125.2	6153975	PCT 3643 Bungonia Tableland Silvertop Ash -Stringybark Forest
Joarimin Creek Management Area	R2	772059.7	6155132	772065.7	6155178	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest
Habitat Management Area	R3	772844.6	6155654	772870.5	6155695	PCT 3486 Wollondilly-Shoalhaven Slopes Grassy Open Forest
	R4	773491.9	6156306	773453.6	6156296	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest
Amenity Bund Rehabilitation Area	RM1	769915.4	6157908	769962.9	6157910	PCT 3376 Southern Tableland Grassy Box Woodland (prior to recent quarry development)
Habitat Management Area (Rehabilitation portion)	RM2	773464.8	6155743	773506.3	6155726	n/a
	RM3	773741.8	6155457	773757.6	6155409	n/a
Biodiversity Offset Area - Regeneration Area portion	RM4	770845.1	6153936	770830.3	6153989	n/a
Biodiversity Offset Area - Box-Gum Woodland CEEC Regeneration Area	RM5	771706.9	6153029	771739.9	6153072	n/a
Retained Box-Gum Woodland (non-revegetated area)	BG1	769577.1	6154113	769535.1	6154090	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest
	BG2	771851.8	6152990	771838.8	6152946	PCT 3643 Bungonia Tableland Silvertop Ash -Stringybark Forest
Riparian	CR1	771326.2	6154954	771285.1	6154935	n/a
	CR2	773062.9	6153023	773084.5	6153068	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest



LEGEND

- Site boundary (approx only)
- Box Gum Woodland Monitoring
- Rehabilitation Monitoring
- Vegetation Monitoring Plot
- Riparian Monitoring
- Railway
- Major Watercourse
- Assisted Natural Regeneration
- Biodiversity Offset Area
- Box Gum Woodland (CEEC)
- Box Gum Woodland (CEEC) Regeneration
- Box Gum Woodland Derived Native Grassland (CEEC)
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Existing Approved Habitat Management Area
- Habitat Management Area
- Joarmin Creek Management Area
- Rehabilitated Area – Biodiversity Values or Grazing
- Rehabilitated Area – Grazing
- Rehabilitated Areas – Biodiversity Values
- Rehabilitation Area – Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (PCT 1330)

0 0.5 1 km

Scale: 1:30,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 28-Feb-2024
Project Number: 630.V13844

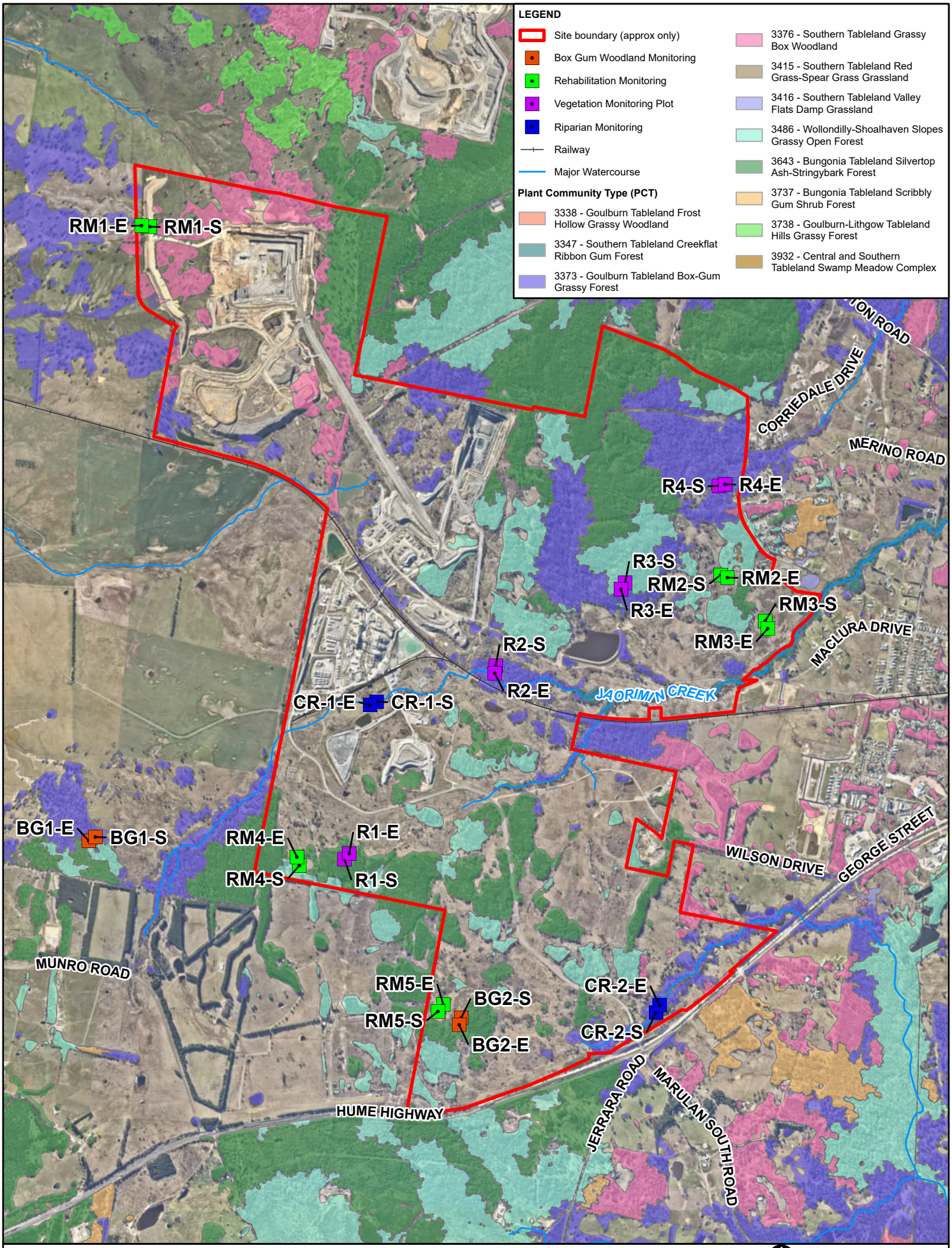
Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (December, 2023)
Conservation and Management Areas digitised from (Umwelt, 2018)

SLR

MONITORING SITES

FIGURE 4

Path: H:\Projects-SLR\630-SrvNTL\630-NTL\630.V13844.00001 Lynwood Quarry Ecological Moni\06 SLR Data\01 CADGIS\GIS\630V13844_LynwoodEcologicalMonitoring\630V13844_LynwoodEcologicalMonitoring.aprx\630V13844_F02_MonitoringSites



Scale: 1:30,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 28-Feb-2024
Project Number: 630.V13844

Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (December, 2023)
State Vegetation Type Map (Version C2.0.M2.0, NSW DPE 2023)

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PLAT COMMUNITY TYPES

FIGURE 5

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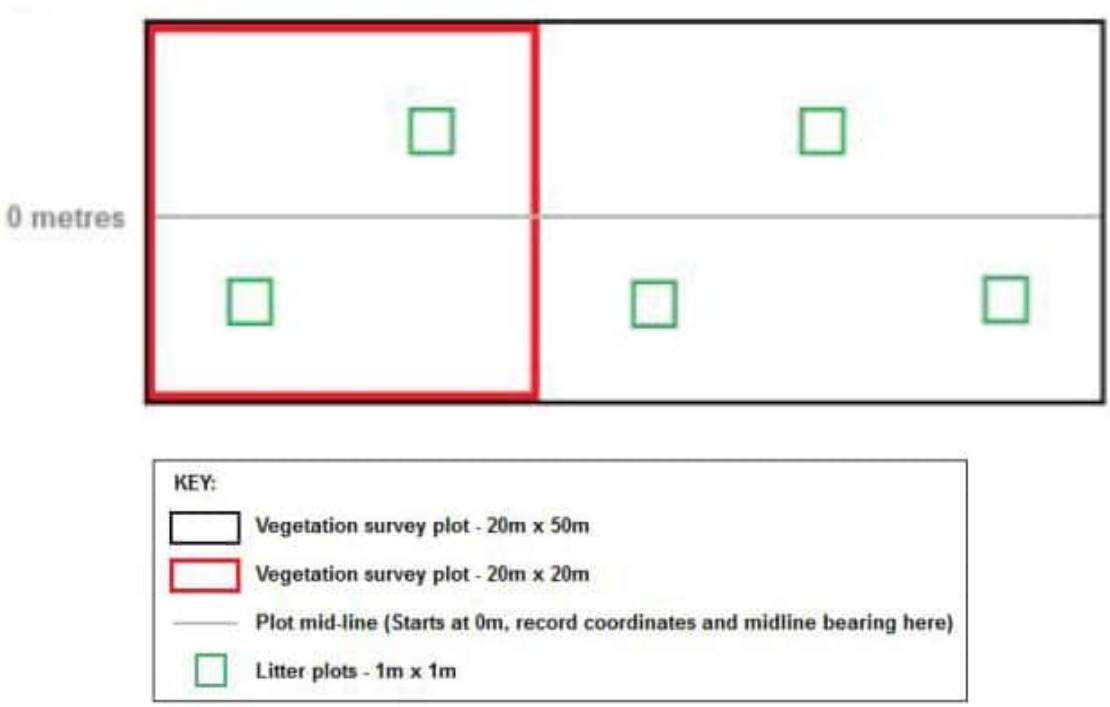
2.1.2 Vegetation Survey Technique

Flora monitoring was completed during the spring survey period at each of the nine permanent monitoring plots described above, following survey methods prescribed in the NSW Biodiversity Assessment Method (BAM) (DPIE 2020).

This involved a 20 m by 20 m floristic plot to assess species composition and structure, and a 20 m by 50 m plot to assess vegetation function. The function attributes collected under the BAM include tree stem size, hollow-bearing tree counts, and ground cover (litter, bare ground, cryptogram, and rock). The ground cover attributes are collected via five 1 m by 1 m plots along the midline, see Figure 6.

Figure 6: BAM Plot Layout



The BAM provides a repeatable assessment tool to compare vegetation and structural changes over time and to provide comparison for the areas of retained vegetation. All PCTs listed in the NSW BioNet Vegetation Classification database provide 'benchmark' scores for these attributes to which comparison with the relevant plot data can be made. Due to the widespread use of this method in NSW, this method was chosen to provide a consistent and replicable method of assessing the health of the retained vegetation.

To categorise the vegetation at each BAM plot into a PCT (where relevant), previous vegetation mapping and floristic data (Umwelt 2005), as well as current floristic composition data was compared to PCT's within the BioNet Vegetation Classification database. The PCT database was filtered using the Southern Highland IBRA Region and Bungonia Sub-region, followed by a close examination of floristics to match the vegetation at each plot.

2.2 Fauna Survey Techniques

Fauna monitoring was undertaken at each of the retained vegetation monitoring plots (R1, R2, R3, R4) during the winter and spring surveys utilising survey techniques and effort as detailed in Table 3.

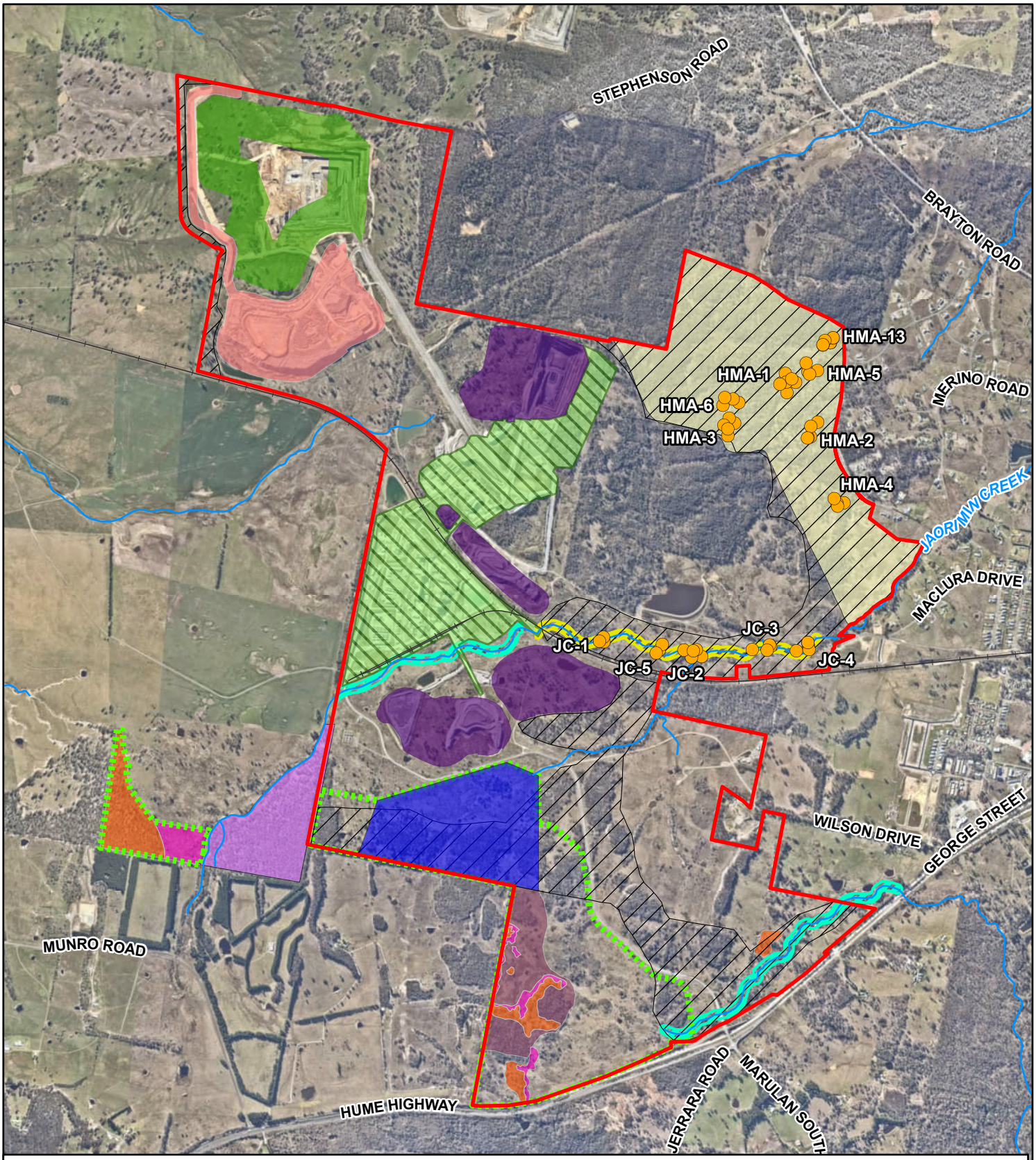
Table 3: Fauna Survey Techniques and Effort

Technique	Description	Identification	Total Hours
Reptile and Amphibian Survey - diurnal	Searches through areas of likely habitat such as under rocks and logs, in bark at the base of trees, around water sources and in man-made features.	Visual observation and vocal calls	4 (1hr per plot vicinity)
Bird Survey – diurnal	Slowly walking stratified transects within an approximate 2 ha area of the monitoring plot. Visual observations made through SLR Digital cameras (Canon EOS) or binoculars.	Calls, flight patterns and visual observations	4 (1hr per plot vicinity)
Spotlighting - diurnal	Conducted on foot using high-powered Head Torches (1000 Lumen). Targeted nocturnal amphibians, reptiles, birds, and mammals within an approximate 2 ha area of each monitoring plot.	Visual observation or vocal calls	4 (1hr per plot vicinity)
Ultrasonic Bat-call Detection - nocturnal	Echolocation calls are detected and recorded using a Bat detector. Bat detectors are positioned at a 45-degree angle approximately one metre off the ground. All night bat detectors were positioned with a clear view of potential micro-bat flyways. They are automated and programmed to start recording one hour before dusk and to stop recording one hour after sunrise the following morning.	Analysis by Luke Forster (Trace Ecology)	96 (or two nights 6pm to 6am per plot vicinity)
Infrared Cameras	Four infrared motion detection cameras were left recording over night at each of the monitoring plots. Each camera is set onto a tree at a 45-degree angle towards the ground where a suitable bait (such as cat food or oats) was placed as an attractant.	Analysis of photographic records	96 (or two nights 6pm to 6am per plot)

2.3 Nest Box Monitoring Methods

A total of 59 nest boxes were inspected as part of the winter monitoring event, with the locations of nest boxes shown in Figure 7. Of these 59 nest boxes, 50 have been monitored by SLR since 2020 and an additional nine were located and monitored during the survey. The nest box monitoring was completed by two qualified SLR ecologists, using a non-invasive remote camera inspection method to record the following details:

- Native fauna occupancy
- Presence of nests, eggs, or young
- Indirect signs of usage (eg scats, fur, feathers, egg fragments, nest material)
- Evidence of pest species (eg bees, exotic birds, such as Indian Miners)
- Nest box condition and maintenance requirements



LEGEND

- Site boundary (approx only)
- Location of Nest Box
- Railway
- Major Watercourse
- Assisted Natural Regeneration
- Biodiversity Offset Area
- Box Gum Woodland (CEEC)
- Box Gum Woodland (CEEC) Regeneration
- Box Gum Woodland Derived Native Grassland (CEEC)
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Existing Approved Habitat Management Area
- Habitat Management Area
- Joarmin Creek Management Area
- Rehabilitated Area – Biodiversity Values or Grazing
- Rehabilitated Area – Grazing
- Rehabilitated Areas – Biodiversity Values
- Rehabilitation Area – Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (PCT 1330)

0 0.5 1 km

Scale: 1:30,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 28-Feb-2024
Project Number: 630.V13844

Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (December, 2023)
Conservation and Management Areas digitised from (Umwelt, 2018)

SLR

NEST BOX LOCATIONS

FIGURE 7

Path: H:\Projects-SLR\630-SrvNTL\630-NTL\630.V13844.00001 Lynwood Quarry Ecological Moni\06 SLR Data\01 CADGIS\GIS\630V13844_LynwoodEcologicalMonitoring\630V13844_LynwoodEcologicalMonitoring.aprx\630V13844_F05_NestBoxLocations

2.4 Hoary Sunray Monitoring Methods

Eleven Hoary Sunray monitoring plots have been established as detailed in Table 4 and Figure 8. Plot locations were selected randomly whilst in the field but aiming to include one plot within each of the patches of Hoary Sunray which had been previously mapped on the site (Umwelt 2013). Monitoring plots have been pegged using a metal star-picket at the centre of the plot, fitted with a yellow cap marked with the plot reference.

Table 4: Hoary Sunray Monitoring Plots

Monitoring Plot	Easting (MGA)	Northing (MGA)
Hoary Sunray 1 (HS1)	772565.1	6152919
Hoary Sunray 2 (HS2)	772620	6152739
Hoary Sunray 3 (HS)3	772245.9	6152606
Hoary Sunray 4 (HS4)	771609.9	6152464
Hoary Sunray 5 (HS5)	772046	6152762
Hoary Sunray 6 (HS6)	772158.6	6153676
Hoary Sunray 7 (HS7)	773014.4	6154255
Hoary Sunray 8 (HS8)	773071.2	6153755
Hoary Sunray 9 (HS9)	772905.5	6153843
Hoary Sunray 10 (HS10)	772401.6	6154880
Hoary Sunray 11 (HS11)	773440	6154894

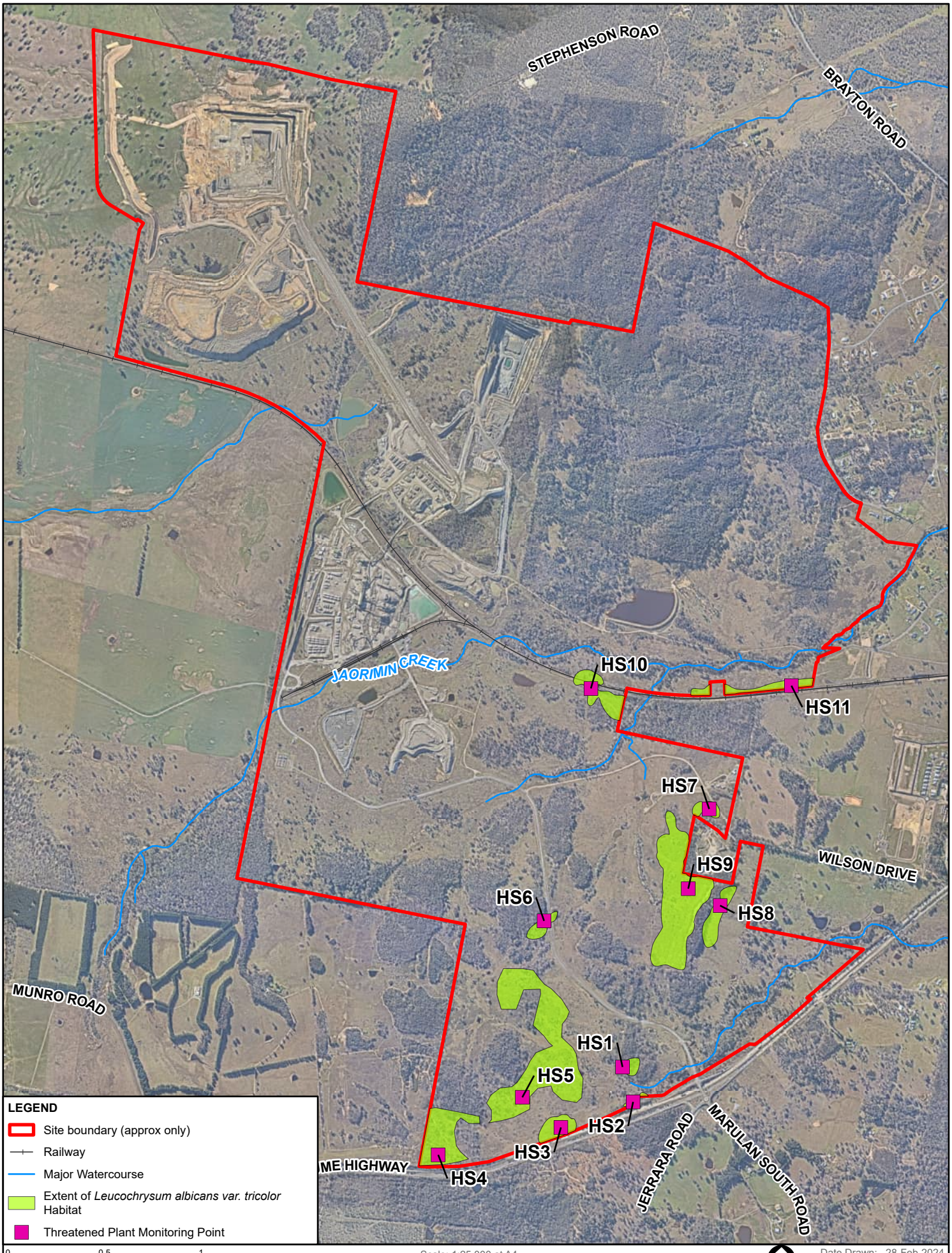
At each monitoring plot accurate counts of individuals of the Hoary Sunray were recorded within a $4m^2$ plot using a series of $1m^2$ quadrats laid out around the centre marker. Notes on disturbance and condition of the population at each plot were made and a reference photo was taken of each $1m^2$ quadrat.

2.5 Rehabilitation Inspection

2.5.1 General Survey

The following notes were recorded within each BAM plot, as required by the RLMP:

- Evidence of natural regeneration.
- The extent of the vegetative cover and species diversity and any requirement for additional revegetation works to be undertaken.
- The general health of the vegetation.
- Any occurrences of weed species in the revegetation area and any requirements for weed control activities.
- Presence of threatened or other significant species.
- Feral animals and the need for control.
- Erosion and the need for repair of eroded areas.
- Fire management.
- Any signs of disturbance, either by animals or humans.
- Evidence of site management (eg fencing and weed control actions).



Scale: 1:25,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 28-Feb-2024
Project Number: 630.V13844

Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (December, 2023)

SLR

HOARY SUNRAY MONITORING SITES

FIGURE 8

Path: H:\Projects-SLR\630-SrvNTL\630-NTL\630.V13844.00001 Lynwood Quarry Ecological Moni\06 SLR Data\01 CADGIS\GIS\630V13844_LynwoodEcologicalMonitoring\630V13844_LynwoodEcologicalMonitoring.aprx\630V13844_F06_HoarySunrayMonitoring

- The success of any management programs implemented following previous monitoring inspections.
- Opportunistic fauna observations.

2.5.2 Biodiversity Offset Area Survey

A general inspection of the biodiversity offset area was also undertaken opportunistically whilst traversing across the site between monitoring plot locations. The survey involved searches for evidence of erosion, collecting notes on weeds and pests, evidence of planting, natural regeneration, and general management.

2.6 Survey Details

2.6.1 Survey Conditions

The current 2023 ecological and rehabilitation monitoring involved winter and spring surveys as detailed in Table 5.

Table 5: Details of the 2023 Ecological and Rehabilitation Monitoring

Date (2023)	Survey Technique	Weather Conditions*
24 July	Nest box inspections	Temp: -2.1°C (min) 13.6°C (max). Rain: 0.0 mm (no rain while onsite). Wind: calm. Moon phase: New moon to first quarter. Sunrise: 6:53am. Sunset: 5:09pm.
25 July	Nest box inspections	Temp: -2.2°C (min) 15.4°C (max). Rain: 0.0 mm (no rain while onsite). Wind: calm. Moon phase: New moon to first quarter. Sunrise: 6:53am. Sunset: 5:10pm.
11 December	Vegetation survey (BAM plots) and fauna (reptile and amphibian survey, spotlighting, bat detection and infrared camera recording)	Temp: 15.7°C (min) 29.7°C (max). Rain: 0.2 mm (light rain during evening survey). Rinds: light. Moon phase: Third quarter to new moon. Sunrise: 5:37am. Sunset: 7:58pm.
12 December	Vegetation survey (BAM plots) and fauna (spotlighting, bat detection and infrared camera recording)	Temp: 16.4°C (min) 27.1°C (max). Rain: 0 mm (no rain while onsite). Wind: calm. Moon phase: Third quarter to new moon. Sunrise: 5:37am. Sunset: 7:59pm.
13 December	Fauna survey (bat detection and infrared camera recording, morning birds) and Hoary Sunray	Temp: 14.1°C (min) 32.6°C (max). Rain: 0 mm (no rain while onsite). Wind: calm. Moon phase: New moon. Sunrise: 5:37am. Sunset: 8:00pm.
* Weather data sourced from BOM (2023) weather station Goulburn Airport (20 km SW of site) and www.timeanddate.com (Sydney 2023)		

2.6.2 Survey Limitations

Survey efficacy is influenced by a range of factors. For this type of survey, such limitations are generally due to a single, short duration survey that does not account for seasonal variation. Given the short period of time spent on site, the detection of certain species may be affected by:

- Seasonal migration (particularly migratory birds).
- Seasonal flowering periods (eg cryptic species unlikely to be detected outside of the known flowering period).

- Seasonal availability of food, such as blossoms for some fauna.
- Weather conditions during the survey period (cycles of activity related to specific weather conditions, eg reptiles and frogs inactive during cold weather).
- Species lifecycle (cycles of activity related to breeding).

2.6.3 SLR Permits and Licenses

The SLR ecology team operates under a Scientific Licence (licence number SL 00176, issued under the BC Act), which authorises field staff to trap, capture, harm, hold and release plants and animals protected under the BC Act and *National Parks and Wildlife Act 1974*, as well as an Animal Research Authority (issued by the Secretary of the NSW Animal Care and Ethics Committee of DPIE), which allows trapping of animals in NSW for the purposes of animal research.

2.7 Staff Roles and Qualifications

The roles and qualifications of all staff responsible for preparation of this report are listed in Table 6.

Table 6 Staff Roles and Qualifications

Staff Name/Title	Qualifications and Training	Role
Jeremy Pepper Technical Director, NSW Ecology Team Lead	Bachelor of Science (Hons Class 1), University of NSW 1996 Cert II Bushland Regeneration, TAFE NSW Cert III Horticulture (Arboriculture), TAFE NSW BAM accredited assessor (#BAAS17104)	Project Director
Fiona Iolini Associate Ecologist	Bachelor of Environmental Science and Management, University of Newcastle 2007 Certificate of Native Plant Identification, Sydney University 2008 Cert III Conservation and Land Management, TAFE NSW 2015 BAM accredited assessor (#BAAS19042)	Project Manager, field surveys, report preparation
David Conder Associate Ecologist	Bachelor of Applied Science, University of New England 1994	Report review
Joshua Drane Project Ecologist	Bachelor of Environmental Science, Australian Catholic University	Field surveys, data analysis, report preparation
Hannah Centra Project Ecologist	Bachelor of Environmental Science and Management, University of Newcastle 2021	Field surveys
James Hugo GIS technician	Master of Environmental Management and Sustainability, University of Newcastle (2020) Bachelor of Science (Hons), University of Newcastle (2016)	GIS data management and figure preparation

3.0 Results

3.1 Vegetation Monitoring

3.1.1 PCT Floristic Assessment

An assessment of the total number of matching floristic species at each of the monitoring plots (Table 7) indicates that overall, most plots reflect the PCTs as mapped by the SVT mapping. However, R2 is consistently most aligned with PCT 3486 and BG1 and BG2 with PCT 3376 rather than the mapped PCT. Plots that do not have PCTs mapped by the SVT mapping align with PCT 3376 (RM2, RM3, RM4, CR1) or PCT 3373 (RM5).

Table 7: PCT Floristic Assessment

Plot	Mapped PCT (SVT)	PCT code with most matching flora species per year and the total number of matching species				Final matching PCT
		2020	2021	2022	2023	
R1	3643	3643 (16)	n/a	n/a	3643 (21)	3643
R2	3373	3486 (21)	n/a	n/a	3486 (22)	3486
R3	3486	3373, 3486 (24)	n/a	n/a	3643 (25)	3486
R4	3373	3373, 3376 (22)	n/a	n/a	3373, 3486 (15)	3373
RM1	3376	n/a	3376 (3)	3373, 3376 (1)	3376 (11)	3376
RM2	n/a	n/a	3376 (12)	3376 (13)	3373, 3376 (14)	3376
RM3	n/a	n/a	3376 (10)	3373, 3376 (9)	3376 (5)	3376
RM4	n/a	n/a	3373, 3376 (9)	3373, 3376, 3486 (11)	3376 (11)	3376
RM5	n/a	n/a	3373, 3376 (12)	3373 (11)	3373 (8)	3373
BG1	3373	n/a	3376 (20)	3376 (20)	3376 (24)	3376
BG2	3643	n/a	3373, 3376 (19)	3376 (17)	3373, 3376 (13)	3376
CR1	n/a	n/a	n/a	3373, 3376 (6)	3376 (5)	3376
CR2	3373	n/a	n/a	3373 (13)	3373 (14)	3373

According to the species profiles (Appendix A) the PCTs at the monitoring plots in 2023 typically contain the following key species:

- PCT 3486 ‘Wollondilly - Shoalhaven Slopes Grassy Open Forest’ *Eucalyptus macrorhyncha*, *Eucalyptus bridgesiana*, *Lissanthe strigosa*, *Olearia viscidula*, *Bursaria spinosa*, *Hibbertia obtusifolia*, *Microlaena stipoides* and *Echinopogon ovatus*.
- PCT 3643 ‘Bungonia Tableland Silvertop Ash-Stringybark Forest’ *Eucalyptus sieberi*, *Eucalyptus agglomerata*, *Allocasuarina littoralis*, *Persoonia linearis*, *H. obtusifolia*, *Goodenia hederacea*, *Lomandra obliqua*, *Pomax umbellata*.
- PCT 3373 ‘Goulburn Tableland Box-Gum Grassy Forest’ *Eucalyptus melliodora*, *E. macrorhyncha*, *Eucalyptus blakelyi*, *Eucalyptus dives*, *L. strigosa*, *Pimelea curviflora*, *Melichrus urceolatus*, *H. obtusifolia*, *Themeda triandra*, *M. stipoides*, *Poa sieberiana*, *Elymus scaber*, *Aristida ramosa, Lomandra filiformis*, *Lomandra multiflora*, *Goodenia hederacea*, *Hydrocotyle laxiflor*a, *Oxalis perennans*,

Chrysocephalum apiculatum, *Tricoryne elatior*, *Gonocarpus tetragynus*, *Hypericum gramineum*.

- PCT 3376 'Southern Tableland Grassy Box Woodland' *E. melliodora* or *E. bridgesiana*, *E. blakelyi*, *M. urceolatus*, *L. strigosa*, *Acacia* spp., *H. laxiflora*, *Austrostipa scabra*, *Lomandra filiformis*, *M. stipoides* and *E. scaber*).

PCT 3373 and PCT 3376 which was recorded at 10 of the 13 plots, corresponds to the national and state listed CEEC known as White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSC 2024, DCCEEW 2024b).

A full list of species common to each PCT is included in Appendix A. Dominant species at each of the monitoring plots is indicated in Table 8. The dominant species have been defined as being the top three species in each structural layer with the highest cover scores in 2023.

Table 8: Dominant Native Plant Species at Monitoring Plots in 2023

Plot (PCT)	Tree	Shrub	Grass & Grass-like	Forb	Fern	Other
R1 (3643)	*Eucalyptus agglomerata*, *E. sieberi*, *Acacia decurrens*	*Cassinia sifton*, *Exocarpos strictus*, *Hibbertia obtusifolia*	*Austrostipa densiflora*, *Entolasia stricta*, *Rytidosperma racemosum*	*Goodenia hederacea*, *Einadia hastata*, *Gonocarpus tetragynus*	Nil	*Hardenbergia violacea*
R2 (3486)	*E. eugenioides*, *E. globoidea*, *E. cinerea*	*C. sifton*, *Acacia, mearnsii*, *Lissanthe strigosa*	*Microlaena stipoides*, *Poa sieberiana*, *A. densiflora*	*G. tetragynus*, *Lagenophora stipitata*, *Opercularia diphylla*	*Cheilanthes sieberi*	*Nil*
R3 (3486)	*E. agglomerata*, *Allocasuarina littoralis*, *E. cinerea*	*Cassinia aculeata*, *C. sifton*, *Olearia viscidula*	*P. sieberiana*, *Rytidosperma tenuius*, *A. densiflora*	*Stypandra glauca*, *G. hederacea*, *Hydrocotyle laxiflora*	*C. sieberi*	*Billardiera scandens*
R4 (3373)	*E. melliodora*, *A. littoralis*, *E. blakelyi*	*C. sifton*, *L. strigosa*	*Carex inversa*, *R. tenuius*, *Juncus sarophorus*	*G. tetragynus*, *L. stipitata*, *O. diphylla*	Nil	Nil
RM1 (3376)	*E. blakelyi*, *E. sieberi*, *E. bridgesiana*	*A. mearnsii*, *Acacia obtusifolia*, *Acacia ulicifolia*	*Chloris truncata*	*Geranium solanderi*, *Einadia trigonos*, *Erodium crinitum*	Nil	Nil
RM2 (3376)	*E. melliodora*	*C. sifton*, *C. aculeata*, *Astroloma humifusum*	*Aristida vagans*, *A. densiflora*, *Eragrostis leptostachya*	*Gonocarpus tetragynus, G. hederacea, Euchiton involucratus*	*C. sieberi*	Nil
RM3 (3376)	Nil	*C. sifton*	*Juncus usitatus*, *Eragrostis benthamii*, *Rytidosperma fulvum*	*Wahlenbergia gracilis*	Nil	Nil
RM4 (3376)	*E. agglomerata*, *E. macrorhyncha*, *A. decurrens*	C. sifton, *C. aculeata*	*Austrostipa scabra* subsp. *falcata*,	*E. trigonos*	*C. sieberi*	Nil

Plot (PCT)	Tree	Shrub	Grass & Grass-like	Forb	Fern	Other
			M. stipoides, *R. racemosum*			
RM5 (3373)	Nil	*C. Sifton, C. aculeata*, *Kunzea parvifolia*	*M. stipoides*, *E. benthamii*, *J. usitatus*	*Hydrocotyle sibthorpioides*, *E. involucratus*	Nil	Nil
BG1 (3376)	*E. blakelyi*, *E. bridgesiana*	*C. sifton*, *L. strigosa*	*A. scabra* subsp. *falcata*, *Lomandra multiflora*, *Themeda triandra*	*H. sibthorpioides*, *G. tetragynus*, *O. diphylla*	Nil	Nil
BG2 (3376)	*E. blakelyi*, *E. agglomerata*, *A. littoralis*	*C. sifton*, *C. aculeata*	*A. scabra* subsp. *falcata*, *L. multiflora*, *A. densiflora*	*G. tetragynus*, *W. gracilis*, *S. glauca*	Nil	Nil
CR1 (3376)	*Acacia parramattensis*	*C. sifton*	*J. usitatus*, *Sporobolus creber*	*G. solanderi*, *Haloragis hetrophylla*	Nil	Nil
CR2 (3373)	*A. littoralis*, *E. blakelyi*, *A. parramattensis*	*C. sifton*, *O. viscidula*, *Cassinia uncata*	*M. stipoides*, *A. scabra* subsp. *falcata*, *R. racemosum*	*Veronica plebeia*, *Oxalis radicosa*, *G. teucrioides*	Nil	Nil

3.1.2 Retained Vegetation Plots

The retained vegetation monitoring plots are assessed against benchmark values for species richness and species cover of target PCT species in Figure 9 and Figure 10, respectively. Tables of analysed data used to create the Figures are included in Appendix B. The species richness of trees ranges from 2-3 and is below the benchmark at all plots but has not declined over the monitoring period. The species cover of trees ranges from 0.2-35% and is typically below benchmark except for R4 which has reached benchmark in 2023.

The species richness of shrubs ranges from 2-9 and is below benchmark but has increased over the monitoring period, particularly at R3 which is now almost at benchmark. The species cover of shrubs ranges from 0.3-85.4% and has noticeably increased over the monitoring period such that most retained vegetation plots are now within or well above benchmark. R3 has seen a significant rise in shrub cover, whilst shrubs at R2 remain low and below benchmark.

The species richness of grass and grass-like ranges from 3-6 and is below the benchmark at all plots. There has been a slight decrease in species richness for grass and grass-like species across the monitoring period. Grass and grass-like covers range from 0.6-30.8, with scores varying across the plots. R1 and R2 have increased, whilst R3 and R4 have decreased. R1 and R4 have consistently remained below benchmarks, whilst R2 has been within benchmark across the monitoring program. The cover of grass and grass-like has declined significantly at R3.

Forb species richness ranges from 5-13 and is below benchmark for all plots. There has been a slight decrease in species richness for forb species across the monitoring period. The cover of forbs ranges from 0.7-52.1, with scores varying across the plots. R1 has increased such that it is now within benchmark. R2 and R4 have been consistently below benchmarks with scores decreasing in 2023. R3 has also decreased significantly in 2023 but has remained within benchmark.

Fern species richness ranges from 0-1 and is below benchmark for all plots but has not changed over the monitoring period. Fern covers have ranged from 0-0.2 which is below benchmark for PCT 3486 plots, but within benchmark of nil for the other PCTs.

'Other' growth form species richness ranges from 0-2 and is below benchmark for all plots except for R1 in 2020. R1 recorded one less 'other' species in 2023, whilst R3 recorded one additional 'other' species in 2023. Other covers have ranged from 0-0.3 which is below benchmark for PCT 3486 plots, other PCTs having a benchmark of nil.

Slight decline in species richness in the ground layer growth forms may be explained by the increasing density in the shrub layer.

Figure 9: Native Species Richness for Retained Vegetation Plots

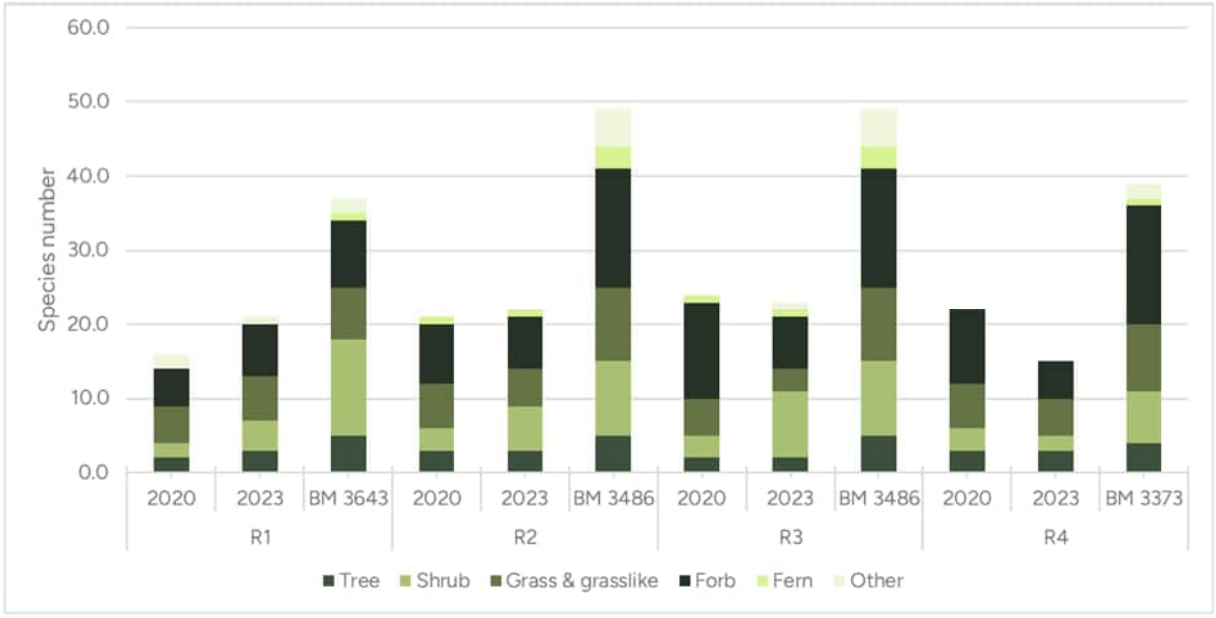
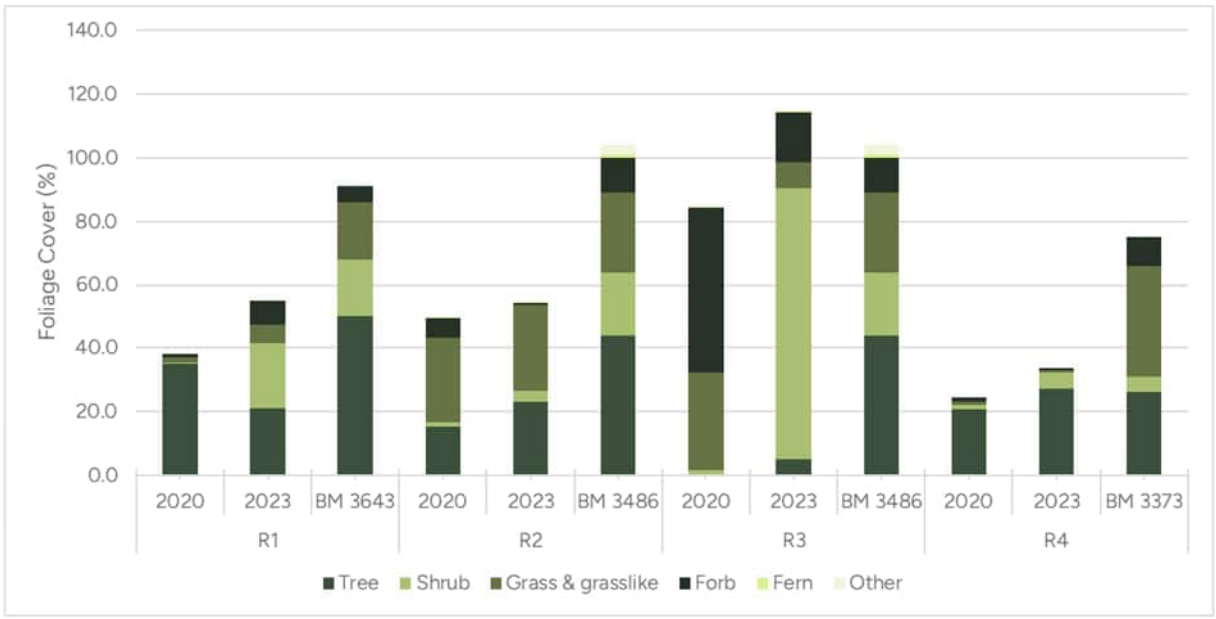


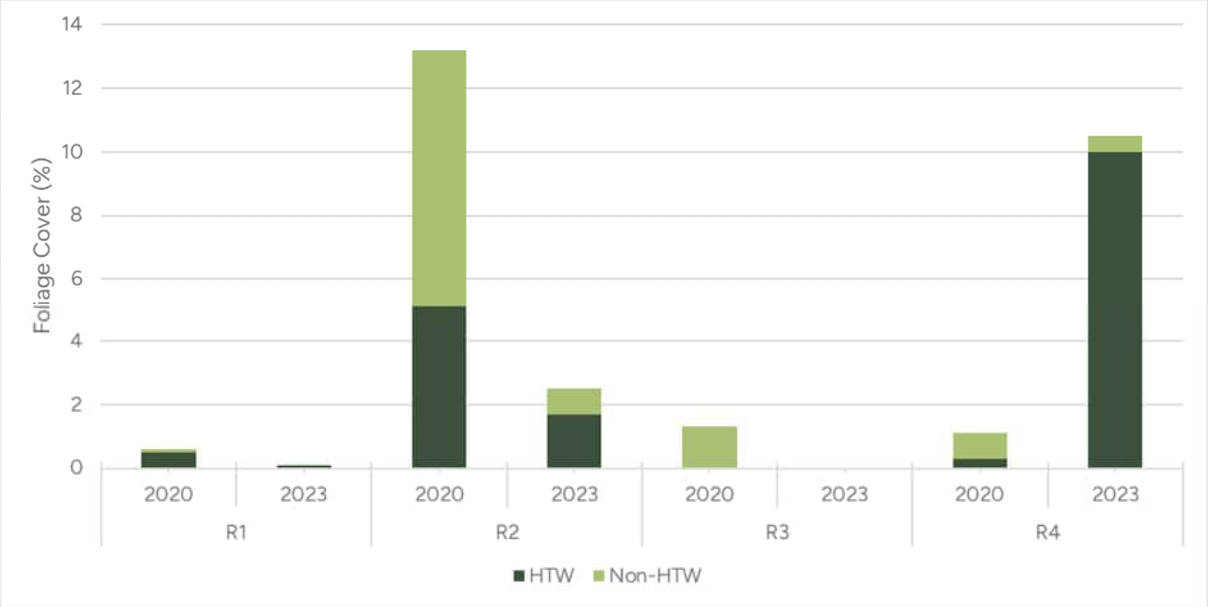
Figure 10: Native Species Cover for Retained Vegetation Plots



Exotic species covers for retained vegetation plots are represented in Figure 11, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 0-10% and the non-HTW covers have ranged from 0-8.1%. Weed covers were

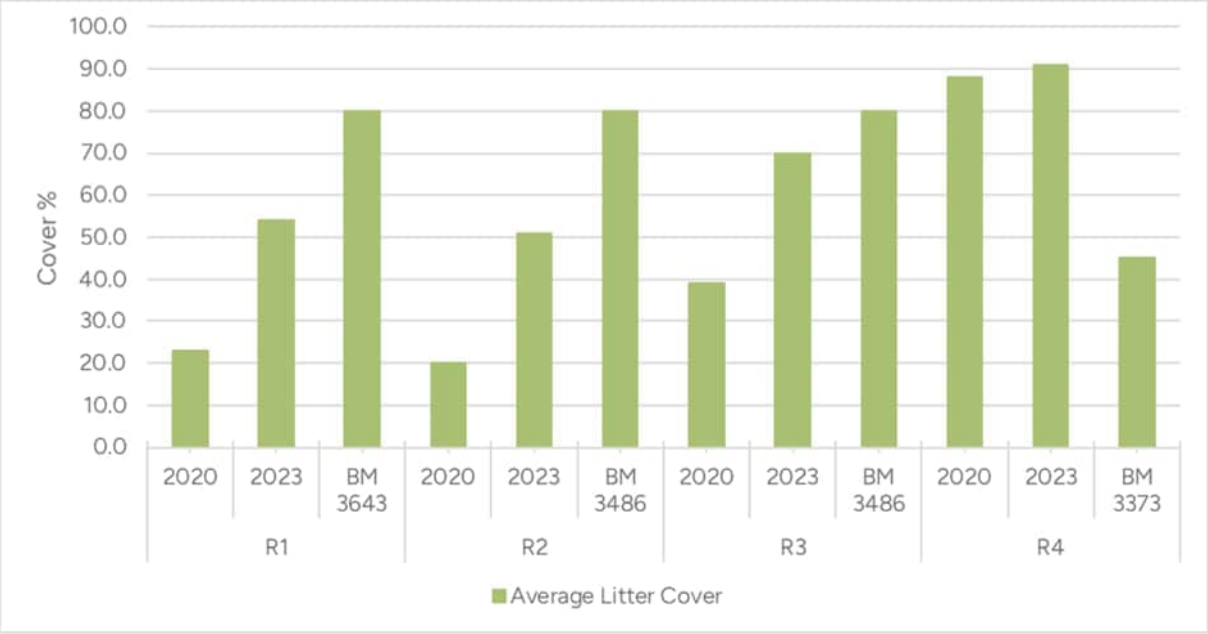
highest at R2 in 2020, but have significantly decreased in 2023, whilst weed covers have significantly increased at R4 in 2023.

Figure 11 Exotic Species Cover for Retained Vegetation Plots



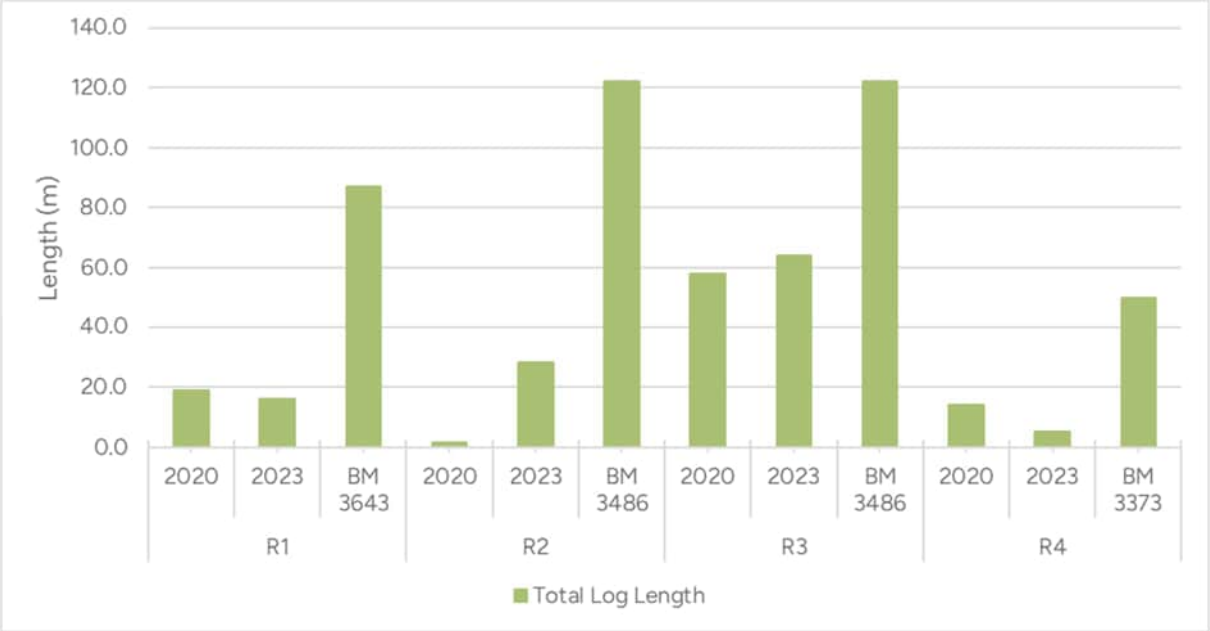
The retained vegetation monitoring plots are assessed against benchmark values for litter cover in Figure 12. Litter scores have ranged from 20-91% across the monitoring period. The data shows that litter scores have increased at all plots between 2020 and 2023. Most plots remain below benchmarks for litter, except for R4 which has remained well above benchmark across the monitoring period.

Figure 12: Litter Cover for Retained Vegetation Plots



The retained vegetation monitoring plots are assessed against benchmark values for total log length in Figure 13. The data shows that total log lengths have ranged from 1.5-64m across the monitoring period and are consistently below benchmark values. The total log lengths have decreased at R1 and R4 but have increased at R2 and R3.

Figure 13: Total Log Length for Retained Vegetation Plots



An assessment of vegetation integrity is provided in Figure 14. The graphs shows that composition improved or remained the same at R1 and R2 but declined at R3 and R4. Structure improved at all plots except R3. Function improved at R2 and R3 but declined at R1 and R4. Overall, the vegetation integrity, which is an indicator of vegetation condition, improved at R1 and R2 but declined at R3 and R4.

Figure 14: Vegetation Integrity Assessment for Retained Vegetation Plots

3.1.3 Rehabilitation Monitoring Plots

The rehabilitation monitoring plots are assessed against benchmark values for species richness and species cover in Figure 15 and Figure 16, respectively. Tables of analysed data used to create the Figures are included in Appendix B. The species richness of trees ranges from 0-3 and is below the benchmark at all plots but has not declined over the monitoring period. The species cover of trees ranges from 0-10% and is below benchmark

for all plots, having remained nil or decreased slightly at most plots except RM1 which increased slightly due to planting efforts.

The species richness of shrubs ranges from 0-3 and is below benchmark but has increased or remained the same over the monitoring period. The species cover of shrubs ranges from 0-45.2% and has noticeably increased over the monitoring period such that most rehabilitation monitoring plots are now within or well above benchmark.

The species richness of grass and grass-like ranges from 0-6 and is below the benchmark at all plots. There has been a slight increase in species richness for grass and grass-like species at most plots across the monitoring period, except for RM3 and RM5 which decreased slightly. Grass and grass-like covers range from 0-55.2%, with most plots remaining consistently below or declining to below benchmark in 2023. Grass and grass-like covers at RM1, RM2 and RM3 all increased across the monitoring period, with RM3 now within benchmark for species cover in 2023.

Forb species richness ranges from 1-8 and is below benchmark for all plots. There has been a slight decrease in species richness for forb species across the monitoring period, except for RM1 which increased. The cover of forbs ranges from 0.1-30.1%, with most plots being consistently below benchmark and experiencing an overall decline in cover over the monitoring period. The exception is at RM2 and RM3 where the cover of forbs has increased over the monitoring period such that RM2 is now well within benchmark.

Fern species richness ranges from 0-1 and is at or just below benchmark for all plots, having only changed slightly across the monitoring period (increase or decrease by one value at two plots). Fern covers have ranged from 0-0.5 which is at or above the benchmark of nil.

'Other' growth form species richness and cover has been consistently nil across the monitoring period and is below benchmark for all plots except RM5 which has a benchmark of nil.

Overall, the native species richness and cover has increased at RM1 due to the plot repositioning to the outer face of the amenity bund which has been planted with native species. The remaining plots have only seen slight changes to species richness, but cover has increased, particularly in the shrub layers which is likely due to increased rainfall and cessation of slashing practises. Sifton Bush *Cassinia sifton* has become prolific within the passive rehabilitation areas.

Figure 15: Native Species Richness for Rehabilitation Monitoring Plots

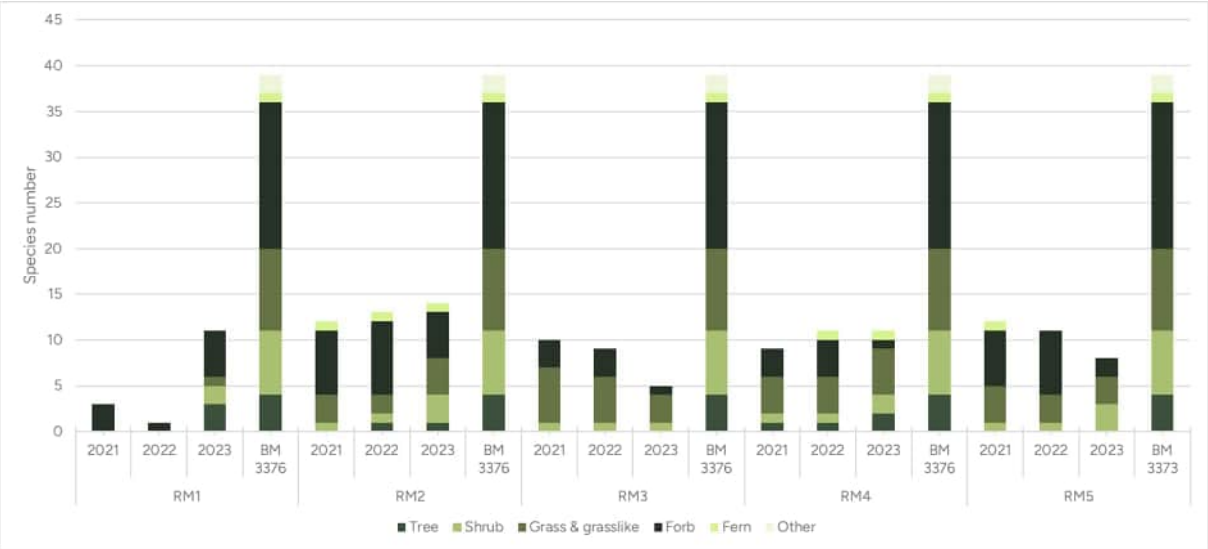
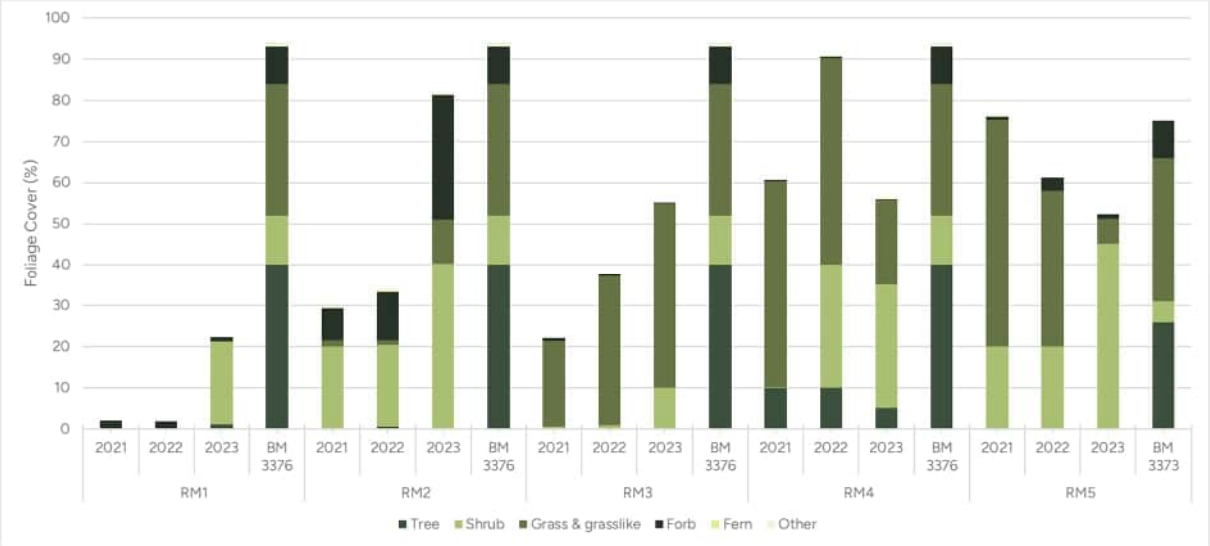
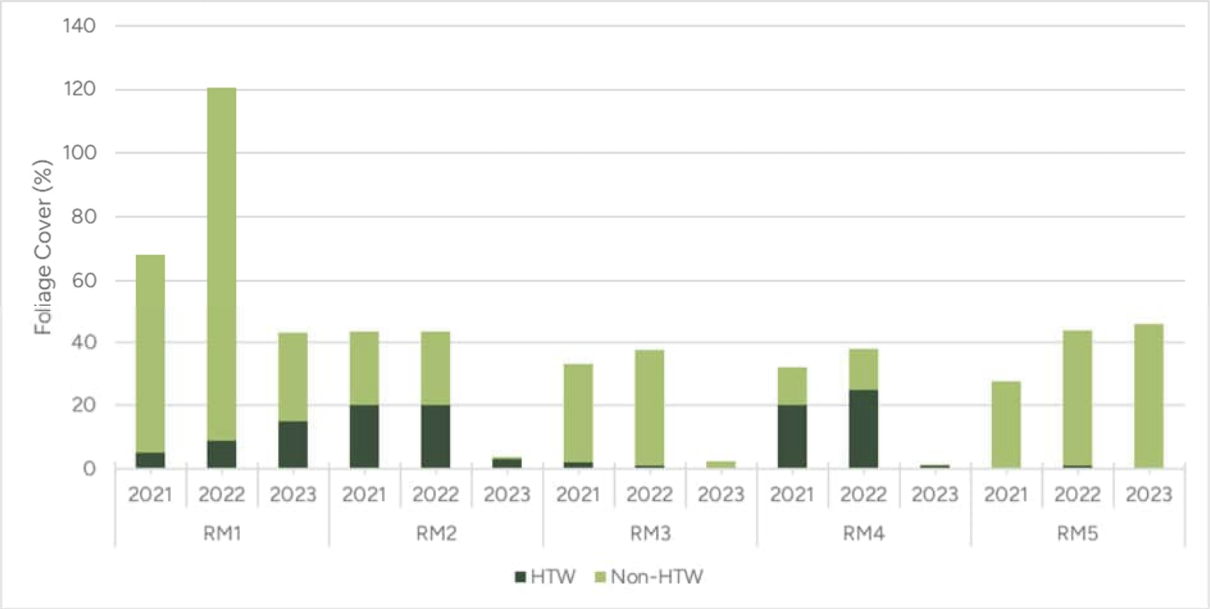


Figure 16: Native Species Cover for Rehabilitation Monitoring Plots



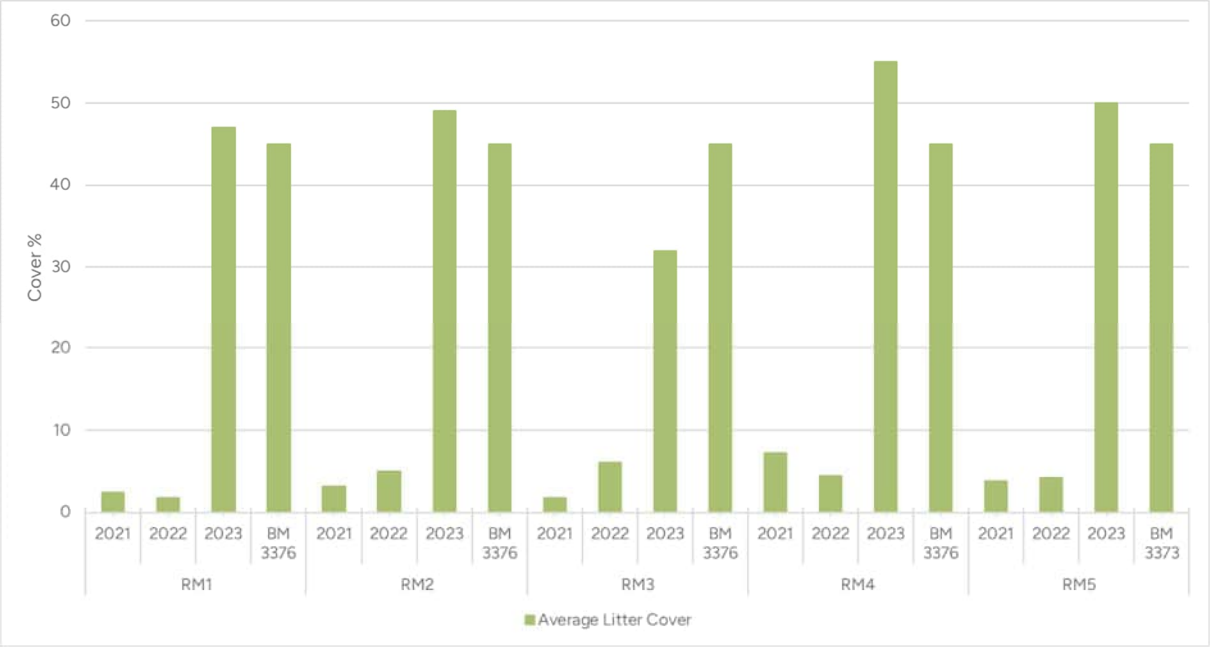
Exotic species covers for rehabilitation monitoring plots are represented in Figure 17, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 0.1-25% and the non-HTW covers have ranged from 0.5-111.17%. Weed covers were highest at RM1 in 2022 but have significantly decreased in 2023 (mostly due to plot relocation). Weed covers have decreased at most plots in 2023, except for RM5 which experience a slight increase in weeds.

Figure 17: Exotic Species Cover for Rehabilitation Monitoring Plots



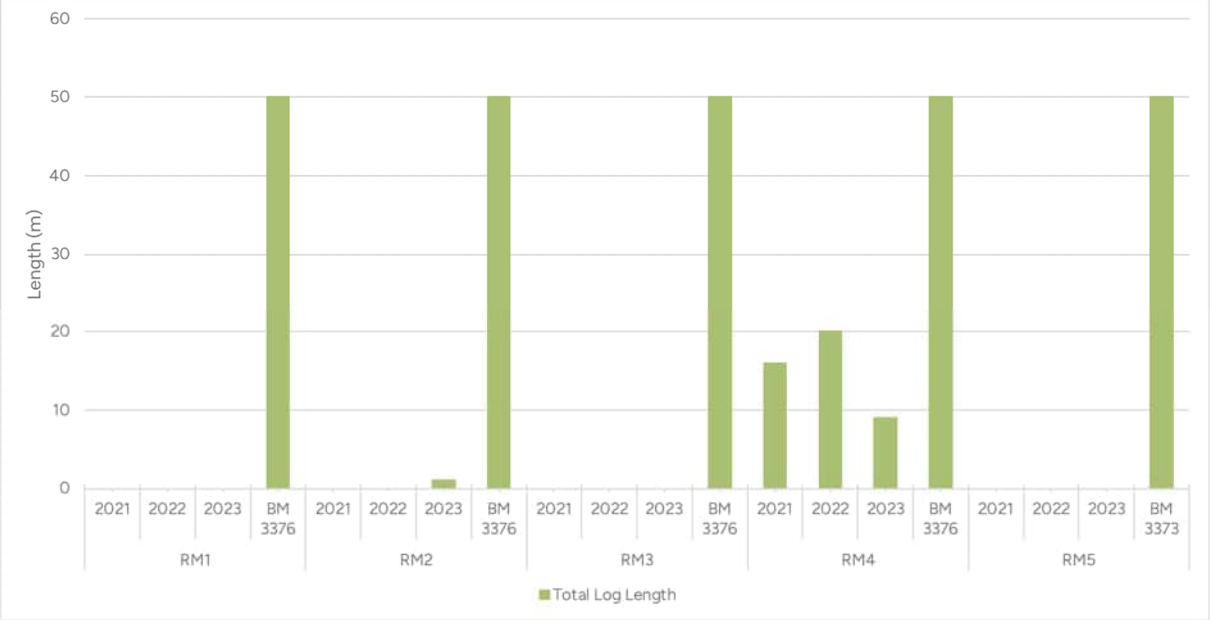
The rehabilitation monitoring plots are assessed against benchmark values for litter cover in Figure 18. Litter scores have ranged from 1.8-55% across the monitoring period. The data shows that litter scores have increased at all plots between 2020 and 2023. Most plots are now above benchmarks for litter, except for RM3 which is just below benchmark.

Figure 18: Litter Cover for Rehabilitation Monitoring Plots



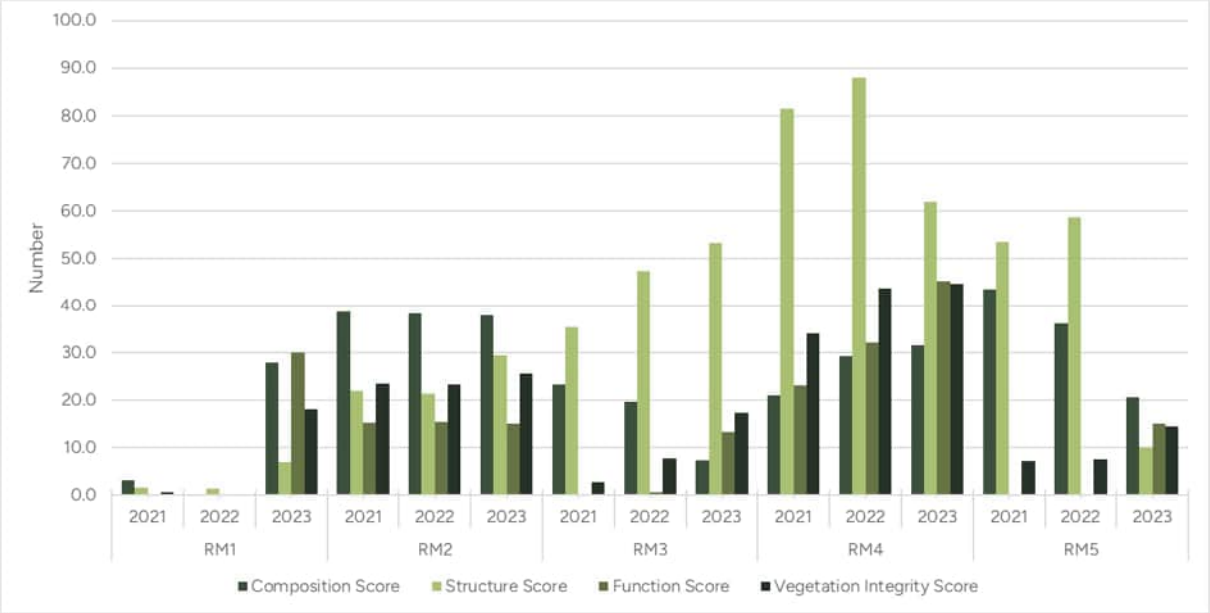
The rehabilitation monitoring plots are assessed against benchmark values for total log length in Figure 19. The data shows that total log lengths have ranged from 0-20m across the monitoring period and are consistently below benchmark values.

Figure 19: Total Log Length for Rehabilitation Monitoring Plots



An assessment of vegetation integrity for rehabilitation monitoring plots is provided Figure 20. The graph shows that composition improved or remained the same at RM1, RM2 and RM4 but declined at RM3 and RM5. Structure improved at all plots except RM4 and RM5. Function improved all plots. Overall, the vegetation integrity, which is an indicator of overall vegetation condition, improved at all plots.

Figure 20: Vegetation Integrity Assessment for Rehabilitation Monitoring Plots



3.1.4 Box-Gum Monitoring Plots

The Box-Gum monitoring plots are assessed against benchmark values for species richness and species cover in Figure 21 and Figure 22, respectively. Tables of analysed data used to create the Figures are included in Appendix B. The species richness of trees ranges from 2-4 and is below the benchmark at all plots having declined slightly over the monitoring period. Similarly, the species cover of trees ranges from 6-15.2% and is below benchmark for all plots and has decreased at all plots over the monitoring program. It is thought that some storm damage may have contributed to the decline in tree diversity and cover at these plots.

The species richness of shrubs ranges from 1-2 and is below benchmark but has increased or remained the same over the monitoring period. The species cover of shrubs ranges from 20.2-60% which has consistently been well above the benchmark.

The species richness of grass and grass-like ranges from 5-9 and has typically been below the benchmark, except for BG1 which is now within benchmark in 2023. There has been a slight increase in species richness for grass and grass-like species at BG1 across the monitoring period, but BG2 has decreased slightly. Grass and grass-like covers range from 1.3-55.6%, with most plots remaining consistently below or declining to below benchmark in 2023.

Forb species richness ranges from 2-11 and is below benchmark for all plots. There has been a slight increase in species richness for forb species at BG1 across the monitoring period, but BG2 has decreased. The cover of forbs ranges from 0.3-7.7%, being consistently below benchmark and experiencing an overall decline in cover over the monitoring period.

Fern species richness ranges from 0-1 and has typically been below benchmark for all plots. Fern covers have ranged from 0-0.1 which is at or above the benchmark of nil.

'Other' growth form species richness and cover has been consistently nil across the monitoring period and is below benchmark.

Overall, the native species richness and cover at the Box-Gum monitoring plots has remained or fallen below benchmark and has varied slightly throughout the survey period. An increase in the shrub layer appears to have affected ground cover species diversity and covers at the Box-Gum monitoring plots.

Figure 21: Native Species Richness for Box-Gum Monitoring Plots

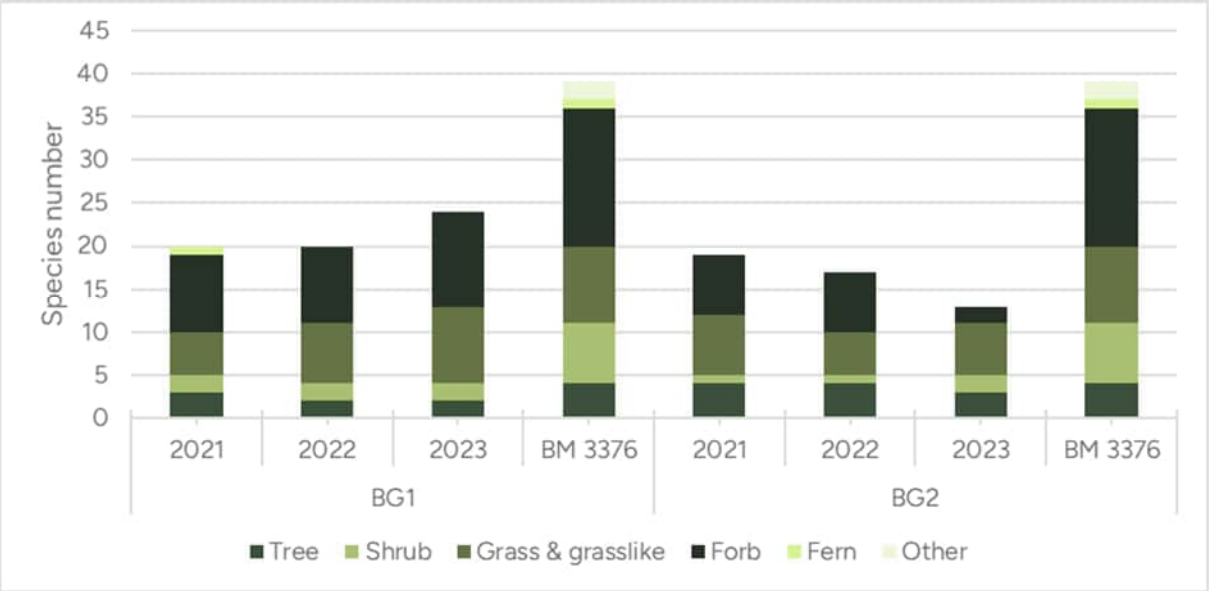
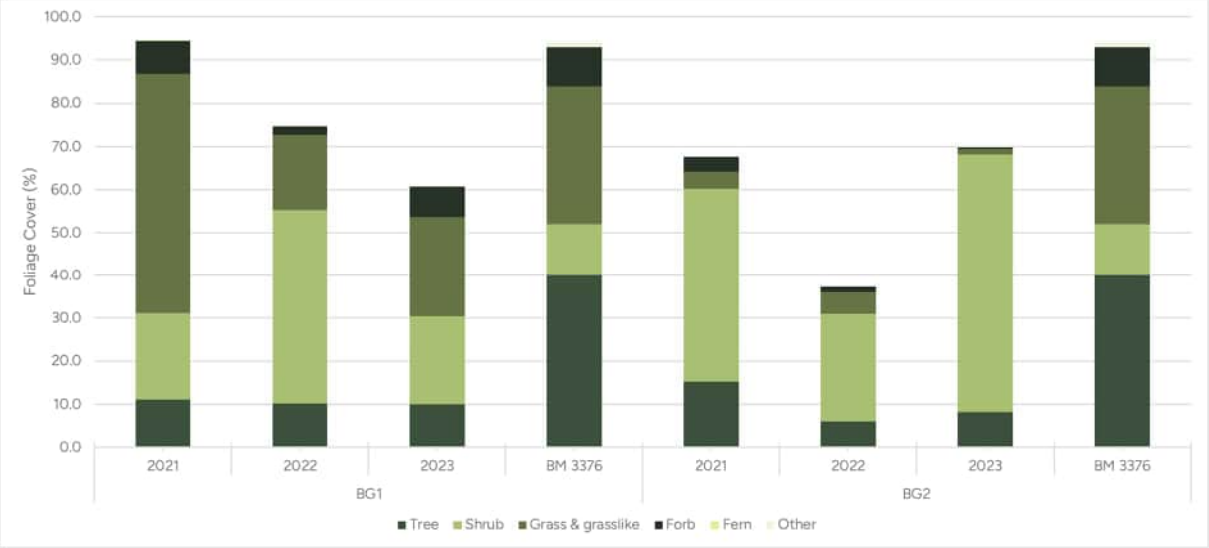
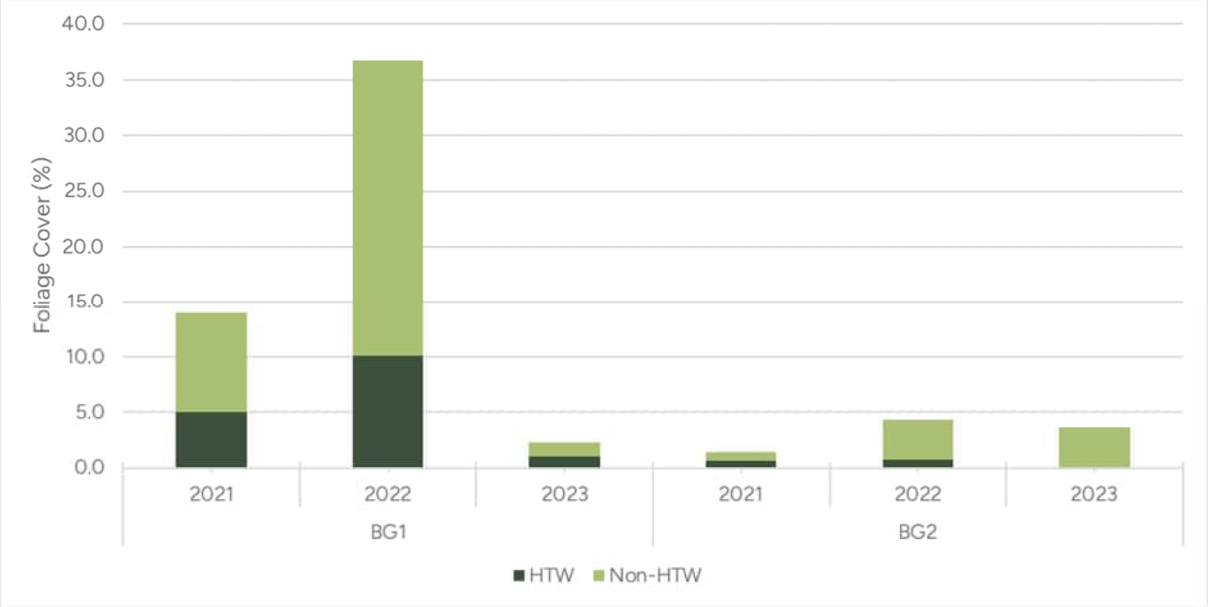


Figure 22: Native Species Cover for Box-Gum Monitoring Plots



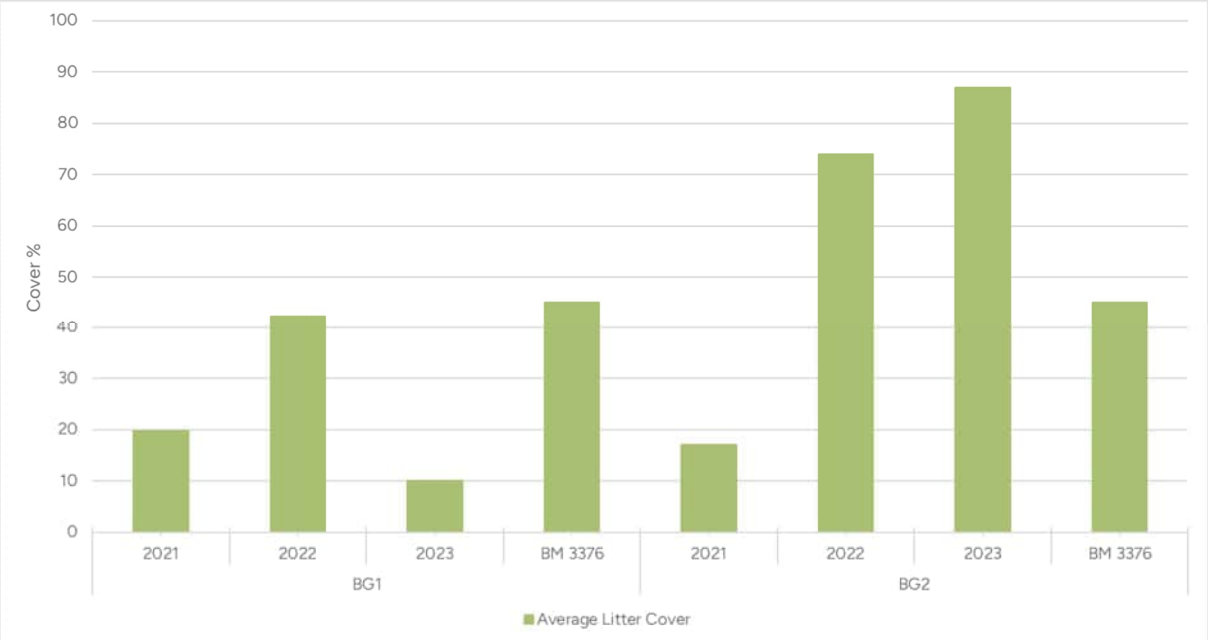
Exotic species covers for Box-Gum monitoring plots are represented in Figure 23, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 0.1-10.1% and the non-HTW covers have ranged from 0.8-26.6%. Weed covers were highest at BG1 in 2022, but have significantly decreased in 2023, whilst weed covers have remained low at BG2.

Figure 23: Exotic Species Cover for Box-Gum Monitoring Plots



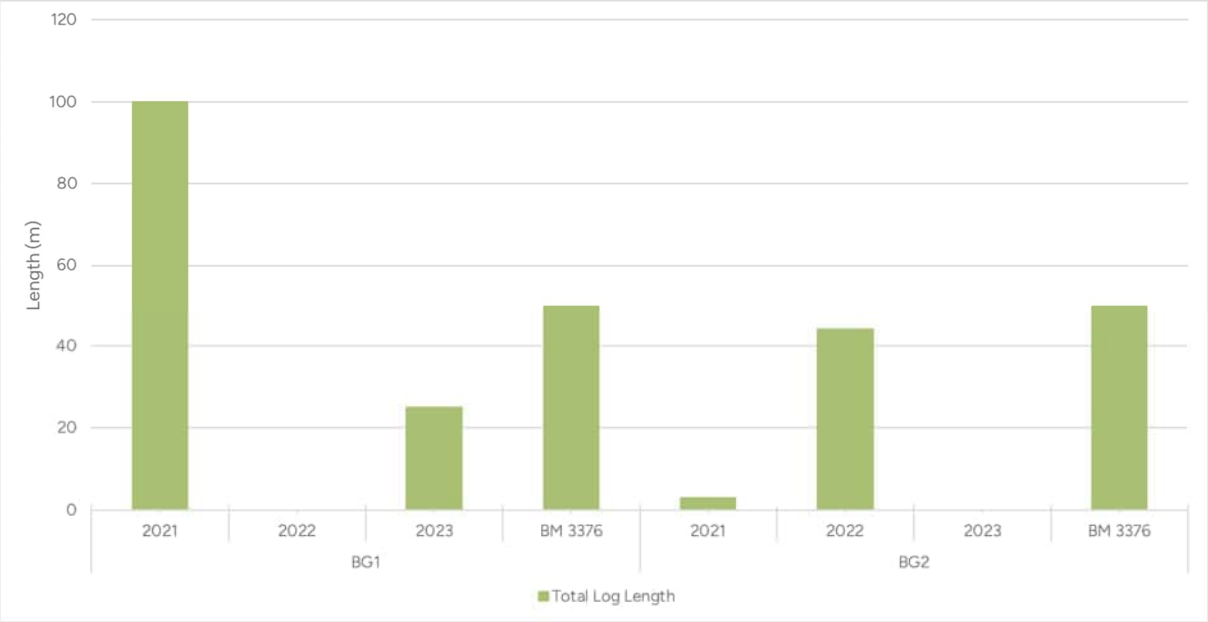
The Box-Gum monitoring plots are assessed against benchmark values for litter cover in Figure 24. Litter scores have ranged from 10-87% across the monitoring period. The data shows that overall litter scores have decreased at BG1 but increased at BG2 between 2020 and 2023. BG1 is below benchmark whilst BG2 has been consistently above benchmark. The ground litter may be affected by surface water flows at BG1 as there is a nearby drainage channel and evidence of sheet erosion was noted in 2023.

Figure 24: Litter Cover for Box-Gum Monitoring Plots



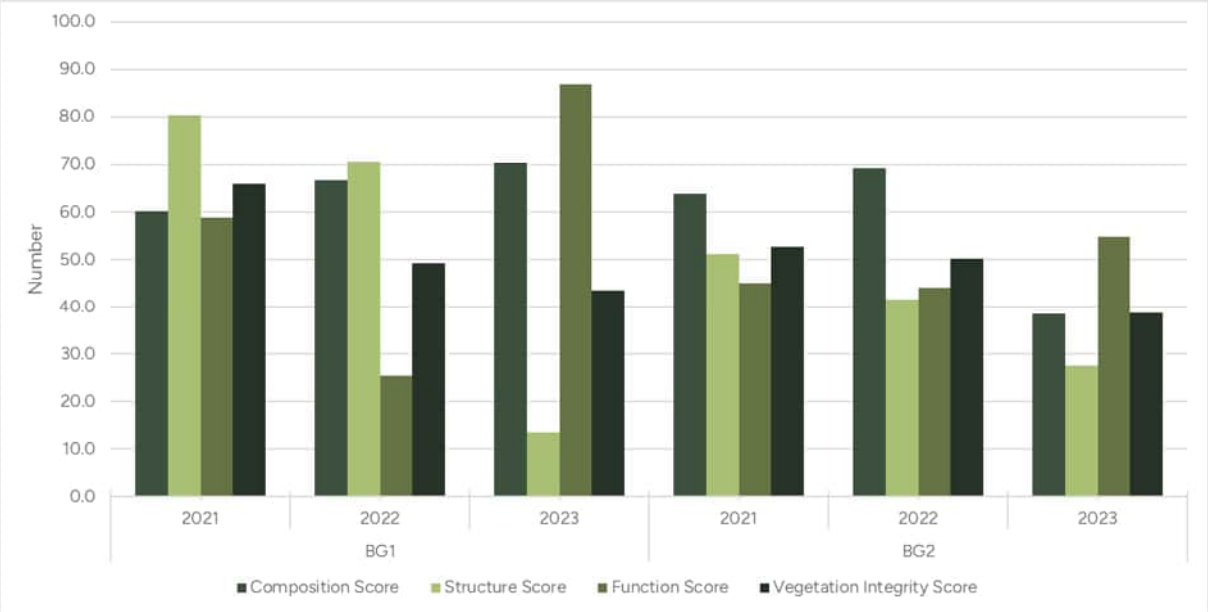
The Box-Gum monitoring plots are assessed against benchmark values for total log length in Figure 25. The data shows that total log lengths have fluctuated substantially, ranging from 0-100m across the monitoring period and more recently scores are below benchmark values.

Figure 25: Total Log Length for Box-Gum Monitoring Plots



An assessment of vegetation integrity for Box-Gum monitoring plots is provided in Figure 26 . The graph shows that composition increased at BG1 but decreased at BG2. Structure has decreased, whilst function has increased at both plots. Overall, the vegetation integrity, which is an indicator of vegetation condition, declined slightly at the Box-Gum monitoring plots.

Figure 26: Vegetation Integrity Assessment for Box-Gum Monitoring Plots



3.1.5 Core Riparian Plots

The core riparian monitoring plots are assessed against benchmark values for species richness and species cover in Figure 27 and Figure 28, respectively. Tables of analysed data used to create the Figures are included in Appendix B. The species richness of trees has consistently ranged from 1-3 over the monitoring period and is below the benchmark at both core riparian plots. The species cover of trees has been consistently below benchmark, ranging from 5-27%, but has shown an increase at both plots over the monitoring program.

The species richness of shrubs has consistently ranged from 1-3 and is below benchmark. The species cover of shrubs ranges from 0.1-39.5% and has risen significantly over the monitoring period such that both plots are now well above the benchmark.

The species richness of grass and grass-like ranges from 2-6 and has remained below the benchmark. There has been a slight increase in species richness for grass and grass-like at CR2 across the monitoring period, but CR1 remains unchanged. Grass and grass-like covers range from 3.5-40.6%, with a substantial increase noted across the monitoring period, such that CR2 is now within benchmark.

Forb species richness ranges from 1-4 and is below benchmark for both core riparian plots. There has been a slight decrease in species richness for forb species at CR2 across the monitoring period, but CR1 remains unchanged. The cover of forbs ranges from 0.1-1.7%, being consistently below benchmark and experiencing and slight increase in cover over the monitoring period.

The 'fern' and 'other' growth form species richness and cover has been consistently nil at both core riparian plots across the monitoring period and is below benchmark.

Overall, the native species richness and cover at the core riparian monitoring plots has improved over the monitoring period, such that some structural layers are now within benchmark. Like the other monitoring locations there was a notable increase in the cover of the shrub layer since the previous monitoring event.

Figure 27: Native Species Richness for Core Riparian Plots

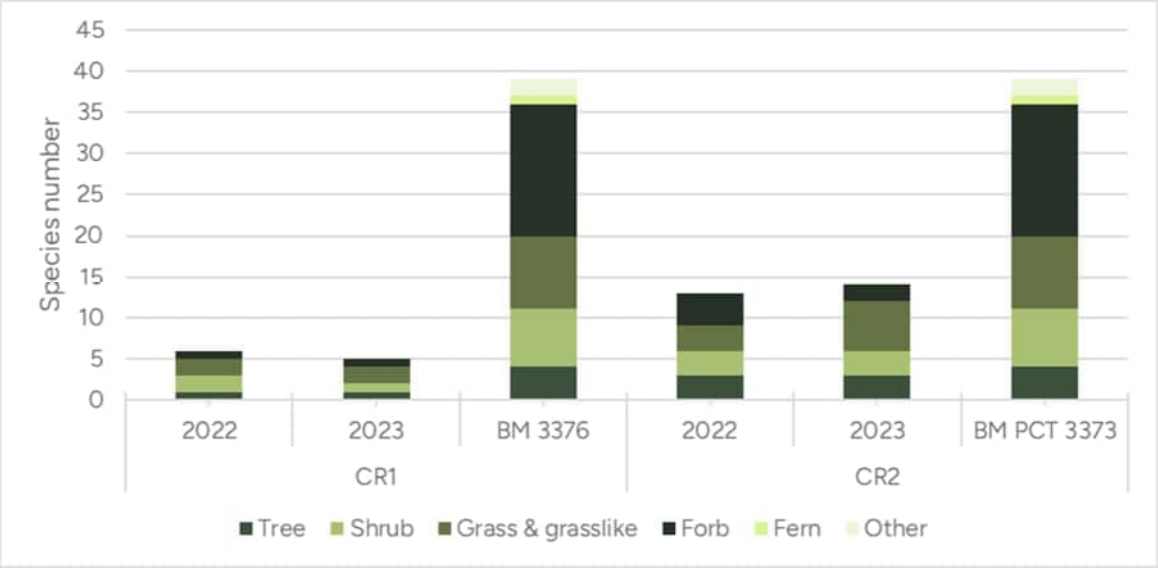
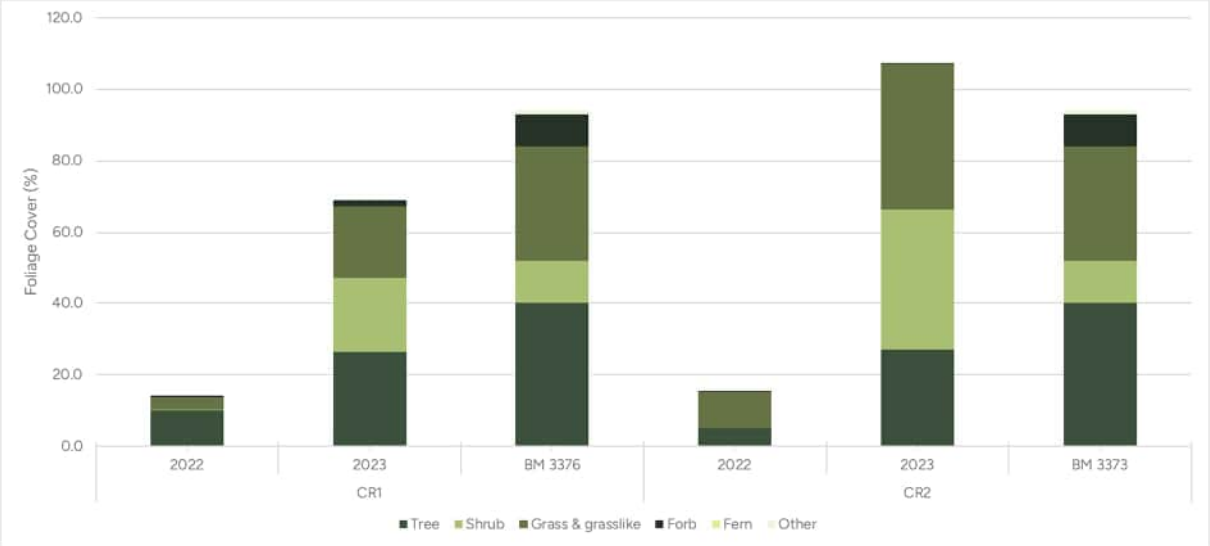
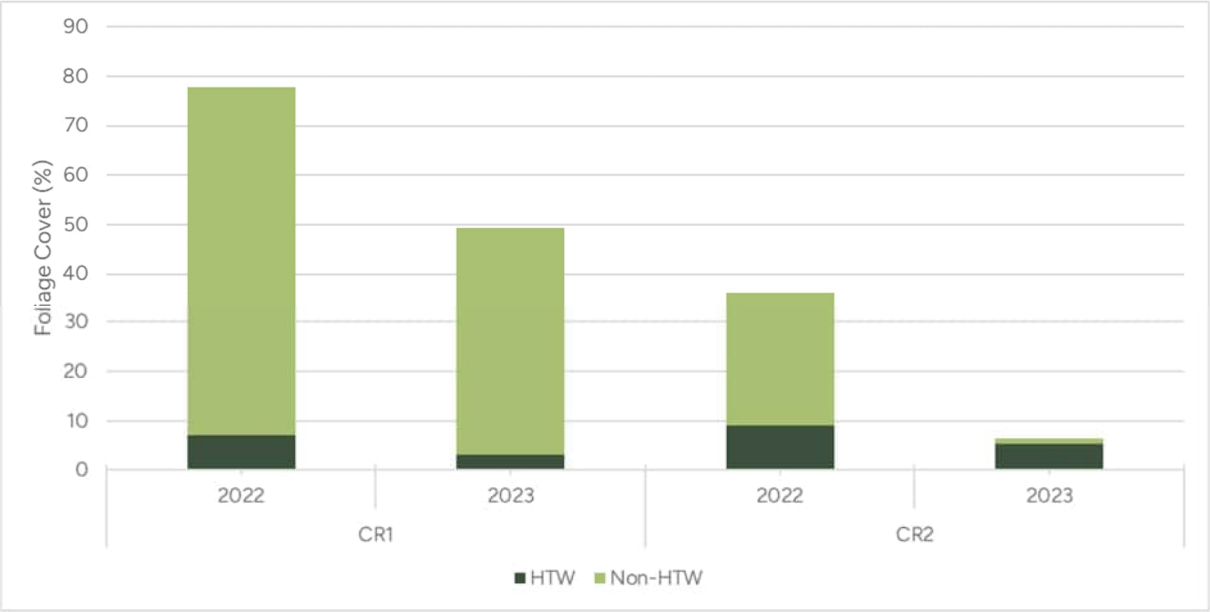


Figure 28: Native Species Cover for Core Riparian Plots



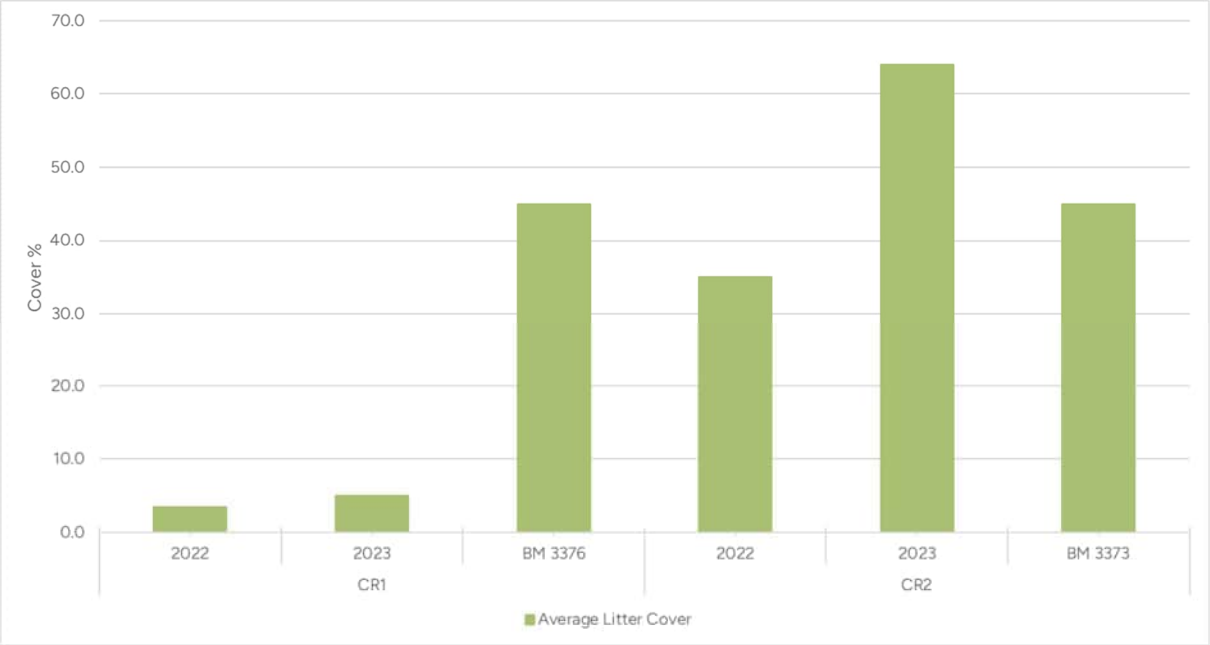
Exotic species covers for core riparian plots are represented in Figure 29, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 3.2-9.1% and the non-HTW covers have ranged from 1.1-70.8%. Weed covers were highest at CR1 in 2022 but have decreased at both core riparian plots in 2023.

Figure 29: Exotic Species Cover for Core Riparian Plots



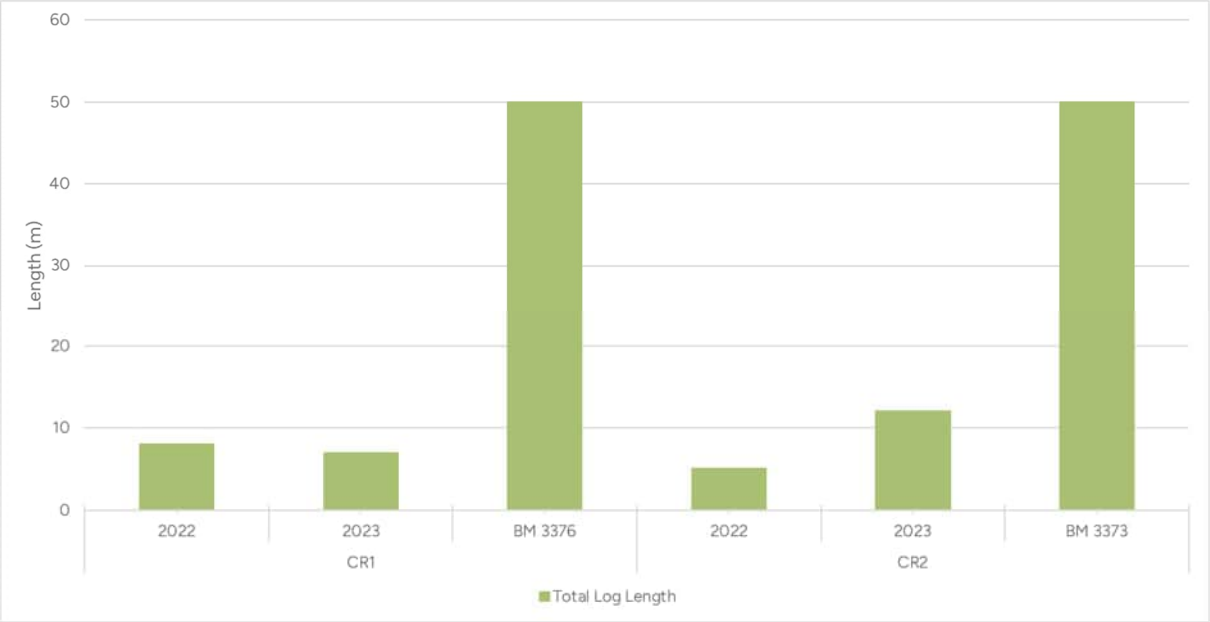
The core riparian monitoring plots are assessed against benchmark values for litter cover in Figure 30. Litter scores have ranged from 3.4-64% across the monitoring period. The data shows that overall litter scores have increased, such that CR2 is now well within benchmark. However, litter cover remains low and below benchmark at CR1.

Figure 30: Litter Cover for Core Riparian Plots



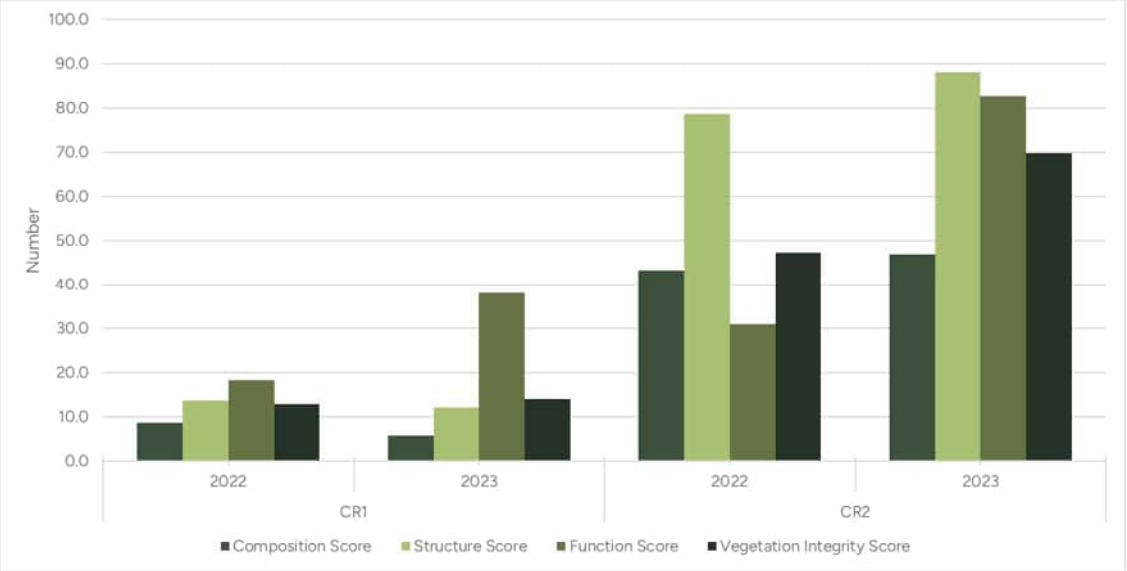
The core riparian monitoring plots are assessed against benchmark values for total log length in Figure 31. The data shows that total log lengths have remained below benchmark and have not changed much, ranging from 5-12m across the monitoring period.

Figure 31: Total Log Length for Core Riparian Plots



An assessment of vegetation integrity for core riparian monitoring plots is provided in Figure 32. The graph shows that composition and structure decreased slightly at CR1 but increased slightly at CR2, whilst function increased notably at both plots. Overall, the vegetation integrity, which is an indicator of vegetation condition, increased at the core riparian monitoring plots.

Figure 32: Vegetation Integrity Assessment for Retained Vegetation Plots



3.2 Fauna Monitoring Results

A total of 47 fauna species were recorded during the 2023 monitoring surveys at the retained vegetation plots (R1, R2, R3, R4), including one reptile, two crustacean, four frog, 14 mammal, and 26 bird species. A summary of fauna species composition per plot is included in Table 9. A complete fauna species list in included in Appendix C.

Table 9: Fauna Species Composition per Monitoring Plot

Fauna group	R1	R2	R3	R4
Total number of birds	12	15	12	12
Total number of Crustacean	0	2	0	0
Total number of frogs	2	1	2	4
Total number of mammals	3	10	5	2
Total number of reptiles	1	1	0	1
Total native	18	26	19	18
Total exotic	0	3	0	1
Total threatened species	0	2	0	0

One threatened species and one potential threatened species were recorded:

- Large Bent-winged Bat *Miniopterus orianae oceanensis*, listed as vulnerable under the BC Act
- Potential record only for the Squirrel Glider *Petaurus norfolcensis*, listed as vulnerable under the BC Act

The following four exotic pest species were recorded:

- Common Myna *Acridotheres tristis*
- Cat *Felis catus*
- European Rabbit *Oryctolagus cuniculus*
- Fox *Vulpes vulpes*

3.3 Nest Box Monitoring

A total of 59 nest boxes were inspected during the winter monitoring event (see Appendix A for complete nest box inventory). Key results are summarised as follows:

- 11 nest boxes were occupied by native fauna, including: eight boxes occupied by either Sugar Gliders or Squirrel Gliders *Petaurus spp*. (six boxes had young), two boxes occupied by Brushtail Possum *Trichosurus vulpecula*, one box contained a deceased Wood Duck *Chenonetta jubata*.
- One nest box contained what appears to be an active Wood Duck nest, containing a feather nest with medium - large fresh eggs.
- 47 of the 59 nest boxes contained nesting material, identified as being a mix of glider nests (leaf material), wood duck nest (bark and leaves with fragments of eggs) and bird nests (sticks and feathers).
- Seven nest boxes were recorded as having chew marks on the entrance, ranging from severe to slight chew marks.
- Three nest boxes were recorded as having pests (inactive wasp nests).
- Five nest boxes require maintenance including:
    - One requiring the removal of an inactive wasp nest.
    - One box needs tightening or replace attachment on the tree.
    - One microbat box needs to be replaced on to a new tree due to a snapped tree branch.
    - Two boxes need to be replaced due to deterioration.

3.4 Hoary Sunray Monitoring

All populations previously mapped by Umwelt (2013) were identified as still present and within roughly the same bounds of the previous mapping, although population extent appears to have reduced in 2023.

Results of the population count, patch size and a population estimate for the plot are included in Table 10. An extrapolation of the plot results estimates the population size at 213,078 plants, which is a significant reduction from the 2020 estimate which has been recalculated as 15,490,172 plants. However, these are likely over-estimates as some areas within the larger patches contained no plants, or very few plants. Increased sampling plots would result in better estimates.

All Hoary Sunray monitoring data, including notes on disturbance and general health, is included in Appendix E. Generally, conditions at most Hoary Sunray monitoring plots appeared to be dry in 2023 with light grazing and weediness recorded at all plots. The overall health of the vegetation was poor or moderate and Sifton Bush was noted as representing competition around many plots.

Table 10: Hoary Sunray Counts and Extrapolated Population Estimate

Plot ID	Number per 1m^2	Patch area (m^2)	Population estimates
HS1	1.5	7566.5	11349.7
HS2	0.3	2440.1	616.1
HS3	0.0	18454.0	0.0
HS4	0.0	53811.8	0.0
HS5	0.0	169143.2	0.0
HS6	4.5	9664.0	43487.9
HS7	5.3	8764.4	46013.2
HS8	0.0	21942.2	0.0
HS9	0.8	130011.2	97508.4
HS10	0.0	28452.8	0.0
HS11	0.8	18803.7	14102.8
Average/Total	**1.2**	**469,053.9**	**213,078.1**

3.5 Rehabilitation Inspection

3.5.1 General Observations

General observations were made at all monitoring plots in 2023 and are included in Appendix B. Natural regeneration was observed at most plots, but for some areas only a very low level of regeneration was occurring. Most of the open paddock areas (eg RM2, RM3, RM5) which are being monitored for natural regeneration are regenerating with very high abundance and cover of Sifton Bush *Cassinia sifton* (see Photo 1), which appears to be resulting in suppression of other native species, including the Hoary Sunray, as well as forming a potential bushfire hazard and limiting access to the monitoring plots. Due to earthworks at RM1 natural regeneration was not occurring, but tree and shrub planting was evident.

Native species cover and diversity varied across the plots but was generally lower at the rehabilitation monitoring plots, particularly in the canopy layer. General vegetation health was overall moderate to good, but generally lower at the rehabilitation monitoring plots. Weeds occur at most plots but were generally lower in 2023 than other years of monitoring. Plots with higher weeds include R4, RM1, RM5 and CR1. Main problematic weeds were Serrated Tussock (see Photo 2), African Lovegrass, Blackberry (see Photo 3) and Sweet Vernal Grass (see Photo 4). The core riparian plot CR2 did not have a high cover of weeds within the plot but Serrated Tussock and Blackberry were noted as highly abundant along the adjacent creek line.

No threatened or significant species were noted at the vegetation monitoring plots. Overall, the Hoary Sunray was less abundant across the Holcim land than previous years. Feral animals recorded at the site in 2023 were mainly made via animal scat observations and include Rabbit/Hare (recorded at most sites), Feral Honeybees (recorded at R3) and European Fox (recorded at RM1 and BG1). Potential rabbit warrens were also noted at RM4 and CR2.

Severe creek erosion was observed at R4 and CR2, and minor sheet erosion was noted at RM1, RM2, RM4 and BG1. There was no evidence of recent fire at any of the plots and fuel loads were moderate at R1, R3, BG1, BG2 and CR2. Sifton Bush may also present a fire hazard at RM2, RM3 and RM5.

Signs of human disturbance include historic clearing at RM3, RM5, CR1, a disused track at RM1 and a small drainage bund at RM4. Signs of animal disturbance include Kangaroo/Wallaby/Rabbit grazing at most plots, with areas of bare ground from Kangaroo mobs at R1. Wombat burrows were noted at R3, BG2 and CR1 and possible rabbit warrens were noted at RM4 and CR2.

Other site management noted include:

- Erosion controls requiring ongoing maintenance at RM1 and CR2.
- Successfully established planting on western side of amenity bund at RM1, with recommendation for log emplacement.
- Perimeter BOA protection fencing successful at RM5/BG1.

Photo 1: Sifton Bush taking over previously cleared paddock areas at RM3

Photo 2: Serrated Tussock grass occurring around the active quarry at RM1

Photo 3: Evidence of successful Blackberry control in northeast of the Quarry

Photo 4 Sweet Vernel Grass in foreground at the southern portion of the BOA

Photo 5: Erosion occurring at R4 in the northeast of the site

3.5.2 Biodiversity Offset Area Observations

The areas of retained Box-Gum woodland vegetation within the BOA (ie 'Box-Gum Woodland (CEEC)' and 'Box-Gum Woodland derived Native Grassland (CEEC)' – see Figure 4) are generally in moderate to good condition and no immediate actions are necessary, other than spot control of high threat weeds, such as Serrated Tussock *Nassella trichotoma* and St John's Wort *Hypericum perforatum*. Open areas in the west of the BOA that appear to have been historically cleared (previously identified as derived native grassland) are naturally regenerating with *Eucalyptus* spp. and *Cassinia sifton* (see Photo 6). Evidence of planting was seen in the southeast of the BOA (Photo 7).

Other parts of the BOA were also generally in moderate to good condition, although control of high threat and priority weeds Serrated Tussock *Nassella trichotoma*, St John's Wort *Hypericum perforatum* and Blackberry *Rubus anglocandicans* is required as patches of these species occur particularly in the southeast portion of the BOA. In 2023 there was a significant increase in the cover and abundance of Sifton Bush *Cassinia sifton*, particularly in disturbed open paddocks. Although this species is native, in the Southern Tablelands it has become a weed of disturbed areas and degraded native pasture (DPI 2024). At present the Sifton Bush is outcompeting native species and may be contributing to a reduction in the Hoary Sunray population.

A program of slashing or brushcutting involving minimal disturbance to soils and other native plants, as well as tree planting should be implemented to reduce the cover of Sifton Bush.

No erosion was seen within the areas of the BOA that were inspected although erosion was seen along the southern edge of the BOA in previous surveys. Erosion inspections targeting areas of drainage should be undertaken by a qualified expert and erosion control measures implemented where required.

There were no other management issues noted at the BOA.

Photo 6: Regeneration in Box-Gum Woodland derived Native Grassland CEEC

Photo 7: Tree Plantings along eastern edge of southern BOA

4.0 Completion Criteria Assessment

An assessment of completion criteria from the RLMP is provided in Appendix F. The assessment determined the following:

- With respect to the amenity bund:
  - Four completion criteria are on track vegetation establishment, groundcover protection, weed and feral pest control, achievement of a sustainable ecosystem with trees.
  - Three are not met including presence of habitat features, recruitment of natives and fencing.
- With respect to the HMA:
  - Two completion criteria were unable to be assessed, being the completion criteria in relation to fencing of the HMA, cattle exclusion.
  - three are on track for completion, being nest box usage, weed and feral pest control, natural regeneration.
- With respect to the core riparian corridors:
  - two completion criteria are not met due to a lack revegetation and natural regeneration at CR1.
  - two are on track for completion, being nest box usage, weed and feral pest control.
  - one could not be assessed (cattle exclusion).

5.0 Discussion and Recommendations

5.1 Vegetation Monitoring

5.1.1 Floristic Analysis

Floristic analysis against the new PCT classifications (DPE 2022) has shown that most plots correspond to PCT 3373 or PCT 3376 which are forms of the CEEC White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSC 2024, DCCEEW 2024b). Two of the retained vegetation plots have been found to correspond better with the common PCT's being PCT 3486 at R2 and R3 and PCT 3643 at R1. It is recommended that comparison to PCTs is repeated at each monitoring event to ensure vegetation is representative of the correct PCT.

5.1.2 Retained Vegetation Plots

Retained vegetation plots have maintained a good tree canopy over the monitoring program, as well as a shrub layer that has increased in cover and diversity, which in turn has seen some lower scores and slight decreases in the grass, forb, fern, and other growth forms (particularly at the plots that are within more forested areas, being R3 and R4). Natural regeneration is occurring, cover and abundance of natives is good, overall health is moderate to good and weed covers are low at most plots. Some of the cover and abundance scores are within benchmark of the respective PCTs at the retained vegetation plots.

No threatened or significant species were recorded during the rehabilitation inspections. However, potential habitat (native vegetation and hollow-bearing trees) is present for species known to occur at the site (the Squirrel Glider, Speckled Warbler and threatened species of bats).

Feral animals recorded at the retained vegetation sites include Rabbit/Hare, Fox, and Feral Honeybee. Erosion was minimal at most sites, however, R4 is being affected by erosion of a nearby drainage channel. No recent fire was recorded, and fuel loads were thought to be moderate at R1 and R3 and low at the other sites. Signs of disturbance were minor and include animal (Kangaroo/Wallaby, Rabbit, Wombat) activity and grazing.

Follow up actions for these sites include feral animal control at all sites and weed removal and erosion control at R4. The increased density of the shrub layer indicates that an ecological burn may be considered for larger bushland areas over the coming years (in the vicinity of R3).

5.1.3 Rehabilitation monitoring sites

Rehabilitation monitoring sites have a low cover and diversity of trees, high cover of shrubs which has significantly increased since the past survey (due to Sifton Bush), low to moderate cover and diversity in the grass, forb, fern, and other layers. Natural regeneration is low, and weeds are low, but RM1 and RM5 may benefit from minor weed control. These areas are below benchmark for the respective PCT and would benefit from Sifton Bush control, followed by native tree planting. The total length of logs is low at most rehabilitation sites and log emplacement could be considered where feasible.

No threatened or significant species were recorded at the rehabilitation inspections. Feral animals recorded at the retained vegetation sites include Rabbit/Hare and Fox. Erosion was minimal at all sites, but sediment fencing requires ongoing maintenance at RM1. No recent fire was recorded, and fuel loads were thought to be low at all rehabilitation monitoring sites. Dense Sifton Bush was noted as a potential fuel source at RM2, RM3 and RM5.

Signs of human disturbance include past clearing, disused track (RM1) and drainage ditch (RM4). Signs of disturbance by animals include Kangaroo/Wallaby, Rabbit grazing, with possible rabbit warrens at RM4. Weed control is required, particularly at RM1 and RM5. Tree plantings appear to have successfully established at RM1 and fencing is in good condition at the BOA (RM5).

Follow up actions for the rehabilitation sites include feral animal control, weed control, Sifton Bush control, native tree planting, log emplacement and maintenance of sediment control devices (RM1 only).

5.1.4 Box-Gum Monitoring sites

Box-Gum monitoring sites have undergone a slight decrease on canopy condition due to storm activity, but shrub diversity and cover have improved slightly, and grass, forb, fern, and other growth forms have decreased only slightly. Natural regeneration is occurring, cover and abundance of natives is good, overall health is moderate to good and weed covers are low. Some of the cover and abundance scores are within benchmark of the respective PCTs at the Box-Gum monitoring sites.

No threatened or significant species were recorded at the rehabilitation inspections. Feral animals recorded at the Box-Gum monitoring sites include Rabbit/Hare and Fox. Minor sheet erosion was noted at BG1 due to proximity to a small drainage line. No recent fire was recorded, and fuel loads were thought to be moderate. Signs of disturbance were minor and include animal (Kangaroo/Wallaby, Rabbit, Wombat) activity and grazing. Fencing is in good condition at these sites. Overall, the vegetation integrity has declined slightly at the Box-Gum monitoring sites, but this is likely due to natural factors at the monitoring site locations such as storm damage, drainage, and animal disturbances.

Follow up actions for the Box-Gum monitoring sites include feral animal control and minor weed control.

5.1.5 Core riparian sites

Overall, the native species richness and cover at the core riparian monitoring sites has improved over the monitoring period, such that some structural layers are now within benchmark. Tree cover and diversity at CR1 remains low and natural regeneration in minimal. Like the other monitoring locations there was a notable increase in the cover of the shrub layer since the previous monitoring event.

No threatened or significant species were recorded at the rehabilitation inspections. Feral animals recorded at the core riparian monitoring sites include Rabbit/Hare. Bank erosion was noted at both locations, being more severe at CR2. No recent fire was recorded, and fuel loads were thought to be low to moderate. Signs of disturbance include past clearing and include animal (Kangaroo/Wallaby, Rabbit, Wombat) activity and grazing.

Follow up actions for the core riparian sites include feral animal control, weed control, native tree planting and erosion control.

5.2 Fauna monitoring

Fauna surveys at retained vegetation monitoring sites detected a good assemblage of native species at the retained vegetation sites, being one reptile, two crustacean, four frogs, 11 mammals, and 26 birds. Spotlighting surveys detected three arboreal mammals (Sugar Glider, Brushtail Possum, and a possible Squirrel Glider), two macropods (Eastern Grey Kangaroo, Swamp Wallaby), three frogs (Brown-striped Frog, Eastern Dwarf Frog and Peron’s Tree Frog), one bird (White-faced Heron) and three feral mammals (Fox, Cat, and Rabbit). Bat detectors returned five microchiropteran bats including one threatened species, and it is thought that three of the bat detectors had technical issues at sites R1, R3 and R4

as they returned no results. Infrared cameras recorded the White-faced Heron, Magpie Lark, Eastern Grey Kangaroo, Wombat and Fox.

Feral pest monitoring is recommended due to records of rabbits, foxes, and cats. The aim of the feral pest monitoring would be to determine whether there are large numbers or dens/burrows occurring on site and to implement control (shooting or baiting) where necessary and in liaison with the appropriate government departments and neighbouring property owners.

5.3 Nest Box monitoring

Nest box inspections found that most nest boxes showed evidence of usage (50 of 59), with 10 being occupied by live fauna during the survey. In regard to target species usage: the Squirrel Glider boxes were generally occupied by Sugar Gliders or their nesting materials; the Brushtail and Ringtail Possum boxes showed evidence of possum usage but were predominantly being used by birds (mostly Wood Duck); the bat boxes showed no evidence of usage; the Owlet Nightjar boxes all appeared to be used by gliders; and the Rosella boxes showed evidence of glider and bird usage. In relation to maintenance one box requires pest removal, one requires tightening or new attachment, one requires transfer to a new tree and two need to be replaced due to deterioration.

It is recommended best practice for nest box installation includes painting the exterior of the box for a protective coat to extend the life of the box and durability against the elements. The interior of the box should never be painted and should be left as it is – raw untreated wood (Nest Box Australia, 2023). The boxes can be finished in either oil (decking oil, linseed oil), varnish or paint. Nest Boxes Australia recommends a good quality exterior water-based paint such as Dulux Weathershield, or a water based decking oil such as Intergrain in a Merbau colour. Two to three coats are recommended to ensure that the box is protected for several years (Nest Box Australia, 2023).

Orientation is also crucial when installing the nest boxes. Microbats prefer a north to north-westerly aspect, while birds and mammals prefer the entrance of the nest box to face in an easterly direction, ranging from northeast to southeast. Furthermore, mammals such as gliders and possums tend to prefer a more closed or sheltered aspect (eg dense overhanging foliage), whereas birds prefer a more open aspect (fauNature 2011).

Nest box monitoring indicates a high rate of usage by native fauna and general good condition of most nest boxes. Removal of pests and ongoing monitoring of the boxes, particularly along Joarimin Creek, is recommended to prevent further impacts on the native fauna using the boxes. It is recommended that one of the boxes is repositioned and one is relocated to a new tree.

5.4 Hoary Sunray

Overall, the Hoary Sunray population is in moderate health with a large population estimated, however estimates are significantly lower than the previous estimate in 2020. This may be due to climatic conditions or competition with native shrubs. Most plots showed recent evidence of light grazing and weeds, as well as possible competition with surrounding native shrubs (*Cassinia sifton* and *Leptospermum* sp.).

General health was poor to moderate with leaf browning and vegetation/ground layers appearing dry. It is recommended that populations are re-surveyed next year and that a remapping/map-refining exercise is incorporated so that more accurate population estimates can be made. Additional survey sites could also be incorporated. A careful control program for Sifton Bush will likely also assist recovery/maintenance of the population of Hoary Sunray.

6.0 Conclusion and Actions Summary

The 2023 ecological monitoring of Holcim quarry has collected data with respect to:

- Condition of vegetation and fauna assemblages in areas of retained vegetation.
- Progress of passive and active rehabilitation.
- Usage and condition of nest boxes.
- Counts and condition of populations of the Hoary Sunray.

Overall, the vegetation was in moderate to good condition across the site with two key management issues being the abundance of high threat weeds and Sifton Bush. Rehabilitation areas require particular attention regarding Sifton Bush control, and it is recommended that a program of slashing/brushcutting is undertaken combined with native tree planting.

Fauna results show a good assemblage of native fauna species persists within the areas of retained vegetation. Three pests identified for targeted management rabbit, cat, and fox. The Hoary Sunray population appeared to be in decline, and it is though that the climatic conditions, combined with over-abundance of Sifton Bush could be causing this decline. Climatic conditions were generally hotter and drier leading up to the survey, although good rainfall was seen close to the survey timing.

Additional surveys recommended for 2024 include a follow-up Hoary Sunray survey and ongoing surveys of the amenity bund rehabilitation (RM1). Ecological monitoring should continue in accordance with the summary in Section 1.3. The next monitoring event would therefore be required in 2024 and will include:

- Nest box monitoring
- Rehabilitation monitoring at the:
  - Amenity bund (RM1)
  - HMA (RM2 and RM3)
  - BOA revegetation areas (RM5)
  - Core riparian area (CR1 and R2)
- Box-Gum woodland monitoring (BG1 and BG2)
- Hoary Sunray monitoring (HS1-HS11)

The 2023 monitoring saw the last schedule survey of rehabilitation monitoring of the BOA, therefore surveys of RM4 may cease.

In response to the findings of the 2023 ecological monitoring the recommended site management actions for 2024 include:

- Ongoing weed maintenance
- Sifton Bush control program in consultation with a local bush regeneration specialist
- Tree planting
- Targeted pest surveys and ongoing pest control
- Nets box maintenance
- Erosion control, particularly along creeks and drainage lines
- Consider bushfire management of large patches of forest in consultation with bushfire consultant with experience undertaking ecological burns

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Appendix A PCT Profile and Benchmark Data

Lynwood Quarry, NSW

Ecological Monitoring 2023

Holcim Australia Pty Ltd

SLR Project No.: 630.V13844.00001

5 March 2024

Table A-1: PCT 3373 Goulburn Tableland Box-Gum Grassy Forest

Plant Community Type ID (PCT ID)	3373
VCA Type ID	0
PCT Name	Goulburn Tableland Box-Gum Grassy Forest
PCT Scientific Name	
Authority	Eastern NSW PCT Classification
Classification Type	Quantitative
Classification Confidence Level	High
Vegetation Formation	Grassy Woodlands;
Vegetation Class	Southern Tableland Grassy Woodlands;
Vegetation Description	A mid-high to tall dry sclerophyll grassy open forest to woodland of northern parts of the Southern Tablelands, occurring from Canberra and Queanbeyan north to Pejar and east to Durran Durra and Canyonleigh, with a northern outlier at Golspie. It is found in landscape positions with moderately deep soil profiles, particularly footslopes of gently undulating low hills, on a wide range of substrates including sedimentary (sandstone, arenite, greywacke, shale), acid volcanic (ignimbrite, rhyolite) and granitic rocks. This PCT is found at elevations of 600-850 metres asl with mean annual rainfall of 650-800 mm. Remnants of this community often have a long history of disturbance and the tree canopy may be sparse to very sparse, commonly including *Eucalyptus melliodora* and occasionally with *Eucalyptus macrorhyncha*, *Eucalyptus blakelyi* or *Eucalyptus dives*. A very sparse shrub stratum commonly includes scattered *Lissanthe strigosa*, *Pimelea curviflora*, *Melichrus urceolatus* or *Hibbertia obtusifolia*, while the ground layer is predominantly grassy and commonly includes *Themeda triandra*, *Microlaena stipoides*, *Poa sieberiana*, *Elymus scaber* and *Aristida ramosa*, with occasional high cover of *Rytidosperma laeve*. Common forbs include *Lomandra filiformis*, *Lomandra multiflora* subsp. *multiflora*, *Goodenia hederacea*, *Hydrocotyle laxiflora*, *Oxalis perennans*, *Chrysocephalum apiculatum*, *Tricoryne elatior*, *Gonocarpus tetragynus* and *Hypericum gramineum*. In lower landscape positions subject to cold air drainage this community may be replaced by PCT 3338, while on stony dry hills it commonly grades into PCT 3747.
Other Diagnostic Features	
IBRA Bioregion(s)	South Eastern Highlands;
IBRA Comments	
IBRA Sub-region(s)	Bungonia; Crookwell; Monaro; Murrumbateman;
NSW Landscape(s)	
LGA(s)	GOULBURN MULWAREE; QUEANBEYAN-PALERANG REGIONAL; UPPER LACHLAN SHIRE; YASS VALLEY;
Elevation Min(m)	615.2
Elevation Median(m)	698.5
Elevation Max(m)	839.5
Annual Rainfall Min(mm)	648
Annual Rainfall Median(mm)	698
Annual Rainfall Max(mm)	776
Annual Mean Temperature Min (deg.C)	11.28
Annual Mean Temperature Median(deg.C)	12.36

Annual Mean Temperature Max(deg.C)	13.18
Upper Stratum Species	
Mid Stratum Species	
Ground Stratum Species	
Diagnostic Species	
Emergent Species	
Tree Growth Form Group Species	*Eucalyptus melliodora , Eucalyptus macrorhyncha , Eucalyptus blakelyi , Eucalyptus dives , Eucalyptus mannifera , Eucalyptus bridgesiana , Acacia decurrens , Eucalyptus rubida , Eucalyptus rossii , Acacia dealbata , Acacia melanoxylon , Eucalyptus cinerea , Eucalyptus pauciflora , Allocasuarina littoralis , Eucalyptus amplifolia , Acacia parramattensis , Allocasuarina luehmannii , Eucalyptus tereticornis , Eucalyptus eugenioides , Eucalyptus goniocalyx , Eucalyptus polyanthemos , Eucalyptus radiata , Eucalyptus sclerophylla , Eucalyptus viminalis*
Shrub Growth Form Group Species	*Melichrus urceolatus , Lissanthe strigosa , Pimelea curviflora , Hibbertia obtusifolia , Bossiaea buxifolia , Dillwynia sericea , Brachyloma daphnoides , Astroloma humifusum , Cassinia sifton , Acacia genistifolia , Cassinia aculeata , Daviesia latifolia , Daviesia genistifolia , Acacia mearnsii , Acrotriche serrulata , Pultenaea procumbens , Indigofera australis , Pultenaea microphylla , Acacia deanei , Cryptandra amara , Daviesia mimosoides , Dillwynia phylicoides , Pultenaea subspicata , Acacia gunnii , Daviesia leptophylla , Exocarpos cupressiformis , Exocarpos strictus , Gompholobium huegelii , Leucopogon virgatus , Acacia rubida , Acacia ulicifolia , Cassinia longifolia , Daviesia ulicifolia , Hibbertia riparia , Leucopogon fraseri , Persoonia linearis , Rubus parvifolius , Acacia brownii , Acacia cognata , Acacia dawsonii , Acacia falciformis , Acacia implexa , Acacia paradoxa , Acacia terminalis , Calytrix tetragona , Cassinia laevis , Cassinia uncata , Grevillea lanigera , Hibbertia cistoidea , Kunzea parvifolia , Leptospermum continentale , Leptospermum myrtifolium , Leucopogon attenuatus , Leucopogon fletcheri , Leucopogon juniperinus , Olearia viscidula , Pimelea linifolia , Pomaderris andromedifolia , Pultenaea ferruginea , Rhytidosporum procumbens , Styphelia triflora*
Grass & Grass-like Growth Form Group Species	*Lomandra filiformis , Themeda triandra , Microlaena stipoides , Lomandra multiflora subsp. multiflora , Poa sieberiana , Elymus scaber , Aristida ramosa , Rytidosperma laeve , Austrostipa scabra , Dichelachne micrantha , Rytidosperma pallidum , Poa meionectes , Rytidosperma racemosum , Austrostipa densiflora , Echinopogon ovatus , Panicum effusum , Rytidosperma monticola , Luzula densiflora , Luzula flaccida , Rytidosperma tenuius , Schoenus apogon , Carex inversa , Lepidosperma laterale , Aristida jerichoensis , Juncus subsecundus , Rytidosperma pilosum , Austrostipa mollis , Aristida vagans , Echinopogon caespitosus , Juncus filicaulis , Lomandra longifolia , Poa labillardierei var. labillardierei , Rytidosperma auriculatum , Eragrostis benthamii , Lepidosperma gunnii , Rytidosperma caespitosum , Austrostipa rudis , Carex breviculmis , Chloris truncata , Dichelachne inaequiglumis , Dichelachne sieberiana , Eragrostis leptostachya , Juncus usitatus , Panicum simile , Rytidosperma penicillatum , Rytidosperma setaceum , Austrostipa pubinodis , Austrostipa semibarbata , Bothriochloa macra , Cynodon dactylon , Lomandra micrantha subsp. tuberculata , Lomandra obliqua , Rytidosperma carphoides , Rytidosperma erianthum , Rytidosperma nudiflorum*
Forb Growth Form Group Species	*Goodenia hederacea , Gonocarpus tetragynus , Hydrocotyle laxiflora , Hypericum gramineum , Chrysocephalum apiculatum , Oxalis perennans , Tricoryne elatior , Dianella revoluta , Bossiaea prostrata , Cymbonotus lawsonianus , Opercularia aspera , Einadia nutans , Hovea linearis , Wahlenbergia stricta , Solenogyne dominii , Galium gaudichaudii , Acaena echinata , Daucus glochidiatus , Microseris lanceolata , Stylidium graminifolium , Acaena ovina , Coronidium scorpioides , Crassula sieberiana , Leptorhynchos squamatus , Asperula conferta , Geranium solanderi , Laxmannia gracilis , Plantago gaudichaudii , Plantago varia , Ajuga australis , Calocephalus citreus , Opercularia hispida , Scleranthus biflorus , Bulbine bulbosa , Chrysocephalum semipapposum , Dichondra repens , Euchiton sphaericus , Rumex brownii , Veronica plebeia , Wahlenbergia communis , Wahlenbergia luteola , Acaena novae-zelandiae , Leucochrysum albicans , Opercularia diphylla , Plantago debilis , Senecio quadridentatus , Stackhousia monogyna , Wahlenbergia gracilis , Arthropodium fimbriatum , Brachyscome ciliaris , Eryngium ovinum , Hackelia suaveolens , Oxalis exilis , Vittadinia muelleri , Wahlenbergia graniticola , Asperula scoparia , Craspedia variabilis , Dianella longifolia , Drosera peltata , Euchiton involucratus , Euchiton japonicus , Poranthera microphylla , Sebaea ovata , Senecio prenanthoides , Thysanotus tuberosus , Veronica calycina , Viola betonicifolia , Vittadinia cuneata , Brachyscome rigidula , Caladenia carnea , Eriochilus cucullatus , Goodenia pinnatifida , Haloragis heterophylla , Lagenophora stipitata , Microtis unifolia , Oreomyrrhis eriopoda , Podolepis jaceoides , Pterostylis reflexa , Senecio tenuiflorus , Swainsona sericea , Triptilodiscus pygmaeus , Velleia paradoxa , Arthropodium minus , Arthropodium strictum , Asperula ambleia , Burchardia umbellata , Caesia parviflora , Caladenia tentaculata , Calotis anthemoides , Calotis scabiosifolia , Cynoglossum australe , Dianella caerulea , Diuris sulphurea , Dysphania pumilio , Einadia hastata , Galium ciliare , Geranium retrorsum , Helichrysum rutidolepis , Hydrocotyle sibthorpioides , Isoetopsis graminifolia , Lagenophora gracilis , Mitrasacme serpyllifolia , Oxalis chnoodes , Oxalis*

	radicosa , Plantago hispida , Pterostylis nana , Pterostylis truncata , Ranunculus lappaceus , Scleranthus diander , Senecio diaschides , Solenogyne gunnii , Stypandra glauca , Thelymitra circumsepta , Trachymene incisa subsp. incisa , Wahlenbergia littoricola , Wahlenbergia multicaulis , Xerochrysum bracteatum , Xerochrysum viscosum
Fern Growth Form Group Species	*Cheilanthes sieberi subsp. sieberi , Cheilanthes austrotenuifolia*
Other Growth Form Group Species	*Hardenbergia violacea , Glycine clandestina , Desmodium varians , Thysanotus patersonii , Glycine tabacina , Billardiera scandens , Convolvulus angustissimus , Amyema miquelii , Cassytha pubescens , Convolvulus erubescens , Muellerina eucalyptoides*
Median Native Species Richness per plot	37
Height Class (Walker & Hopkins 1990)	
Variation And Natural Disturbance	
Fire Regime	
Landscape Position	
Lithology	
Landform Pattern	
Landform Element	
Is PCT Derived?	
PCT derived from these communities	
PCT derived community comments	
Pre-European Extent	45446
Pre-European Extent Accuracy	
Pre-European Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
Current Extent	3589
Current Extent Accuracy	
Current Extent Comments	Calculated from State Vegetation Type Map (SVTM) extant PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
PCT Percent Cleared	92.1
% accuracy (of PCT % cleared estimate)	
PCT Percent Cleared Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing and extant PCT maps C1.1.M1 and Inland Multinomial Modelling. Values are condition weighted SVTM % cleared estimates (see DPE 2022 Eastern NSW PCT % Cleared Calculation Technical notes). There may be a discrepancy between the calculated % cleared values and displayed values due to rounding.
PCT associated with TEC	Has associated TEC
TEC List	Listed BC Act,CE: White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part) ; Listed EPBC Act,CE: White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland (Part) ;
TEC Comments	(Comment TEC1) Relates to the NSW White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland TEC. (Comment TEC2) May relate to the Commonwealth White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland TEC where it meets condition criteria as per section 4 of the Listing Advice.

Adequacy of plot sampling	None
Total Number of Replicates	85
Number of Primary Replicates	56
Number of Secondary Replicates	29
Pre-European Mapped Or Modelled	
Current Extent Mapped Or Modelled	
Classification source	
Citations	Connolly, D. et al., in prep.
Full Reference Details	Connolly, D., Binns, D., Turner, K., Hager, T., Lyons, M., Magarey, E. (in prep.) A revised classification of Plant Community Types for eastern New South Wales. NSW DPIE, Parramatta;
Profile Source	R4.145;
PCT Definition Status	Approved

Table A-2: Default Benchmark Data PCT 3373

Plant Community Type ID(PCT ID)	3373
Classification Confidence Level	High
PCT Name	Goulburn Tableland Box-Gum Grassy Forest
PCT Scientific Name	
Vegetation Class	Southern Tableland Grassy Woodlands
Vegetation Formation	Grassy Woodlands
IBRA Bioregion Code	SEH
IBRA Bioregion(s)	South Eastern Highlands
Benchmark Calculation Level	Class/IBRA
PCT Benchmark Variation	monthly average, following AVERAGE RAINFALL year
Rainfall Threshold	560 - 846
Default Benchmark Condition	Yes
Tree richness	4
Shrub richness	7
Grass & grass - like richness	9
Forb richness	16
Fern richness	1
Other richness	2
Tree cover	26
Shrub cover	5
Grass & grass - like cover	35
Forb cover	9
Fern cover	0
Other cover	0
No.of large trees(per 0.1ha)	50
Litter cover	45
Total length of fallen logs	3
Large Tree Threshold Size	50
PCT Benchmarks Comments	Composition-Structure Benchmark : Class/IBRA | Function: Logs-Class; Litter-Class; Large Trees-Formation
PCT Benchmarks Reference Site	
Benchmark source	Multiple methods
Benchmark Confidence	Composition: High | Structure: Moderate | Function: Logs-Moderate; Litter-Moderate; Large Trees-Moderate
PCT Benchmark Status	Approved
PCT Definition Status	Approved

Table A-3: PCT 3376 Southern Tableland Grassy Box Woodland

Plant Community Type ID (PCT ID)	3376
VCA Type ID	0
PCT Name	Southern Tableland Grassy Box Woodland
PCT Scientific Name	
Authority	Eastern NSW PCT Classification
Classification Type	Quantitative
Classification Confidence Level	Medium
Vegetation Formation	Grassy Woodlands;
Vegetation Class	Southern Tableland Grassy Woodlands;
Vegetation Description	A tall sclerophyll woodland with a dry shrub layer that is patchy to absent and a mid-dense, grassy groundcover, widespread in the low hills of the drier parts of the Southern Tablelands between Bredbo and Rylstone. The canopy almost always includes Box eucalypts (*Eucalyptus melliodora* or *Eucalyptus bridgesiana*), occasionally associated with *Eucalyptus blakelyi* which may be locally prominent in lower parts of the landscape. The shrub layer is sparse to absent with occasional, scattered *Melichrus urceolatus*, *Lissanthe strigosa* or various Acacia species. The mid-dense ground layer typically includes grasses, forbs, graminoids and some twiners, very frequently including *Hydrocotyle laxiflora*, *Austrostipa scabra*, *Lomandra filiformis*, *Microlaena stipoides* and *Elymus scaber*. The PCT primarily occurs in the Bredbo, Canberra, Goulburn and Boorowa areas, with more scattered occurrences extending north to Bathurst, Orange and Rylstone. It occurs on granite, volcanic and sedimentary substrates in cold, dry environments with a mean annual rainfall typically below 760 mm. While widespread, this PCT primarily occurs in small, often disturbed patches with a long history of grazing. It is not closely related floristically to nearby PCTs, however it grades into PCT 3373 which has a more diverse shrub layer and some subtle differences in canopy species. *Eucalyptus macrorhyncha*, *Eucalyptus dives*, *Bossiaea buxifolia*, *Dillwynia sericea* and *Brachyloma daphnoides* are only occasional in PCT 3373 however collectively represent a suite of species that are rare in this PCT. In the Boorowa area, PCT 3376 grades into PCT 3400 which are both grassy woodlands featuring *Eucalyptus melliodora* and *Eucalyptus blakelyi*. This represents the transition from the colder environment of the tablelands (PCT 3376) to the woodlands of the lower elevation, warmer climate of the South-west Slopes (PCT 3400).
Other Diagnostic Features	
IBRA Bioregion(s)	NSW South Western Slopes; South East Corner; South Eastern Highlands; Sydney Basin;
IBRA Comments	
IBRA Sub-region(s)	Capertee Valley; Inland Slopes; South East Coastal Ranges; Bathurst; Bondo; Bungonia; Crookwell; Hill End; Monaro; Murrumbateman; Oberon; Orange; Wollemi;
NSW Landscape(s)	
LGA(s)	BATHURST REGIONAL; BLAYNEY; CABONNE; GOULBURN MULWAREE; HILLTOPS; LITHGOW CITY; MID-WESTERN REGIONAL; QUEANBEYAN-PALERANG REGIONAL; SNOWY MONARO REGIONAL; SNOWY VALLEYS; UPPER LACHLAN SHIRE; YASS VALLEY;
Elevation Min(m)	311.9
Elevation Median(m)	684.1
Elevation Max(m)	1028.1
Annual Rainfall Min(mm)	574
Annual Rainfall Median(mm)	687
Annual Rainfall Max(mm)	918
Annual Mean Temperature Min (deg.C)	10.55
Annual Mean Temperature Median(deg.C)	12.44

Annual Mean Temperature Max(deg.C)	14.06
Upper Stratum Species	
Mid Stratum Species	
Ground Stratum Species	
Diagnostic Species	
Emergent Species	
Tree Growth Form Group Species	*Eucalyptus melliodora , Eucalyptus blakelyi , Eucalyptus bridgesiana , Eucalyptus rossii , Acacia dealbata , Eucalyptus macrorhyncha , Eucalyptus mannifera , Eucalyptus rubida , Allocasuarina verticillata , Eucalyptus dives , Eucalyptus polyanthemos , Brachychiton populneus , Eucalyptus nortonii , Eucalyptus pauciflora , Eucalyptus tereticornis , Acacia decurrens , Acacia parramattensis , Allocasuarina littoralis , Eucalyptus amplifolia , Callitris endlicheri , Eucalyptus albens , Eucalyptus camaldulensis , Eucalyptus cinerea , Eucalyptus dalrympleana , Eucalyptus sieberi , Eucalyptus viminalis*
Shrub Growth Form Group Species	*Melichrus urceolatus , Lissanthe strigosa , Pimelea curviflora , Hibbertia obtusifolia , Bossiaea buxifolia , Cassinia sifton , Astroloma humifusum , Cryptandra amara , Dillwynia sericea , Acacia implexa , Acrotriche serrulata , Cassinia longifolia , Pultenaea microphylla , Acacia genistifolia , Cassinia quinquefaria , Acacia mearnsii , Daviesia genistifolia , Daviesia ulicifolia , Dodonaea viscosa , Exocarpos cupressiformis , Kunzea ericoides , Acacia deanei , Acacia rubida , Brachyloma daphnoides , Bursaria spinosa , Cassinia aculeata , Pultenaea procumbens , Rubus parvifolius , Acacia falciformis , Cassinia laevis , Daviesia leptophylla , Hibbertia riparia , Indigofera australis , Leucopogon fletcheri , Styphelia triflora , Acacia cardiophylla , Acacia dawsonii , Acacia paradoxa , Acacia ulicifolia , Acacia vestita , Calytrix tetragona , Cheiranthera linearis , Daviesia acicularis , Daviesia latifolia , Daviesia mimosoides , Dillwynia phylicoides , Hibbertia cistoidea , Hibbertia monogyna , Indigofera adesmiifolia , Leucopogon neoanglicus , Monotoca scoparia , Pultenaea ferruginea , Pultenaea subspicata , Pultenaea villosa , Rhytidosporum procumbens , Solanum linearifolium*
Grass & Grass-like Growth Form Group Species	*Austrostipa scabra , Lomandra filiformis , Microlaena stipoides , Elymus scaber , Themeda triandra , Bothriochloa macra , Panicum effusum , Poa sieberiana , Rytidosperma racemosum , Carex inversa , Aristida ramosa , Lomandra multiflora subsp. multiflora , Rytidosperma carphoides , Schoenus apogon , Juncus filicaulis , Austrostipa bigeniculata , Austrostipa densiflora , Rytidosperma auriculatum , Rytidosperma pilosum , Dichelachne micrantha , Luzula densiflora , Rytidosperma laeve , Chloris truncata , Poa labillardierei var. labillardierei , Rytidosperma erianthum , Rytidosperma pallidum , Carex breviculmis , Rytidosperma caespitosum , Enneapogon nigricans , Eragrostis benthamii , Juncus subsecundus , Aristida jerichoensis , Lepidosperma laterale , Poa meionectes , Rytidosperma monticola , Carex appressa , Cymbopogon refractus , Cynodon dactylon , Lomandra bracteata , Lomandra longifolia , Rytidosperma setaceum , Sorghum leiocladum , Austrostipa rudis , Dichelachne sieberiana , Eragrostis brownii , Eragrostis leptostachya , Rytidosperma penicillatum , Rytidosperma tenuius , Sporobolus creber , Aristida vagans , Austrostipa mollis , Bothriochloa decipiens var. decipiens , Dichanthium sericeum , Dichelachne crinita , Dichelachne rara , Digitaria brownii , Echinopogon ovatus , Eragrostis parviflora , Juncus homalocaulis , Lachnagrostis filiformis , Luzula flaccida , Rytidosperma bipartitum , Rytidosperma fulvum , Aristida behriana , Austrostipa gibbosa , Austrostipa setacea , Carex tereticaulis , Cyperus gracilis , Deyeuxia quadriseta , Dichanthium tenue , Dichelachne hirtella , Dichelachne inaequiglumis , Dichelachne parva , Eragrostis elongata , Eragrostis trachycarpa , Isolepis cernua , Juncus gregiflorus , Juncus usitatus , Luzula meridionalis , Luzula ovata , Sporobolus elongatus , Tricostularia pauciflora , Typha domingensis*
Forb Growth Form Group Species	*Hydrocotyle laxiflora , Oxalis perennans , Chrysocephalum apiculatum , Gonocarpus tetragynus , Acaena ovina , Rumex brownii , Solenogyne dominii , Tricoryne elatior , Cymbonotus lawsonianus , Hypericum gramineum , Crassula sieberiana , Geranium solanderi , Einadia nutans , Asperula conferta , Plantago varia , Triptilodiscus pygmaeus , Goodenia hederacea , Wahlenbergia communis , Vittadinia muelleri , Euchiton involucratus , Dichondra repens , Bulbine bulbosa , Daucus glochidiatus , Leptorhynchos squamatus , Vittadinia cuneata , Plantago gaudichaudii , Senecio quadridentatus , Wahlenbergia stricta , Eryngium ovinum , Acaena echinata , Arthropodium minus , Wahlenbergia gracilis , Euchiton sphaericus , Arthropodium fimbriatum , Bossiaea prostrata , Chrysocephalum semipapposum , Cotula australis , Goodenia pinnatifida , Microtis unifolia , Oxalis radicosa , Calocephalus citreus , Galium gaudichaudii , Scleranthus biflorus , Hackelia suaveolens , Dianella longifolia , Dianella revoluta , Drosera peltata , Euphorbia drummondii , Haloragis heterophylla , Leucochrysum albicans , Stackhousia monogyna , Xerochrysum viscosum , Veronica calycina , Veronica plebeia , Ajuga australis , Euchiton japonicus , Opercularia aspera , Opercularia diphylla , Oxalis exilis , Wahlenbergia luteola , Laxmannia gracilis , Lythrum hyssopifolia , Microseris lanceolata , Oreomyrrhis eriopoda , Sebaea ovata , Aphanes australiana , Burchardia umbellata , Dysphania pumilio , Epilobium billardierianum , Euphorbia dallachyana , Geranium retrorsum , Scleranthus diander , Thelymitra circumsepta , Wahlenbergia graniticola , Brachyscome rigidula , Calotis lappulacea , Cynoglossum australe ,*

	Plantago hispida , Ranunculus lappaceus , Solenogyne gunnii , Stuartina muelleri , Swainsona sericea , Vittadinia gracilis , Acaena novae-zelandiae , Alternanthera nana , Erodium crinitum , Hypoxis hygrometrica , Isoetopsis graminifolia , Oxytes brachypoda , Thysanotus tuberosus , Ammobium craspedioides , Arthropodium milleflorum , Calotis anthemoides , Calotis scabiosifolia , Coronidium scorpioides , Craspedia variabilis , Einadia hastata , Hovea linearis , Lagenophora gracilis , Microtis parviflora , Opercularia hispida , Plantago debilis , Podolepis jaceoides , Pterostylis mutica , Pterostylis nana , Stellaria pungens , Thelymitra pauciflora , Viola betonicifolia , Wahlenbergia multicaulis , Zornia dyctiocarpa var. dyctiocarpa , Alternanthera sp. A , Arthropodium strictum , Brachyscome angustifolia , Brachyscome ciliaris , Brachyscome multifida , Brachyscome ptychocarpa , Caesia parviflora , Caladenia tentaculata , Centipeda cunninghamii , Cymbonotus preissianus , Desmodium rhytidophyllum , Diuris sulphurea , Einadia trigonos , Galium ciliare , Galium leiocarpum , Gnaphalium indutum , Goodenia elongata , Hydrocotyle algida , Hydrocotyle foveolata , Isotoma axillaris , Lepidium pseudohyssopifolium , Mentha diemenica , Myriophyllum crispatum , Polygala japonica , Poranthera microphylla , Portulaca oleracea , Ranunculus pumilio , Rumex dumosus , Rutidosis leptorrhynchoides , Scutellaria humilis , Senecio diaschides , Senecio prenanthoides , Senecio tenuiflorus , Solanum pungetium , Spiranthes australis , Swainsona monticola , Urtica incisa , Velleia paradoxa , Vittadinia triloba , Wahlenbergia gracilenta , Xerochrysum bracteatum
Fern Growth Form Group Species	*Cheilanthes sieberi subsp. sieberi , Cheilanthes austrotenuifolia , Ophioglossum lusitanicum , Asplenium flabellifolium*
Other Growth Form Group Species	*Desmodium varians , Glycine tabacina , Convolvulus erubescens , Glycine clandestina , Convolvulus angustissimus , Clematis microphylla , Kennedia prostrata , Amyema pendula , Amyema miquelii , Thysanotus patersonii , Hardenbergia violacea , Glycine microphylla , Xanthorrhoea concava*
Median Native Species Richness per plot	34
Height Class (Walker & Hopkins 1990)	
Variation And Natural Disturbance	
Fire Regime	
Landscape Position	
Lithology	
Landform Pattern	
Landform Element	
Is PCT Derived?	
PCT derived from these communities	
PCT derived community comments	
Pre-European Extent	452899
Pre-European Extent Accuracy	
Pre-European Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
Current Extent	31900
Current Extent Accuracy	
Current Extent Comments	Calculated from State Vegetation Type Map (SVTM) extant PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
PCT Percent Cleared	92.96
% accuracy (of PCT % cleared estimate)	
PCT Percent Cleared Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing and extant PCT maps C1.1.M1 and Inland Multinomial Modelling. Values are condition weighted SVTM % cleared estimates (see DPE 2022 Eastern NSW PCT % Cleared Calculation Technical notes). There may be a discrepancy between the calculated % cleared values and displayed values due to rounding.

PCT associated with TEC	Has associated TEC
TEC List	Listed BC Act,CE: White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part) ; Listed EPBC Act,CE: White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland (Part) ;
TEC Comments	(Comment TEC1) Relates to the NSW White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland TEC. (Comment TEC2) May relate to the Commonwealth White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland TEC where it meets condition criteria as per section 4 of the Listing Advice.
Adequacy of plot sampling	None
Total Number of Replicates	187
Number of Primary Replicates	110
Number of Secondary Replicates	77
Pre-European Mapped Or Modelled	
Current Extent Mapped Or Modelled	
Classification source	
Citations	Connolly, D. et al., in prep.
Full Reference Details	Connolly, D., Binns, D., Turner, K., Hager, T., Lyons, M., Magarey, E. (in prep.) A revised classification of Plant Community Types for eastern New South Wales. NSW DPIE, Parramatta;
Profile Source	R6.97;
PCT Definition Status	Approved

Table A-4: Default Benchmark Data PCT 3376

Plant Community Type ID(PCT ID)	3376
Classification Confidence Level	Medium
PCT Name	Southern Tableland Grassy Box Woodland
PCT Scientific Name	
Vegetation Class	Southern Tableland Grassy Woodlands
Vegetation Formation	Grassy Woodlands
IBRA Bioregion Code	SEH
IBRA Bioregion(s)	South Eastern Highlands
Benchmark Calculation Level	Class/IBRA
PCT Benchmark Variation	monthly average, following AVERAGE RAINFALL year
Rainfall Threshold	560 - 846
Default Benchmark Condition	Yes
Tree richness	4
Shrub richness	7
Grass & grass - like richness	9
Forb richness	16
Fern richness	1
Other richness	2
Tree cover	26
Shrub cover	5
Grass & grass - like cover	35
Forb cover	9
Fern cover	0
Other cover	0
No.of large trees(per 0.1ha)	50
Litter cover	45
Total length of fallen logs	3
Large Tree Threshold Size	50
PCT Benchmarks Comments	Composition-Structure Benchmark : Class/IBRA | Function: Logs-Class; Litter-Class; Large Trees-Formation
PCT Benchmarks Reference Site	
Benchmark source	Multiple methods
Benchmark Confidence	Composition: High | Structure: Moderate | Function: Logs-Moderate; Litter-Moderate; Large Trees-Moderate
PCT Benchmark Status	Approved
PCT Definition Status	Approved

Table A-5: PCT 3486 Wollondilly-Shoalhaven Slopes Grassy Open Forest

Plant Community Type ID (PCT ID)	3486
VCA Type ID	0
PCT Name	Wollondilly-Shoalhaven Slopes Grassy Open Forest
PCT Scientific Name	
Authority	Eastern NSW PCT Classification
Classification Type	Quantitative
Classification Confidence Level	High
Vegetation Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation);
Vegetation Class	Central Gorge Dry Sclerophyll Forests;
Vegetation Description	A tall dry grass/shrub sclerophyll open forest of upper slopes of the gorges of the mid Shoalhaven and mid Wollondilly River (and tributaries). This PCT is known primarily from Wombeyan Caves south to Bungonia and Jockeys Point, on soils derived from Abercrombie Formation sediments and from Barrallier Ignimbrite, at elevations of 400-850 metres asl and with mean annual rainfall of 650-850 mm. The tree stratum commonly includes *Eucalyptus macrorhyncha*, with occasional *Eucalyptus bridgesiana* or rarely *Eucalyptus cinerea*, *Eucalyptus melliodora* or *Eucalyptus eugenioides*. Shrubs are sparse to patchy and commonly include *Lissanthe strigosa*, *Olearia viscidula*, *Bursaria spinosa*, *Hibbertia obtusifolia*, and occasional scattered tall *Acacia falciformis*. The ground layer is often grassy, almost always including *Microlaena stipoides*, very frequently with *Echinopogon ovatus*, and commonly including *Poa sieberiana*, *Austrostipa rudis* and *Elymus scaber*. Forbs include very frequent tall clumps of *Lomandra longifolia* and a diverse suite of small forbs that commonly includes *Hydrocotyle laxiflora*, *Lomandra filiformis*, *Cheilanthes sieberi* subsp. *sieberi*, *Hypericum gramineum*, *Veronica plebeia*, *Dichondra repens*, *Geranium solanderi*, *Plantago debilis*, *Desmodium varians*, *Gonocarpus tetragynus*, *Goodenia hederacea* and *Oxalis perennans*. This community may be replaced by PCT 3483 on lower, warmer gorge slopes, or by PCT 3643 on exposed, rocky upper slopes and crests with shallow to skeletal soils.
Other Diagnostic Features	
IBRA Bioregion(s)	South Eastern Highlands;
IBRA Comments	
IBRA Sub-region(s)	Bungonia; Kanangra;
NSW Landscape(s)	
LGA(s)	GOULBURN MULWAREE; QUEANBEYAN-PALERANG REGIONAL; UPPER LACHLAN SHIRE; WINGECARRIBEE;
Elevation Min(m)	334.2
Elevation Median(m)	644.2
Elevation Max(m)	849.2
Annual Rainfall Min(mm)	675
Annual Rainfall Median(mm)	731
Annual Rainfall Max(mm)	829
Annual Mean Temperature Min (deg.C)	11.44
Annual Mean Temperature Median(deg.C)	12.87
Annual Mean Temperature Max(deg.C)	14.69

Upper Stratum Species	
Mid Stratum Species	
Ground Stratum Species	
Diagnostic Species	
Emergent Species	
Tree Growth Form Group Species	*Eucalyptus consideniana , Eucalyptus globoidea , Eucalyptus mannifera , Eucalyptus moluccana , Eucalyptus nortonii , Eucalyptus sieberi , Notelaea longifolia , Eucalyptus macrorhyncha , Eucalyptus bridgesiana , Eucalyptus melliodora , Eucalyptus cinerea , Acacia decurrens , Eucalyptus eugenioides , Eucalyptus dives , Eucalyptus blakelyi , Casuarina cunninghamiana subsp. cunninghamiana , Eucalyptus tereticornis , Eucalyptus viminalis , Acacia melanoxylon , Acacia parramattensis , Allocasuarina littoralis , Eucalyptus amplifolia , Eucalyptus blaxlandii , Eucalyptus bosistoana , Eucalyptus rossii , Eucalyptus rubida , Brachychiton populneus*
Shrub Growth Form Group Species	*Lissanthe strigosa , Olearia viscidula , Bursaria spinosa , Hibbertia obtusifolia , Acacia falciformis , Melichrus urceolatus , Melicytus dentatus , Cassinia laevis , Pimelea curviflora , Cassinia aculeata , Cassinia uncata , Lomatia myricoides , Acacia deanei , Bossiaea buxifolia , Brachyloma daphnoides , Indigofera australis , Persoonia linearis , Pittosporum undulatum , Rubus parvifolius , Acrotriche serrulata , Astroloma humifusum , Cassinia quinquefaria , Notelaea neglecta , Bossiaea foliosa , Cassinia cunninghamii , Cassinia longifolia , Exocarpos cupressiformis , Exocarpos strictus , Pultenaea microphylla , Acacia filicifolia , Acacia genistifolia , Acacia gunnii , Acacia implexa , Acacia mearnsii , Acacia stricta , Acacia ulicifolia , Astroloma pinifolium , Coronidium elatum , Coronidium oxylepis , Cryptandra amara , Daviesia leptophylla , Hakea dactyloides , Hibbertia pedunculata , Jacksonia scoparia , Kunzea ericoides , Leptomeria drupacea , Leptospermum continentale , Leptospermum multicaule , Leptospermum polygalifolium , Leucopogon fraseri , Leucopogon lanceolatus , Melaleuca parvistaminea , Ozothamnus diosmifolius , Persoonia mollis , Pittosporum multiflorum , Polyscias sambucifolia , Pomaderris angustifolia , Pultenaea pedunculata*
Grass & Grass-like Growth Form Group Species	*Microlaena stipoides , Lomandra filiformis , Echinopogon ovatus , Lomandra longifolia , Poa sieberiana , Elymus scaber , Austrostipa rudis , Rytidosperma laeve , Lomandra multiflora subsp. multiflora , Rytidosperma racemosum , Themeda triandra , Aristida ramosa , Dichelachne micrantha , Carex inversa , Rytidosperma pilosum , Entolasia stricta , Lepidosperma gunnii , Poa meionectes , Bothriochloa macra , Dichelachne inaequiglumis , Echinopogon caespitosus , Luzula densiflora , Cymbopogon refractus , Austrostipa densiflora , Austrostipa scabra , Carex breviculmis , Carex incomitata , Dichelachne rara , Juncus subsecundus , Panicum effusum , Poa labillardierei var. labillardierei , Dichelachne parva , Dichelachne sieberiana , Digitaria diffusa , Echinopogon cheelii , Lepidosperma laterale , Lomandra confertifolia , Lomandra glauca , Rytidosperma caespitosum , Rytidosperma erianthum , Rytidosperma longifolium , Rytidosperma monticola , Rytidosperma pallidum , Rytidosperma penicillatum , Schoenus apogon , Aristida vagans , Austrostipa blackii , Austrostipa mollis , Carex appressa , Chloris truncata , Cyperus gracilis , Dichelachne crinita , Digitaria brownii , Echinopogon mckiei , Entolasia marginata , Eragrostis brownii , Eragrostis leptostachya , Juncus filicaulis , Lomandra micrantha subsp. tuberculata , Luzula meridionalis , Paspalidium distans , Rytidosperma setaceum , Rytidosperma tenuius , Schoenus maschalinus*
Forb Growth Form Group Species	*Hydrocotyle laxiflora , Veronica plebeia , Hypericum gramineum , Dichondra repens , Plantago debilis , Geranium solanderi , Gonocarpus tetragynus , Goodenia hederacea , Oxalis perennans , Acaena echinata , Senecio prenanthoides , Stellaria pungens , Wahlenbergia stricta , Dianella revoluta , Poranthera microphylla , Wahlenbergia gracilis , Euchiton japonicus , Acaena novae-zelandiae , Einadia nutans , Euchiton sphaericus , Viola betonicifolia , Daucus glochidiatus , Solenogyne gunnii , Viola hederacea , Ajuga australis , Brachyscome angustifolia , Euchiton involucratus , Galium gaudichaudii , Rumex brownii , Vittadinia cuneata , Bossiaea prostrata , Cymbonotus lawsonianus , Dichondra sp. Inglewood , Einadia hastata , Einadia trigonos , Lagenophora stipitata , Mentha diemenica , Opercularia aspera , Opercularia diphylla , Plantago varia , Senecio hispidulus , Senecio quadridentatus , Arthropodium milleflorum , Asperula conferta , Galium leiocarpum , Lagenophora gracilis , Opercularia hispida , Oxalis exilis , Senecio tenuiflorus , Solanum prinophyllum , Solanum pungetium , Stylidium graminifolium , Urtica incisa , Wahlenbergia communis , Wahlenbergia luteola , Dianella longifolia , Euphorbia drummondii , Galium leptogonium , Hackelia suaveolens , Pomax umbellata , Ranunculus lappaceus , Wahlenbergia gracilenta , Arthropodium minus , Brachyscome rigidula , Craspedia variabilis , Crassula sieberiana , Desmodium gunnii , Hovea linearis , Opercularia varia , Oreomyrrhis eriopoda , Scleranthus biflorus , Solenogyne dominii , Stypandra glauca , Veronica calycina , Xerochrysum bracteatum , Xerochrysum viscosum , Acaena anserovina , Acaena ovina , Acianthus collinus , Acianthus fornicatus , Acianthus pusillus , Alternanthera nana , Arthropodium sp. South-east Highlands , Asperula scoparia , Brachyscome scapigera , Brachyscome spathulata , Brunoniella australis , Caesia parviflora , Chrysocephalum semipapposum , Coronidium scorpioides , Corybas hispidus , Cynoglossum australe , Dianella caerulea , Dysphania pumilio , Epilobium billardierianum , Eriochilus cucullatus , Geranium potentilloides , Geranium retrorsum , Gonocarpus micranthus , Helichrysum rutidolepis , Hypoxis hygrometrica , Laxmannia gracilis , Oxalis radicosa , Plantago gaudichaudii , Pseuderanthemum variabile , Pterostylis decurva , Pterostylis grandiflora , Pterostylis longifolia , Pterostylis obtusa , Rhodanthe anthemoides ,*

	Senecio diaschides , Senecio minimus , Stackhousia viminea , Teucrium corymbosum , Tricoryne elatior , Veronica gracilis , Vittadinia gracilis
Fern Growth Form Group Species	*Cheilanthes sieberi subsp. sieberi , Asplenium flabellifolium , Cheilanthes austrotenuifolia , Adiantum aethiopicum , Pteridium esculentum , Lindsaea linearis , Pyrrosia rupestris*
Other Growth Form Group Species	*Desmodium varians , Clematis glycinoides , Glycine clandestina , Glycine tabacina , Billardiera scandens , Clematis aristata , Hardenbergia violacea , Convolvulus angustissimus , Glycine microphylla , Thysanotus patersonii , Amyema miquelii , Cassytha glabella , Cassytha melantha , Cassytha pubescens , Clematis microphylla , Convolvulus erubescens , Geitonoplesium cymosum*
Median Native Species Richness per plot	42
Height Class (Walker & Hopkins 1990)	
Variation And Natural Disturbance	
Fire Regime	
Landscape Position	
Lithology	
Landform Pattern	
Landform Element	
Is PCT Derived?	
PCT derived from these communities	
PCT derived community comments	
Pre-European Extent	14513
Pre-European Extent Accuracy	
Pre-European Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
Current Extent	5770
Current Extent Accuracy	
Current Extent Comments	Calculated from State Vegetation Type Map (SVTM) extant PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
PCT Percent Cleared	60.24
% accuracy (of PCT % cleared estimate)	
PCT Percent Cleared Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing and extant PCT maps C1.1.M1 and Inland Multinomial Modelling. Values are condition weighted SVTM % cleared estimates (see DPE 2022 Eastern NSW PCT % Cleared Calculation Technical notes). There may be a discrepancy between the calculated % cleared values and displayed values due to rounding.
PCT associated with TEC	No associated TEC
TEC List	
TEC Comments	
Adequacy of plot sampling	None
Total Number of Replicates	43
Number of Primary Replicates	31

Number of Secondary Replicates	12
Pre-European Mapped Or Modelled	
Current Extent Mapped Or Modelled	
Classification source	
Citations	Connolly, D. et al., in prep.
Full Reference Details	Connolly, D., Binns, D., Turner, K., Hager, T., Lyons, M., Magarey, E. (in prep.) A revised classification of Plant Community Types for eastern New South Wales. NSW DPIE, Parramatta;
Profile Source	R4.62;
PCT Definition Status	Approved

Table A-6: Default Benchmark Data PCT 3486

Plant Community Type ID(PCT ID)	3486
Classification Confidence Level	High
PCT Name	Wollondilly-Shoalhaven Slopes Grassy Open Forest
PCT Scientific Name	
Vegetation Class	Central Gorge Dry Sclerophyll Forests
Vegetation Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
IBRA Bioregion Code	SEH
IBRA Bioregion(s)	South Eastern Highlands
Benchmark Calculation Level	Class/IBRA
PCT Benchmark Variation	monthly average, following AVERAGE RAINFALL year
Rainfall Threshold	588 - 886
Default Benchmark Condition	Yes
Tree richness	5
Shrub richness	10
Grass & grass - like richness	10
Forb richness	16
Fern richness	3
Other richness	5
Tree cover	44
Shrub cover	20
Grass & grass - like cover	25
Forb cover	11
Fern cover	1
Other cover	3
No.of large trees(per 0.1ha)	122
Litter cover	80
Total length of fallen logs	3
Large Tree Threshold Size	50
PCT Benchmarks Comments	Composition-Structure Benchmark : Class/IBRA | Function: Logs-Formation/IBRA; Litter-Class/IBRA; Large Trees-Formation
PCT Benchmarks Reference Site	
Benchmark source	Multiple methods
Benchmark Confidence	Composition: High | Structure: Moderate | Function: Logs-Low; Litter-High; Large Trees-Low
PCT Benchmark Status	Approved
PCT Definition Status	Approved

Table A-7: PCT 3643 Bungonia Tableland Silvertop Ash-Stringybark Forest

Plant Community Type ID (PCT ID)	3643
VCA Type ID	0
PCT Name	Bungonia Tableland Silvertop Ash-Stringybark Forest
PCT Scientific Name	
Authority	Eastern NSW PCT Classification
Classification Type	Quantitative
Classification Confidence Level	High
Vegetation Formation	Dry Sclerophyll Forests (Shrubby sub-formation);
Vegetation Class	South East Dry Sclerophyll Forests;
Vegetation Description	A dry shrubby sclerophyll open forest of rocky hills and ranges of the south-east Central Tablelands and adjacent north-east Southern Tablelands, from Joadja and Barrallier south to Durran Durra and Larbert in the catchments of the upper Wollondilly and Shoalhaven rivers. Non-standard plots also suggest a western outlier on Collector Hill. This PCT predominantly occurs on sedimentary and metasedimentary substrates of low to intermediate fertility, including margins of sandstone and shale, at elevations of 550-900 metres asl, in locations receiving 650-900 mm mean annual rainfall. A tall, sparse to mid-dense tree canopy is very frequently dominated by *Eucalyptus sieberi*, commonly with *Eucalyptus agglomerata*, with a small tree layer that very frequently includes patchy to scattered *Allocasuarina littoralis*. Smaller shrubs are sparse, with *Persoonia linearis* almost always present, *Hibbertia obtusifolia* very frequent, and *Acacia terminalis*, *Podolobium ilicifolium*, *Melichrus urceolatus* and *Lomatia ilicifolia* occasional. The ground layer often includes a high cover of rock and leaf litter, with sparse low plants almost always including *Goodenia hederacea*, very frequently with *Lomandra obliqua* and *Pomax umbellata*. Common species include *Billardiera scandens*, *Lomandra filiformis*, *Entolasia stricta*, *Microlaena stipoides*, *Lomandra multiflora* subsp. *multiflora* and *Stypandra glauca*, with occasional *Xanthorrhoea concava*. This PCT grades into a variety of other communities across its range, including PCT 3373 on adjacent footslopes in the Goulburn area, and PCT 3737 in the Mayfield area when moving from rocky hills to lower Cainozoic gravel deposits.
Other Diagnostic Features	
IBRA Bioregion(s)	South Eastern Highlands; Sydney Basin;
IBRA Comments	
IBRA Sub-region(s)	Bungonia; Crookwell; Monaro; Burragorang; Ettrema;
NSW Landscape(s)	
LGA(s)	GOULBURN MULWAREE; QUEANBEYAN-PALERANG REGIONAL; SHOALHAVEN; UPPER LACHLAN SHIRE; WINGECARRIBEE;
Elevation Min(m)	572
Elevation Median(m)	703.2
Elevation Max(m)	906
Annual Rainfall Min(mm)	684
Annual Rainfall Median(mm)	753
Annual Rainfall Max(mm)	904
Annual Mean Temperature Min (deg.C)	11.28
Annual Mean Temperature Median(deg.C)	12.52
Annual Mean Temperature Max(deg.C)	13.68

Upper Stratum Species	
Mid Stratum Species	
Ground Stratum Species	
Diagnostic Species	
Emergent Species	
Tree Growth Form Group Species	*Eucalyptus sieberi , Allocasuarina littoralis , Eucalyptus agglomerata , Eucalyptus globoidea , Eucalyptus rossii , Eucalyptus punctata , Eucalyptus mannifera , Acacia parramattensis , Eucalyptus piperita , Eucalyptus cinerea , Eucalyptus dives , Eucalyptus macrorhyncha , Eucalyptus sclerophylla , Acacia decurrens , Corymbia gummifera , Eucalyptus goniocalyx , Eucalyptus radiata , Brachychiton populneus , Eucalyptus eugenioides , Eucalyptus smithii*
Shrub Growth Form Group Species	*Persoonia linearis , Hibbertia obtusifolia , Acacia terminalis , Podolobium ilicifolium , Melichrus urceolatus , Lomatia ilicifolia , Rhytidosporum procumbens , Platysace ericoides , Monotoca scoparia , Brachyloma daphnoides , Hibbertia empetrifolia subsp. empetrifolia , Phyllanthus hirtellus , Hakea dactyloides , Daviesia leptophylla , Platysace lanceolata , Acacia falciformis , Acacia obtusifolia , Cassinia aculeata , Leucopogon lanceolatus , Acacia ulicifolia , Pimelea linifolia , Amperea xiphoclada , Banksia spinulosa , Astroloma humifusum , Gompholobium minus , Ozothamnus diosmifolius , Persoonia laurina , Persoonia mollis , Acacia gunnii , Lissanthe strigosa , Bossiaea obcordata , Petrophile pedunculata , Dillwynia sieberi , Gompholobium huegelii , Acacia brownii , Aotus ericoides , Bossiaea buxifolia , Coronidium waddelliae , Lomatia silaifolia , Cryptandra amara , Dillwynia sericea , Persoonia levis , Pomaderris lanigera , Acacia elongata , Acacia paradoxa , Daviesia latifolia , Exocarpos cupressiformis , Gompholobium aspalathoides , Leptomeria acida , Leucopogon muticus , Olearia viscidula , Pultenaea linophylla , Pultenaea microphylla , Tetratheca thymifolia , Acacia buxifolia , Acacia longifolia , Acacia obtusata , Acacia rubida , Acacia suaveolens , Cassinia sifton , Cassinia uncata , Choretrum pauciflorum , Coronidium oxylepis , Daviesia mimosoides , Exocarpos strictus , Gompholobium inconspicuum , Indigofera australis , Leucopogon virgatus , Mirbelia platylobioides , Olearia microphylla , Philotheca salsolifolia , Platylobium formosum , Platysace linearifolia , Pomaderris andromedifolia , Pomaderris delicata , Pultenaea scabra , Acacia decora , Acacia genistifolia , Acacia implexa , Acacia jonesii , Acacia leucolobia , Acacia uncinata , Boronia algida , Boronia rubiginosa , Bursaria spinosa , Calytrix tetragona , Cassinia cunninghamii , Cassinia quinquefaria , Cryptandra spinescens , Daviesia acicularis , Daviesia corymbosa , Daviesia genistifolia , Daviesia ulicifolia , Dodonaea multijuga , Gompholobium uncinatum , Goodenia ovata , Hakea sericea , Hibbertia circumdans , Hibbertia linearis , Hibbertia monogyna , Hovea purpurea , Isopogon anemonifolius , Leptospermum polygalifolium , Leptospermum trinervium , Leucopogon attenuatus , Lomatia ilicifolia x silaifolia , Melichrus procumbens , Monotoca elliptica , Olearia stellulata , Phyllota squarrosa , Pimelea curviflora , Podolobium scandens , Polyscias sambucifolia , Pomaderris ferruginea , Pomaderris intermedia , Prostanthera saxicola , Pultenaea subspicata , Styphelia angustifolia , Tetratheca bauerifolia , Tetratheca ericifolia*
Grass & Grass-like Growth Form Group Species	*Lomandra obliqua , Entolasia stricta , Lomandra filiformis , Microlaena stipoides , Lomandra multiflora subsp. multiflora , Lepidosperma gunnii , Rytidosperma pallidum , Austrostipa rudis , Poa sieberiana , Lomandra glauca , Lepidosperma urophorum , Lomandra longifolia , Lepidosperma laterale , Lomandra cylindrica , Dichelachne inaequiglumis , Caustis flexuosa , Lomandra gracilis , Aristida ramosa , Austrostipa mollis , Lomandra micrantha subsp. tuberculata , Austrostipa densiflora , Deyeuxia quadriseta , Echinopogon caespitosus , Lepidosperma filiforme , Poa meionectes , Rytidosperma monticola , Rytidosperma pilosum , Rytidosperma racemosum , Aristida calycina , Aristida jerichoensis , Aristida vagans , Austrostipa pubinodis , Deyeuxia monticola , Dichelachne parva , Echinopogon ovatus , Poa labillardierei var. labillardierei , Austrostipa pubescens , Austrostipa semibarbata , Carex appressa , Cyathochaeta diandra , Deyeuxia nudiflora , Dichelachne micrantha , Gahnia microstachya , Lachnagrostis filiformis , Lomandra confertifolia , Poa cheelii , Rytidosperma fulvum , Rytidosperma laeve , Rytidosperma tenuius , Schoenus ericetorum , Themeda triandra*
Forb Growth Form Group Species	*Goodenia hederacea , Pomax umbellata , Stypandra glauca , Dianella revoluta , Gonocarpus tetragynus , Patersonia sericea , Poranthera microphylla , Hovea linearis , Opercularia diphylla , Patersonia glabrata , Opercularia aspera , Helichrysum leucopsideum , Lagenophora stipitata , Patersonia longifolia , Stylidium graminifolium , Hypericum gramineum , Dampiera purpurea , Opercularia varia , Lagenophora gracilis , Viola hederacea , Gonocarpus teucrioides , Goodenia bellidifolia , Stackhousia monogyna , Coronidium scorpioides , Hybanthus monopetalus , Laxmannia gracilis , Opercularia hispida , Oxalis perennans , Scaevola ramosissima , Veronica plebeia , Wahlenbergia gracilis , Xerochrysum bracteatum , Bossiaea prostrata , Caesia parviflora , Comesperma sphaerocarpum , Coopernookia barbata , Hydrocotyle laxiflora , Oxalis exilis , Poranthera ericifolia , Stackhousia viminea , Thysanotus tuberosus , Viola betonicifolia , Arrhenechthites mixta , Boronia nana var. hyssopifolia , Brachyscome decipiens , Brachyscome spathulata , Caladenia carnea , Chiloglottis diphylla , Dianella caerulea , Dichondra repens , Drosera auriculata , Einadia hastata , Euchiton japonicus , Galium leiocarpum , Gonocarpus humilis , Leptorhynchos squamatus , Lobelia gibbosa , Mitrasacme pilosa , Podolepis hieracioides , Pterostylis parviflora , Pterostylis pedunculata , Pterostylis revoluta , Senecio prenanthoides ,*

	Solanum pungetium , Trachymene incisa subsp. incisa , Wahlenbergia gracilenta , Wahlenbergia stricta , Xanthosia pilosa , Xerochrysum viscosum
Fern Growth Form Group Species	*Pteridium esculentum , Cheilanthes sieberi subsp. sieberi , Lindsaea linearis*
Other Growth Form Group Species	*Billardiera scandens , Xanthorrhoea concava , Hardenbergia violacea , Cassytha pubescens , Xanthorrhoea resinosa , Amyema congener subsp. congener , Cassytha melantha , Clematis aristata , Comesperma volubile , Glycine clandestina , Glycine tabacina , Kennedia prostrata , Macrozamia communis , Marsdenia rostrata , Thysanotus patersonii*
Median Native Species Richness per plot	27
Height Class (Walker & Hopkins 1990)	
Variation And Natural Disturbance	
Fire Regime	
Landscape Position	
Lithology	
Landform Pattern	
Landform Element	
Is PCT Derived?	
PCT derived from these communities	
PCT derived community comments	
Pre-European Extent	74103
Pre-European Extent Accuracy	
Pre-European Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
Current Extent	39414
Current Extent Accuracy	
Current Extent Comments	Calculated from State Vegetation Type Map (SVTM) extant PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
PCT Percent Cleared	46.81
% accuracy (of PCT % cleared estimate)	
PCT Percent Cleared Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing and extant PCT maps C1.1.M1 and Inland Multinomial Modelling. Values are condition weighted SVTM % cleared estimates (see DPE 2022 Eastern NSW PCT % Cleared Calculation Technical notes). There may be a discrepancy between the calculated % cleared values and displayed values due to rounding.
PCT associated with TEC	No associated TEC
TEC List	
TEC Comments	
Adequacy of plot sampling	None
Total Number of Replicates	80
Number of Primary Replicates	71

Number of Secondary Replicates	9
Pre-European Mapped Or Modelled	
Current Extent Mapped Or Modelled	
Classification source	
Citations	Connolly, D. et al., in prep.
Full Reference Details	Connolly, D., Binns, D., Turner, K., Hager, T., Lyons, M., Magarey, E. (in prep.) A revised classification of Plant Community Types for eastern New South Wales. NSW DPIE, Parramatta;
Profile Source	R2.11;
PCT Definition Status	Approved

Table A-8: Default Benchmark Data PCT 3643

Plant Community Type ID(PCT ID)	3643
Classification Confidence Level	High
PCT Name	Bungonia Tableland Silvertop Ash-Stringybark Forest
PCT Scientific Name	
Vegetation Class	South East Dry Sclerophyll Forests
Vegetation Formation	Dry Sclerophyll Forests (Shrubby sub-formation)
IBRA Bioregion Code	SEH
IBRA Bioregion(s)	South Eastern Highlands
Benchmark Calculation Level	Class/IBRA
PCT Benchmark Variation	monthly average, following AVERAGE RAINFALL year
Rainfall Threshold	626 - 953
Default Benchmark Condition	Yes
Tree richness	5
Shrub richness	13
Grass & grass - like richness	7
Forb richness	9
Fern richness	1
Other richness	2
Tree cover	50
Shrub cover	18
Grass & grass - like cover	18
Forb cover	5
Fern cover	0
Other cover	0
Total length of fallen logs	87
Litter cover	80
No. of large trees(per 0.1ha)	3
Large Tree Threshold Size	50
PCT Benchmarks Comments	Composition-Structure Benchmark : Class/IBRA | Function: Logs-Formation/IBRA; Litter-Formation/IBRA; Large Trees-Formation
PCT Benchmarks Reference Site	
Benchmark source	Multiple methods
Benchmark Confidence	Composition: High | Structure: Moderate | Function: Logs-Moderate; Litter-Low; Large Trees-Moderate
PCT Benchmark Status	Approved
PCT Definition Status	Approved

Appendix B Monitoring Plot Data

Lynwood Quarry, NSW

Ecological Monitoring 2023

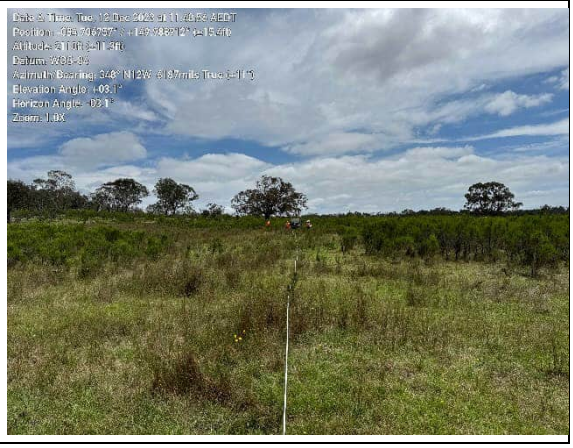
Holcim Australia Pty Ltd

SLR Project No.: 630.V13844.00001

5 March 2024

Table B-1: Photo data for 2023

Site	Start Transect	End Transect
R1		
R2		
R3		

Site	Start Transect	End Transect
R4		
RM1		
RM2		
RM3		

Site	Start Transect	End Transect
RM4		
RM5		
BG1		
BG2		

Site	Start Transect	End Transect
CR1		
CR2		Error

Table B-2: Flora cover data for 2023

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
TG	*Acacia decurrens*	0.1	0	0	0	0	0	0	5	0	0	0	0	0
SG	*Acacia mearnsii*	0	3	0.1	0	20	0	0	0	0	0	0	0	0
SG	*Acacia obtusifolia*	0	0	0.1	0	0.2	0	0	0	0	0	0	0	0
TG	*Acacia parramattensis*	0	0	0	0	0	0	0	0	0	0	0	5	5
SG	*Acacia ulicifolia*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
Non-HTW	*Aira caryophyllea*	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0
Non-HTW	*Aira cupaniana*	0	0	0	0	0	0	0	0	0.1	0	0	0	0
TG	*Allocasuarina littoralis*	0	0	0.1	4	0	0	0	0	0	0	0.1	0	2
Non-HTW	*Anthoxanthum odoratum*	0	0	0	0	0	0	0	0	45	0	3	0	0
GG	*Aristida vagans*	0.1	0	0	0.1	0	10	0	0	0	0.1	0	0	0
SG	*Astroloma humifusum*	0	0	0	0	0	0.1	0	0	0	0	0	0	0
GG	*Austrostipa densiflora*	5	1	0.1	0	0	0.5	0	0.5	0	0.1	0.2	0	0.1
GG	*Austrostipa scabra* subsp. *falcata*	0	0	0	0.1	0	0	0	15	0	1	0.5	0	5

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Non-HTW	*Avena fatua*	0	0	0	0	0	0	0	0	0	0	0	4	0
OG	*Billardiera scandens*	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Briza minor*	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Non-HTW	*Bromus molliformis*	0	0	0	0	0	0	0	0	0	0	0	1	0
FG	*Brunoniella australis*	0	0	0	0.1	0	0	0	0	0	0	0	0	0
GG	*Carex appressa*	0	0	0	0	0	0	0	0	0	0	0	0	0.1
GG	*Carex inversa*	0	0	0	0.2	0	0	0	0.1	0	0	0	0	0.4
SG	*Cassinia aculeata*	0	0	80	0	0	0.1	0	0.1	0.1	0	30	0	0
SG	*Cassinia longifolia*	0	0	1	0	0	0	0	0	0	0	0	0	0
SG	*Cassinia quinquefaria*	0	0.1	1	0	0	0	0	0	0	0	0	0	0
SG	*Cassinia sifton*	20	70	5	5	0	40	10	30	45	20	30	0.1	35
SG	*Cassinia uncata*	0	0.1	1	0	0	0	0	0	0	0	0	0	0.5
Non-HTW	*Centaurium erythraea*	0	0	0	0	0	0.1	0.1	0	0	0	0.1	0	0
EG	*Cheilanthes sieberi*	0	0.1	0.1	0	0	0.1	0	0.1	0	0	0	0	0
GG	*Chloris truncata*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
Non-HTW	*Cirsium vulgare*	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1
Non-HTW	*Conyza bonariensis*	0	0.1	0	0.1	0.1	0	0.1	0	0	0.1	0	0	0.1
FG	*Cymbonotus lawsonianus*	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Cyperus congestus*	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0.1
FG	*Cyperus gracilis*	0	0	0	0	0	0	0	0	0	0.1	0	0	0
FG	*Einadia hastata*	2	0	0	0	0	0	0	0	0	0	0	0	0
FG	*Einadia trigonos*	0	0.1	0	0	0.2	0	0	0.2	0	0.1	0	0	0
Non-HTW	*Eleusine tristachya*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
GG	*Entolasia stricta*	0.5	0	0	0	0	0	0	0	0	0	0	0	0
GG	*Eragrostis benthamii*	0	0	0	0	0	0	15	0	2	0.5	0.1	0	0
HTW	*Eragrostis curvula*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
GG	*Eragrostis leptostachya*	0	0	0	0	0	0.1	0	0	0	0	0	0	0
FG	*Erodium crinitum*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
TG	*Eucalyptus agglomerata*	20	0	30	0	0	0	0	8	0	0	5	0	0
TG	*Eucalyptus blakelyi*	0	0	0	8	0.5	0	0	0	0	5	5	0	20
TG	*Eucalyptus bridgesiana*	0	0	0	0	0.5	0	0	0	0	1	0	0	0
TG	*Eucalyptus cinerea*	0	3	5	0	0	0	0	0	0	0	0	0	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
TG	*Eucalyptus eugenioides*	0	5	0	0	0	0	0	0	0	0	0	0	0
TG	*Eucalyptus globoidea*	0	15	0	0	0	0	0	0	0	0	0	0	0
TG	*Eucalyptus macrorhyncha*	0	0	0	0	0	0	0	0.1	0	0	0	0	0
TG	*Eucalyptus melliodora*	0	0	0	15	0	0.1	0	0	0	0	3	0	0
TG	*Eucalyptus sieberi*	1	0	0	0	0.1	0	0	0	0	0	0	0	0
FG	*Euchiton involucratus*	0	0	0	0	0.1	0.1	0	0	0.1	0	0	0	0
FG	*Euchiton sphaericus*	0	0	0	0	0	0	0	0	0	0.1	0	0	0
SG	*Exocarpos strictus*	0.1	0	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Gamochaeta calviceps*	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Non-HTW	*Gamochaeta coarctata*	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0
Non-HTW	*Gamochaeta purpurea*	0	0	0	0	0	0.1	0	0	0	0.1	0	0	0
FG	*Geranium solanderi*	0	0	0	0	0.5	0	0	0	0	0	0	0.1	0
FG	*Gonocarpus tetragynus*	0.2	0.1	0.1	0.2	0	20	0	0	0	0.2	0.2	0	0
FG	*Gonocarpus teucrioides*	0	0	0	0	0	0	0	0	0	0	0	0	0.1
FG	*Goodenia hederacea*	5	0	0.2	0	0	10	0	0	0	0	0	0	0
FG	*Haloragis hetrophylla*	0	0	0	0	0	0	0	0	0	0	0	0.1	0
OG	*Hardenbergia violacea*	0.1	0	0	0	0	0	0	0	0	0	0	0	0
SG	*Hibbertia obtusifolia*	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Holcus lanatus*	0	0	0	0	0.1	0	1	0	0	0	0	30	0
FG	*Hydrocotyle laxiflora*	0	0	0.2	0	0	0	0	0	0	0	0	0	0
FG	*Hydrocotyle sibthorpioides*	0	0	0	0	0	0	0	0	1	0.2	0	0	0
FG	*Hypericum gramineum*	0	0	0.1	0.1	0	0.1	0	0	0	0	0	0	0
HTW	*Hypericum perforatum*	0	0.1	0	0	0	0	0.1	0	0.1	0	0.1	0	0
Non-HTW	*Hypochaeris radicata*	0	0.1	0	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2
SG	*Jacksonia scoparia*	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Juncus bufonius*	0	0	0	0	0	0	0	0	0	0.5	0	0	0
GG	*Juncus holoschoenus*	0	0	0	0	0	0	0	0	0.1	0	0	0	0
GG	*Juncus sarophorus*	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
GG	*Juncus usitatus*	0	0	0	0	0	0	30	0	0.1	0.5	0.1	10	0.1
GG	*Juncus vaginatus*	0	0	0	0	0	0	0	0	0	0	0.2	0	0
SG	*Kunzea parvifolia*	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0
Non-HTW	*Lactuca serriola*	0	0.1	0	0	0	0	0	0	0	0	0	0	0
FG	*Lagenophora stipitata*	0.1	0.1	0	0.2	0	0	0	0	0	0	0	0	0
SG	*Lissanthe strigosa*	0.1	0.2	0.1	0.2	0	0	0	0	0	5	0	0	0
Non-HTW	*Lolium perenne*	0	0	0	0	25	0	0	0	0	0	0	0.1	0
GG	*Lomandra filiformis* subsp. *coriacea*	0.1	0	0	0	0	0	0	0	0	0	0	0	0
GG	*Lomandra filiformis* subsp. *filiformis*	0	0	0	0.1	0	0	0	0	0	0	0	0	0
GG	*Lomandra multiflora*	0	1	0	0	0	0	0	0	0	1	0.3	0	0
GG	*Lomandra obliqua*	0.1	0	0	0	0	0	0	0	0	0	0	0	0
GG	*Microlaena stipoides*	0	20	0	0	0	0	0	4	4	0.5	0	0	30
Non-HTW	*Modiola caroliniana*	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0
HTW	*Nassella trichotoma*	0	1	0	10	0.1	0	0	1	0	1	0	0	4
SG	*Olearia phlogopappa*	0	0	0	0	0	0	0	0	0	0	0	0	0.2
SG	*Olearia viscidula*	0	0.1	2	0	0	0	0	0	0	0	0	0	4
Non-HTW	*Onopordum acanthium*	0	0	0	0	0	0	0	0	0	0	0	0.1	0
FG	*Opercularia diphylla*	0.1	0.1	0.1	0.1	0	0	0	0	0	0.2	0	0	0
FG	*Oxalis perennans*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
FG	*Oxalis radicosa*	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1
Non-HTW	*Paronychia brasiliana*	0	0	0	0	0.1	0	0	0.1	0	0.1	0	0	0.1
SG	*Persoonia linearis*	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Phalaris aquatica*	0	0	0	0	0	0	0	0	0	0	0	0.1	0
FG	*Plantago gaudichaudii*	0	0	0	0	0	0	0	0	0	0.1	0	0	0
Non-HTW	*Plantago lanceolata*	0	0.1	0	0	0	0	0.1	0	0	0	0	10	0
GG	*Poa sieberiana*	0	5	5	0	0	0	0	0	0	0	0	0	0
SG	*Pomaderris lanigera*	0	0	0.2	0	0	0	0	0	0	0	0	0	0
FG	*Poranthera microphylla*	0.1	0	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Richardia stellaris*	0	0	0	0	0.1	0	0	0	0	0	0	0	0
HTW	*Rubus anglocandicans*	0	0.5	0	0	0	0.1	0	0	0	0	0	3	0.3

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
HTW	*Rumex acetosella*	0.1	0.1	0	0	15	3	0	0.1	0.1	0	0	0.2	1
Non-HTW	*Rumex crispus*	0	0	0	0	0	0	0	0	0	0	0	0.2	0
GG	*Rytidosperma fulvum*	0	0	0	0	0	0.1	0.1	0	0	0.3	0.1	0	0
GG	*Rytidosperma racemosum*	0.2	0.1	0	0	0	0	0	1	0	0	0	0	5
GG	*Rytidosperma tenuius*	0	0	3	0.1	0	0	0	0	0	0	0	0	0
FG	*Senecio quadridentatus*	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Solanum chenopodioides*	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1
Non-HTW	*Solanum nigrum*	0	0.1	0	0	0.1	0	0	0.1	0	0	0	0	0
Non-HTW	*Sonchus asper*	0	0	0	0	0	0	0	0	0	0	0	0.1	0
Non-HTW	*Sonchus olearceus*	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1
Non-HTW	*Spergularia rubra*	0	0	0	0	0	0	0	0	0	0	0	0.1	0
GG	*Sporobolus creber*	0	0	0	0	0	0	0	0	0	0	0	0.1	0
FG	*Stypandra glauca*	0	0	15	0	0	0	0	0	0	0	0.1	0	0
GG	*Themeda triandra*	0	0	0	0	0	0	0	0	0	1	0	0	0
FG	*Tricoryne elatior*	0	0	0	0	0	0	0	0	0	0.2	0	0	0
Non-HTW	*Trifolium arvense*	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Trifolium repens*	0	0	0	0	0	0	0	0	0.1	0	0	0	0
Non-HTW	*Verbena bonariensis*	0	0	0	0	0	0	0	0	0	0	0	0	0.1
FG	*Veronica plebeia*	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0.1
Non-HTW	*Vulpia bromoides*	0	0	0	0	2	0	1	0.1	0	0.2	0.2	0.1	0.2
Non-HTW	*Vulpia myuros*	0	0	0	0.1	0	0.2	0	0	0	0	0	0	0
FG	*Wahlenbergia communis*	0	0	0	0	0	0	0	0	0	0.1	0	0	0
FG	*Wahlenbergia gracilis*	0.1	0	0	0	0	0.1	0.1	0	0	0.1	0.1	0	0
FG	*Wahlenbergia stricta*	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0

Table B-3: Flora abundance data for 2023

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
TG	*Acacia decurrens*	1	0	0	0	0	0	0	1	0	0	0	0	0
SG	*Acacia mearnsii*	0	10	11	0	100	0	0	0	0	0	0	0	0
SG	*Acacia obtusifolia*	0	0	2	0	4	0	0	0	0	0	0	0	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
TG	*Acacia parramattensis*	0	0	0	0	0	0	0	0	0	0	0	10	7
SG	*Acacia ulicifolia*	0	0	0	0	1	0	0	0	0	0	0	0	0
Non-HTW	*Aira caryophyllea*	0	0	0	0	0	20	0	0	0	0	10	0	0
Non-HTW	*Aira cupaniana*	0	0	0	0	0	0	0	0	2	0	0	0	0
TG	*Allocasuarina littoralis*	0	0	3	13	0	0	0	0	0	0	2	0	12
Non-HTW	*Anthoxanthum odoratum*	0	0	0	0	0	0	0	0	6000	0	20	0	0
GG	*Aristida vagans*	1	0	0	11	0	1000	0	0	0	5	0	0	0
SG	*Astroloma humifusum*	0	0	0	0	0	5	0	0	0	0	0	0	0
GG	*Austrostipa densiflora*	50	6	10	0	0	20	0	30	0	10	10	0	1
GG	*Austrostipa scabra* subsp. *falcata*	0	0	0	3	0	0	0	500	0	30	20	0	100
Non-HTW	*Avena fatua*	0	0	0	0	0	0	0	0	0	0	0	100	0
OG	*Billardiera scandens*	0	0	5	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Briza minor*	0	0	0	0	0	20	0	0	0	0	0	0	0
Non-HTW	*Bromus molliformis*	0	0	0	0	0	0	0	0	0	0	0	20	0
FG	*Brunoniella australis*	0	0	0	2	0	0	0	0	0	0	0	0	0
GG	*Carex appressa*	0	0	0	0	0	0	0	0	0	0	0	0	1
GG	*Carex inversa*	0	0	0	30	0	0	0	1	0	0	0	0	50
SG	*Cassinia aculeata*	0	0	1000	0	0	1	0	1	1	0	3000	0	0
SG	*Cassinia longifolia*	0	0	2	0	0	0	0	0	0	0	0	0	0
SG	*Cassinia quinquefaria*	0	1	11	0	0	0	0	0	0	0	0	0	0
SG	*Cassinia sifton*	200	5000	10	500	0	2000	100	3000	2000	1000	3000	3	1000
SG	*Cassinia uncata*	0	2	4	0	0	0	0	0	0	0	0	0	1
Non-HTW	*Centaurium erythraea*	0	0	0	0	0	30	30	0	0	0	10	0	0
EG	*Cheilanthes sieberi*	0	3	2	0	0	10	0	1	0	0	0	0	0
GG	*Chloris truncata*	0	0	0	0	1	0	0	0	0	0	0	0	0
Non-HTW	*Cirsium vulgare*	0	3	0	0	0	0	0	0	0	0	0	0	4
Non-HTW	*Conyza bonariensis*	0	1	0	10	2	0	1	0	0	10	0	0	1
FG	*Cymbonotus lawsonianus*	0	4	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Cyperus congestus*	0	0	0	0	0	0	0	0	0	3	0	4	10
FG	*Cyperus gracilis*	0	0	0	0	0	0	0	0	0	2	0	0	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
FG	*Einadia hastata*	20	0	0	0	0	0	0	0	0	0	0	0	0
FG	*Einadia trigonos*	0	1	0	0	2	0	0	10	0	1	0	0	0
Non-HTW	*Eleusine tristachya*	0	0	0	0	4	0	0	0	0	0	0	0	0
GG	*Entolasia stricta*	20	0	0	0	0	0	0	0	0	0	0	0	0
GG	*Eragrostis benthamii*	0	0	0	0	0	0	1000	0	20	30	2	0	0
HTW	*Eragrostis curvula*	0	0	0	0	5	0	0	0	0	0	0	0	0
GG	*Eragrostis leptostachya*	0	0	0	0	0	10	0	0	0	0	0	0	0
FG	*Erodium crinitum*	0	0	0	0	1	0	0	0	0	0	0	0	0
TG	*Eucalyptus agglomerata*	16	0	13	0	0	0	0	6	0	0	2	0	0
TG	*Eucalyptus blakelyi*	0	0	0	5	4	0	0	0	0	1	3	0	10
TG	*Eucalyptus bridgesiana*	0	0	0	0	3	0	0	0	0	1	0	0	0
TG	*Eucalyptus cinerea*	0	3	2	0	0	0	0	0	0	0	0	0	0
TG	*Eucalyptus eugenioides*	0	15	0	0	0	0	0	0	0	0	0	0	0
TG	*Eucalyptus globoidea*	0	5	0	0	0	0	0	0	0	0	0	0	0
TG	*Eucalyptus macrorhyncha*	0	0	0	0	0	0	0	2	0	0	0	0	0
TG	*Eucalyptus melliodora*	0	0	0	19	0	1	0	0	0	0	1	0	0
TG	*Eucalyptus sieberi*	4	0	0	0	3	0	0	0	0	0	0	0	0
FG	*Euchiton involucratus*	0	0	0	0	1	20	0	0	1	0	0	0	0
FG	*Euchiton sphaericus*	0	0	0	0	0	0	0	0	0	2	0	0	0
SG	*Exocarpos strictus*	10	0	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Gamochaeta calviceps*	0	0	0	10	0	0	0	0	0	0	0	0	0
Non-HTW	*Gamochaeta coarctata*	0	0	0	0	0	0	0	0	0	0	10	10	0
Non-HTW	*Gamochaeta purpurea*	0	0	0	0	0	10	0	0	0	1	0	0	0
FG	*Geranium solanderi*	0	0	0	0	20	0	0	0	0	0	0	5	0
FG	*Gonocarpus tetragynus*	10	10	10	10	0	1000	0	0	0	10	10	0	0
FG	*Gonocarpus teucrioides*	0	0	0	0	0	0	0	0	0	0	0	0	1
FG	*Goodenia hederacea*	100	0	50	0	0	200	0	0	0	0	0	0	0
FG	*Haloragis hetrophylla*	0	0	0	0	0	0	0	0	0	0	0	10	0
OG	*Hardenbergia violacea*	1	0	0	0	0	0	0	0	0	0	0	0	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
SG	*Hibbertia obtusifolia*	1	0	3	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Holcus lanatus*	0	0	0	0	2	0	50	0	0	0	0	3000	0
FG	*Hydrocotyle laxiflora*	0	0	50	0	0	0	0	0	0	0	0	0	0
FG	*Hydrocotyle sibthorpioides*	0	0	0	0	0	0	0	0	40	30	0	0	0
FG	*Hypericum gramineum*	0	0	2	2	0	20	0	0	0	0	0	0	0
HTW	*Hypericum perforatum*	0	2	0	0	0	0	1	0	1	0	1	0	0
Non-HTW	*Hypochaeris radicata*	0	10	0	10	20	20	50	20	10	5	10	20	10
SG	*Jacksonia scoparia*	0	2	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Juncus bufonius*	0	0	0	0	0	0	0	0	0	20	0	0	0
GG	*Juncus holoschoenus*	0	0	0	0	0	0	0	0	1	0	0	0	0
GG	*Juncus sarophorus*	0	1	0	50	0	0	0	0	0	0	0	0	0
GG	*Juncus usitatus*	0	0	0	0	0	0	3000	0	2	20	2	80	1
GG	*Juncus vaginatus*	0	0	0	0	0	0	0	0	0	0	4	0	0
SG	*Kunzea parvifolia*	0	0	0	0	0	2	0	0	1	0	0	0	0
Non-HTW	*Lactuca serriola*	0	1	0	0	0	0	0	0	0	0	0	0	0
FG	*Lagenophora stipitata*	11	5	0	40	0	0	0	0	0	0	0	0	0
SG	*Lissanthe strigosa*	2	3	2	9	0	0	0	0	0	20	0	0	0
Non-HTW	*Lolium perenne*	0	0	0	0	2000	0	0	0	0	0	0	1	0
GG	*Lomandra filiformis* subsp. *coriacea*	10	0	0	0	0	0	0	0	0	0	0	0	0
GG	*Lomandra filiformis* subsp. *filiformis*	0	0	0	10	0	0	0	0	0	0	0	0	0
GG	*Lomandra multiflora*	0	100	0	0	0	0	0	0	0	50	10	0	0
GG	*Lomandra obliqua*	11	0	0	0	0	0	0	0	0	0	0	0	0
GG	*Microlaena stipoides*	0	2000	0	0	0	0	0	50	50	100	0	0	2000
Non-HTW	*Modiola caroliniana*	0	1	0	0	5	0	0	0	0	0	0	0	0
HTW	*Nassella trichotoma*	0	10	0	30	5	0	0	50	0	20	0	0	20
SG	*Olearia phlogopappa*	0	0	0	0	0	0	0	0	0	0	0	0	1
SG	*Olearia viscidula*	0	1	10	0	0	0	0	0	0	0	0	0	5
Non-HTW	*Onopordum acanthium*	0	0	0	0	0	0	0	0	0	0	0	1	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
FG	*Opercularia diphylla*	1	1	10	5	0	0	0	0	0	4	0	0	0
FG	*Oxalis perennans*	0	0	0	0	1	0	0	0	0	0	0	0	0
FG	*Oxalis radicosa*	0	0	0	0	0	0	0	0	0	1	0	0	10
Non-HTW	*Paronychia brasiliana*	0	0	0	0	2	0	0	10	0	1	0	0	1
SG	*Persoonia linearis*	0	0	1	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Phalaris aquatica*	0	0	0	0	0	0	0	0	0	0	0	10	0
FG	*Plantago gaudichaudii*	0	0	0	0	0	0	0	0	0	1	0	0	0
Non-HTW	*Plantago lanceolata*	0	20	0	0	0	0	20	0	0	0	0	2000	0
GG	*Poa sieberiana*	0	10	40	0	0	0	0	0	0	0	0	0	0
SG	*Pomaderris lanigera*	0	0	3	0	0	0	0	0	0	0	0	0	0
FG	*Poranthera microphylla*	11	0	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Richardia stellaris*	0	0	0	0	2	0	0	0	0	0	0	0	0
HTW	*Rubus anglocandicans*	0	10	0	0	0	1	0	0	0	0	0	1	10
HTW	*Rumex acetosella*	10	10	0	0	1000	100	0	10	2	0	0	30	100
Non-HTW	*Rumex crispus*	0	0	0	0	0	0	0	0	0	0	0	10	0
GG	*Rytidosperma fulvum*	0	0	0	0	0	1	2	0	0	10	2	0	0
GG	*Rytidosperma racemosum*	10	1	0	0	0	0	0	20	0	0	0	0	100
GG	*Rytidosperma tenuius*	0	0	2	10	0	0	0	0	0	0	0	0	0
FG	*Senecio quadridentatus*	0	5	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Solanum chenopodioides*	0	0	0	0	0	0	0	0	0	2	0	0	1
Non-HTW	*Solanum nigrum*	0	1	0	0	2	0	0	3	0	0	0	0	0
Non-HTW	*Sonchus asper*	0	0	0	0	0	0	0	0	0	0	0	1	0
Non-HTW	*Sonchus olearceus*	0	0	0	1	0	0	0	0	0	0	0	0	1
Non-HTW	*Spergularia rubra*	0	0	0	0	0	0	0	0	0	0	0	10	0
GG	*Sporobolus creber*	0	0	0	0	0	0	0	0	0	0	0	1	0
FG	*Stypandra glauca*	0	0	20	0	0	0	0	0	0	0	1	0	0
GG	*Themeda triandra*	0	0	0	0	0	0	0	0	0	5	0	0	0
FG	*Tricoryne elatior*	0	0	0	0	0	0	0	0	0	20	0	0	0
Non-HTW	*Trifolium arvense*	0	1	0	0	0	0	0	0	0	0	0	0	0
Non-HTW	*Trifolium repens*	0	0	0	0	0	0	0	0	10	0	0	0	0

GF/ HTW	Scientific Name	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Non-HTW	*Verbena bonariensis*	0	0	0	0	0	0	0	0	0	0	0	0	1
FG	*Veronica plebeia*	0	0	2	0	0	0	0	0	0	1	0	0	1
Non-HTW	*Vulpia bromoides*	0	0	0	0	200	0	10	10	0	10	20	1	10
Non-HTW	*Vulpia myuros*	0	0	0	2	0	50	0	0	0	0	0	0	0
FG	*Wahlenbergia communis*	0	0	0	0	0	0	0	0	0	1	0	0	0
FG	*Wahlenbergia gracilis*	1	0	0	0	0	2	1	0	0	5	1	0	0
FG	*Wahlenbergia stricta*	0	5	0	2	0	0	0	0	0	0	0	0	0

Table B-4: Tree stem data for 2023

DBH (cm)	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
>80	0	0	0	1	0	0	0	0	0	0	0	0	1
50 to 79	1	0	3	2	0	0	0	0	0	3	1	0	2
30 to 49	9	5	18	4	0	0	0	1	0	4	2	0	7
20 to 29	9	8	3	10	0	0	0	0	0	0	1	0	5
10 to 19	8	5	8	12	0	0	0	3	0	0	15	1	5
5 to 9	2	2	2	13	0	0	0	2	0	0	20	1	5
Tree stem <5cm DBH	18	49	120	34	14	0	0	8	0	2	73	14	30
No Large Trees (>50cm DBH)	1	0	3	3	0	0	0	0	0	3	1	0	3

Table B-5: Litter data for 2023

Transect interval	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Litter cover (%) at 5m	60	25	80	95	50	50	40	55	40	75	90	60	95
Litter cover (%) at 15m	30	35	90	90	40	40	25	40	75	90	95	10	15
Litter cover (%) at 25m	35	50	75	95	50	35	40	50	40	50	80	50	75
Litter cover (%) at 35m	60	95	55	85	25	60	25	70	60	60	95	20	60
Litter cover (%) at 45m	85	50	50	90	70	60	30	60	35	95	75	35	75
Average Litter cover (%)	54	51	70	91	47	49	32	55	50	74	87	35	64

Table B-6: Log length data for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Log Length (m)	16	28	64	5	0	1	0	9	0	44	0	5	12

Table B-7: Fauna and General observation data for 2023

Site	Fauna observations	General observation notes
R1	Kangaroo (scats), Friarbird, Eastern Rosella, Pied Currawong, White-naped Honeyeater	• Natural regeneration present, including Eucalypts, but minimal. • Native species cover and diversity generally appears low in ground and shrub layer. • General health appears moderate to good. Not much understorey or ground layer, potentially due to rocky soil with patches of bare soil frequent.

Site	Fauna observations	General observation notes
		• Weed occurrence makes up most of the ground layer, including scattered Serrated Tussock Grass. • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded. • Fire evidence not recorded; management may be required. Ground is dry with moderate litter and logs. • Disturbance signs include areas of bare ground from where Kangaroos lie down, plus signs of past logging (tree stumps) • Site management and successes not recorded.
R2	Sunskink, Eastern Rosella, Magpie	• Natural regeneration present, including Eucalypt regeneration. • Native species cover and diversity not recorded. • General health is moderate with poor tree health and outcompeting by Sifton Bush noted. • Weed occurrence has increased with Blackberry, St Johns Wort and Serrated Tussock • Threatened/significant species not recorded. • Feral animals noted include evidence of the Rabbit (droppings) • Erosion not recorded. • Fire evidence not recorded, slight-moderate fuel loads, management not required. • Disturbance signs include Kangaroos. • Site management and successes not recorded.
R3	Wombats, Kangaroos, White-naped Honeyeater	• Natural regeneration present, including Eucalypts and She-oaks. • Native species cover and diversity not recorded. • General health of vegetation is good, with dense shrub layer dominated by *Cassinia* spp., habitat trees and logs also abundant. • Weed occurrence is minimal. • Threatened/significant species not recorded. • Feral animals noted include a honey bee nest in a dead tree. • Erosion not recorded. • Fire evidence notes as over five years ago. Vegetation and soil is very dry with moderate leaf litter therefore fire management may be required. • Disturbance signs include evidence of wombats (burrows) and Kangaroos. • Site management and successes not recorded.
R4	Eastern Sign-bearing Froglet, Pied Currawong, White-throated Honeyeater. An unattended raptor nest was also noted in a large Yellow Box.	• Natural regeneration present, including juvenile Eucalypts and She-oaks. • Native species cover and diversity not recorded. • General health is moderate to good, but ground layer is affected by erosion. • Weed occurrence includes increased cover of Serrated Tussock, with some Thistles and Fleabane • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion is severe and occurring in proximity to the plot including channel erosion and undercutting (see photo) at drainage line. This is causing sheet erosion within the plot area. • Fire evidence not recorded. Open woodland with moderate litter, but overall light fuel loads therefore management not likely required here. • Disturbance signs include heavy grazing of grasses by Kangaroos. • Site management and successes not recorded
RM1	Magpie-lark, Crimson Rosella, Gallah, Welcome Swallow, Eastern Grey Kangaroo, Australian Raven, Magpie, Corellas, Grey-shrike Thrush, Nankeen Kestrel.	• Natural regeneration not occurring but tube stock and seeding evident. • Native species cover and diversity noted as low due to recent establishment, no need for planting at this time. • General health moderate to good, with steep slope (25 degree), high winds and nearby paddock weeds, noted as potential hinderance to rehabilitation success. • Weed occurrence is low to moderate including Serrated Tussock, African Lovegrass, with Blackberry nearby. • Threatened/significant species not recorded.

Site	Fauna observations	General observation notes
		• Feral animals noted including rabbits and foxes. • Erosion was noted including minor rills (5-10cm). • Fire evidence not recorded, and fuel levels are low. Fuel management not required at this location. • Disturbance signs include an old disused track within plot and signs of native animal grazing (Kangaroos) • Site management and successes include erosion control noted at eastern side of amenity bund, but sediment fencing/erosion controls requiring maintenance. Planting appears successful with eucalypts, acacias, and grasses. Neighbouring fencing noted. Consider log emplacement (pinned down) for habitat and erosion control.
RM2	Superb Fairywren, Magpie Lark, Nankeen Kestrel, Nosy Miner, Pied Currawong, Kangaroo, Wallaby, Rabbit, Hare, Olive-back Oriole, Striated Pardalote, Grey Fantail. Domestic dogs barking at neighbouring house.	• Natural regeneration present, including shrubs (mainly Sifton Bush) and ground layer species. Canopy regeneration appears to be absent from plot. • Native species cover and diversity generally limited in the canopy layer, therefore tree planting should be considered for this area. • General health is moderate, but species diversity appears to be low in open areas. • Weed occurrence is minor, including Blackberry. • Threatened/significant species not recorded. • Feral animals noted include minor evidence of rabbits/hares (scats). • Erosion was noted including minor sheet erosion scattered throughout area. • Fire evidence not recorded. Fuel loads thought to be low due to limited litter and logs, but dense Sifton Bush can present as a fire hazard. Sifton Bush control should be considered for fire management and to improve ecological diversity. • Disturbance signs including grazing by native and feral animal species (Wallaby, Kangaroo, rabbit/hare) • Site management and successes not recorded
RM3	Welcome Swallow, Magpie Lark, Superb Fairy wren, Australian Raven, Corella, Silvereye.	• Natural regeneration present, including shrubs (mainly Sifton Bush) and ground layer species. Canopy regeneration is poor, but one Eucalypt was recorded in the plot. • Native species cover and diversity generally poor, recommend Sifton Bush control and tree planting. Paddock areas are being overtaken by *Cassinia sifton*. Upslope vegetation appears to be dominated by *E. mannifera*, *E. bridgesiana*, *E. sieberi*, *E. blakelyi* with *Cassinia sifton*. • General health of the vegetation is low to moderate with Sifton Bush overtaking paddocks and native species diversity low. • Weed occurrence is low, with some Cats-ear noted. • Threatened/significant species not recorded. • Feral animals noted include rabbit/hare (scats). • Erosion not recorded. • Fire evidence not recorded. Fuel loads thought to be low due to limited litter and logs, but dense Sifton Bush can present as a fire hazard. Sifton Bush control should be considered for fire management and to improve ecological diversity. • Disturbance signs including historic clearing and grazing by kangaroos and wallabies. • Site management and successes not recorded.
RM4	Grey Fantail, Magpie lark, Magpie, Wallaby, Kangaroo, Rabbit, Wombat burrows, Spotted Marsh Frog, Rufous Whistler.	• Natural regeneration present, including Eucalypts and Acacias, but minimal. • Native species cover and diversity generally moderate, with some potential to regenerate passively, though grasses noted as dominant. • General health of the vegetation is moderate to good with some regeneration occurring. • Weed occurrence is noted including Serrated Tussock Grass and a low occurrence of common annual weeds. • Threatened/significant species not recorded. • Feral animals noted include rabbits, evidenced by scats and warrens (possibly inactive). • Erosion was noted as minor sheet erosion near the bund. • Fire evidence not recorded. Fuel loads low, management not likely required. • Disturbance signs include a small man-made bund, potentially for drainage and native/feral animal grazing throughout the plot. • Site management and successes not recorded

Site	Fauna observations	General observation notes
RM5	White-throated Treecreeper, Grey Fantail, Kangaroo, Wallaby.	• Natural regeneration present, in understorey and ground layer, but appears absent in canopy. Paddock areas are being taken over by Sifton Bush. • Native species cover and diversity generally poor particularly in canopy layer. • General health is low to moderate. Plot being taken over by Sifton Bush hindering regeneration of other species. • Weed occurrence is high for exotic perennial grass. • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded, but it is possible that there is a small drainage line through the plot. • Fire evidence not recorded. Fuel loads thought to be low due to limited litter and logs, but dense Sifton Bush can present as a fire hazard. Sifton Bush control should be considered for fire management and to improve ecological diversity. • Disturbance signs including historic clearing and grazing by kangaroos and wallabies. • Site management noted include protection fencing of the general area.
BG1	Magpie, Rufous Whistler, Wallaby, Kangaroo, Magpie Lark	• Natural regeneration present, low in canopy layer but moderate in shrub and ground layers. • Native species cover and diversity not recorded, no planting needed. • General health moderate to good, but the trees appear over mature and juvenile trees are limited. • Weed occurrence is low with some thistles and patches of Serrated Tussock throughout. • Threatened/significant species not recorded. • Feral animals noted include evidence of rabbit/hare and fox (scats). • Erosion noted in nearby drainage line, with evidence of sheet erosion noted at the plot. • Fire evidence not recorded. Fuel loads are moderate with dry logs, stags, and leaf litter present. Fire management may be required, and ecological burn could be beneficial to improve the diversity in the understorey. • Disturbance signs were minimal with possible native wildlife grazing. • Site management noted include environmental protection fencing.
BG2	Kangaroo, Wallaby, Wombat, Willy Wagtail, Grey Fantail. Habitat connectivity and suitability may be affected by proximity to Hume Highway.	• Natural regeneration present, especially in the canopy (Eucalypts) • Native species cover and diversity low in ground layer but high in shrub layer. • General health of vegetation is good with high levels of regeneration occurring. • Weed occurrence is not recorded. • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded. • Fire evidence not recorded. Moderate fuel loads due to leaf litter, fire management may be required. • Disturbance signs include potential for native animal grazing due to evidence of Kangaroos, Wallabies and Wombats. • Site management and successes not recorded.
CR1	Red-browed Finch, Pied Cormorant, Common Eastern Froglet, Skink, Sign-bearing Froglet, Striped Marsh Frog, Spotted Marsh Frog.	• Natural regeneration present, mostly in the understorey and ground layer, but a few juvenile eucalypts were also recorded. • Native species cover and diversity is noted as low in the canopy layer, therefore planting native trees would be beneficial. • General health of the vegetation is moderate. • Weed occurrence is noted including exotic perennial grasses, common annual weeds and Blackberry. • Threatened/significant species not recorded. • Feral animals were not recorded. • Erosion was noted including minor sheet erosion and bank erosion. Areas of bare ground were noted. • Fire evidence not recorded, fuel loads generally low to moderate and fire management not likely to be required here. • Disturbance signs include natural grazing (Wombat hole?) and historic clearing. • Site management and successes not recorded.

Site	Fauna observations	General observation notes
CR2	Noisy Friarbird, Magpie lark, Sign-bearing Froglet, Silvereye, Spotted Marsh Frog, Grey Fantail, Willie Wagtail, Pied Currawong.	• Natural regeneration present, including canopy. • Native species cover and diversity generally good with no immediate need for planting. • General health of vegetation is moderate to good with regeneration and some weeds. • Weed occurrence is noted including abundant Serrated Tussock and Blackberry. A targeted program of Blackberry and Serrated Tussock control is recommended along the creek. • Threatened/significant species not recorded. • Feral animals noted include rabbits evidenced by scats and warrens. Rabbit control should be considered. • Erosion is severe in this area, being mainly concentrated along the creek and including bank and channel erosion. Erosion control is required. • Fire evidence not recorded. Fuel loads are low to moderate. Fire management may be required. • Disturbance signs recorded include natural grazing by kangaroos and wallabies. • Site management noted include some erosion controls that appear to be underway outside the plot and closer to the road. Additional widespread erosion control is recommended.

Table B-8: Species Richness analysis for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Tree	3	3	3	3	3	1	0	3	0	2	4	1	3
Shrub	4	7	12	2	3	4	1	2	3	2	2	1	4
Grass & grasslike	6	6	3	6	1	4	3	5	4	9	7	2	7
Forb	7	7	7	6	5	5	1	1	2	12	3	2	3
Fern	0	1	1	0	0	1	0	1	0	0	0	0	0
Other	1	0	1	0	0	0	0	0	0	0	0	0	0
HTW	1	4	0	1	3	2	1	2	2	1	1	2	3
Non-HTW	0	8	0	5	10	6	6	4	4	8	6	14	9
TOTAL WEED SPECIES	1	12	0	6	13	8	7	6	6	9	7	16	12

Table B-9: Species Cover analysis for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Tree	21.1	23	35.1	27	1.1	0.1	0	13.1	0	6	13.1	5	27
Shrub	20.3	73.6	90.7	5.2	20.3	40.3	10	30.1	45.2	25	60	0.1	39.7
Grass & grasslike	6	27.2	8.1	0.7	0.1	10.7	45.1	20.6	6.2	5	1.5	10.1	40.7
Forb	7.6	0.7	15.8	0.8	1	30.3	0.1	0.2	1.1	1.6	0.4	0.2	0.3
Fern	0	0.1	0.1	0	0	0.1	0	0.1	0	0	0	0	0
Other	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0
HTW	0.1	1.7	0	10	15.2	3.1	0.1	1.1	0.2	1	0.1	3.2	5.3
Non-HTW	0	0.8	0	0.5	27.8	0.7	2.5	0.5	45.4	1.3	3.6	46.1	1.1
TOTAL WEED SPECIES	0.1	2.5	0	10.5	43	3.8	2.6	1.6	45.6	2.3	3.7	49.3	6.4

Table B-10: Target Species Richness analysis for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Target PCT	3643	3486	3486	3373	3376	3376	3376	3376	3373	3376	3376	3376	3373
Tree	3	3	2	3	3	1	0	2	0	2	3	1	3
Shrub	4	6	9	2	2	3	1	2	3	2	2	1	3

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Grass & grasslike	6	5	3	5	1	4	3	5	3	9	6	2	6
Forb	7	7	7	5	5	5	1	1	2	11	2	1	2
Fern	0	1	1	0	0	1	0	1	0	0	0	0	0
Other	1	0	1	0	0	0	0	0	0	0	0	0	0

Table B-11: Target Species Cover analysis for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Target PCT	3643	3486	3486	3373	3376	3376	3376	3376	3373	3376	3376	3376	3373
Tree	21.1	23	5.1	27	1.1	0.1	0	5.1	0	6	8.1	5	27
Shrub	20.3	3.6	85.4	5.2	20.1	40.2	10	30.1	45.2	25	60	0.1	39.5
Grass & grasslike	6	27.1	8.1	0.6	0.1	10.7	45.1	20.6	6.1	5	1.3	10.1	40.6
Forb	7.6	0.7	15.8	0.7	1	30.3	0.1	0.2	1.1	1.4	0.3	0.1	0.2
Fern	0	0.1	0.1	0	0	0.1	0	0.1	0	0	0	0	0
Other	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0

Table B-12: Proportion of Target Species Richness analysis for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Target PCT	3643	3486	3486	3373	3376	3376	3376	3376	3373	3376	3376	3376	3373
Tree	100.0	100.0	66.7	100.0	100.0	100.0	0	66.7	0	100.0	75.0	100.0	100.0
Shrub	100.0	85.7	75.0	100.0	66.7	75.0	100.0	100.0	100.0	100.0	100.0	100.0	75.0
Grass & grasslike	100.0	83.3	100.0	83.3	100.0	100.0	100.0	100.0	75.0	100.0	85.7	100.0	85.7
Forb	100.0	100.0	100.0	83.3	100.0	100.0	100.0	100.0	100.0	91.7	66.7	50.0	66.7
Fern	0	100.0	100.0	0	0	100.0	0	100.0	0	0	0	0	0
Other	100.0	0	100.0	0	0	0	0	0	0	0	0	0	0

Table B-13: Proportion of Target Species Cover analysis for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
Target PCT	3643	3486	3486	3373	3376	3376	3376	3376	3373	3376	3376	3376	3373
Tree	100.0	100.0	14.5	100.0	100.0	100.0	0	38.9	0	100.0	61.8	100.0	100.0
Shrub	100.0	4.9	94.2	100.0	99.0	99.8	100.0	100.0	100.0	100.0	100.0	100.0	99.5
Grass & grasslike	100.0	99.6	100.0	85.7	100.0	100.0	100.0	100.0	98.4	100.0	86.7	100.0	99.8
Forb	100.0	100.0	100.0	87.5	100.0	100.0	100.0	100.0	100.0	87.5	75.0	50.0	66.7
Fern	0	100.0	100.0	0	0	100.0	0	100.0	0	0	0	0	0
Other	100.0	0	100.0	0	0	0	0	0	0	0	0	0	0

Table B-14: VI score data for 2023

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
pct	3643	3486	3486	3373	3376	3376	3376	3376	3373	3376	3376	3376	3373
area	5	5	5	5	5	5	5	5	5	5	5	5	5
patchsize	100	100	100	100	100	100	100	100	100	100	100	100	100
conditionclass	R1_23	R2_23	R3_23	R4_23	RM1_23	RM2_23	RM3_23	RM4_23	RM5_23	BG1_23	BG2_23	CR1_23	CR2_23
zone	56	56	56	56	56	56	56	56	56	56	56	56	56

	R1	R2	R3	R4	RM1	RM2	RM3	RM4	RM5	BG1	BG2	CR1	CR2
easting	771155.1	772059.7	772844.6	773491.9	769915.4	773464.8	773741.8	770845.1	771706.9	769577.1	771851.8	771326.2	773062.9
northing	6154011	6155132	6155654	6156306	6157908	6155743	6155457	6153936	6153029	6154113	6152990	6154954	6153023
bearing	0	0	0	0	0	0	0	0	0	0	0	0	0
compTree	3	3	3	3	3	1	0	3	0	2	4	1	3
compShrub	4	7	12	2	3	4	1	2	3	2	2	1	4
compGrass	6	6	3	6	1	4	3	5	4	9	7	2	7
compForbs	7	7	7	6	5	5	1	1	2	12	3	2	3
compFerns	0	1	1	0	0	1	0	1	0	0	0	0	0
compOther	1	0	1	0	0	0	0	0	0	0	0	0	0
strucTree	21.1	23	35.1	27	1.1	0.1	0	13.1	0	6	13.1	5	27
strucShrub	20.3	73.6	90.7	5.2	20.3	40.3	10	30.1	45.2	25	60	0.1	39.7
strucGrass	6	27.2	8.1	0.7	0.1	10.7	45.1	20.6	6.2	5	1.5	10.1	40.7
strucForbs	7.6	0.7	15.8	0.8	1	30.3	0.1	0.2	1.1	1.6	0.4	0.2	0.3
strucFerns	0	0.1	0.1	0	0	0.1	0	0.1	0	0	0	0	0
strucOther	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0
funLargeTrees	1	0	3	3	0	0	0	0	0	3	1	0	3
funHollowtrees	0	0	11	2	0	0	0	0	0	6	0	0	2
funLitterCover	54	51	70	91	47	49	32	55	50	74	87	35	64
funLenFallenLogs	16	28	64	5	0	1	0	9	0	44	0	5	12
funTreeStem5to9	1	1	1	1	0	0	0	1	0	0	1	1	1
funTreeStem10to19	1	1	1	1	0	0	0	1	0	0	1	1	1
funTreeStem20to29	1	1	1	1	0	0	0	0	0	0	1	0	1
funTreeStem30to49	1	1	1	1	0	0	0	1	0	1	1	0	1
funTreeStem50to79	1	0	1	1	0	0	0	0	0	1	1	0	1
funTreeRegen	1	1	1	1	1	0	0	1	0	1	1	1	1
funHighThreatExotic	0.1	1.7	0	10	15.2	3.1	0.1	1.1	0.2	1	0.1	3.2	5.3

Table B-15: BAM-C Outputs

Category	Plot	Year	Composition Score	Structure Score	Function Score	Vegetation Integrity Score
Retained Vegetation	R1	2020	49.8	49	64.6	54
Retained Vegetation	R1	2023	62.8	55	53.9	57.1
Retained Vegetation	R2	2020	58.3	49.3	26.9	42.6
Retained Vegetation	R2	2023	58.2	70.1	44.5	56.6
Retained Vegetation	R3	2020	61.6	90.5	78.9	76

Category	Plot	Year	Composition Score	Structure Score	Function Score	Vegetation Integrity Score
Retained Vegetation	R3	2023	50.6	76.2	92.4	70.9
Retained Vegetation	R4	2020	74.7	35	83.8	60.3
Retained Vegetation	R4	2023	46.9	41.5	80.3	53.9
Rehabilitation	RM1	2021	3	1.5	0	0.6
Rehabilitation	RM1	2022	0.2	1.3	0	0.2
Rehabilitation	RM1	2023	27.9	7	30	18
Rehabilitation	RM2	2021	38.7	22	15.1	23.4
Rehabilitation	RM2	2022	38.2	21.4	15.3	23.2
Rehabilitation	RM2	2023	37.9	29.4	15	25.6
Rehabilitation	RM3	2021	23.2	35.3	0	2.7
Rehabilitation	RM3	2022	19.6	47.3	0.5	7.6
Rehabilitation	RM3	2023	7.3	53.3	13.3	17.3
Rehabilitation	RM4	2021	21	81.4	23	34
Rehabilitation	RM4	2022	29.3	88	32.1	43.6
Rehabilitation	RM4	2023	31.6	61.9	45.1	44.5
Rehabilitation	RM5	2021	43.4	53.5	0.2	7.1
Rehabilitation	RM5	2022	36.1	58.6	0.2	7.5
Rehabilitation	RM5	2023	20.5	10	15	14.5
Box-Gum	BG1	2021	60.1	80.4	58.8	65.8
Box-Gum	BG1	2022	66.7	70.6	25.3	49.2
Box-Gum	BG1	2023	70.4	13.4	86.8	43.4
Box-Gum	BG2	2021	63.7	51.1	44.9	52.7
Box-Gum	BG2	2022	69.1	41.4	43.9	50.1
Box-Gum	BG2	2023	38.4	27.5	54.7	38.7
Core Riparian	CR1	2022	8.7	13.7	18.3	13
Core Riparian	CR1	2023	5.9	12.1	38.2	14
Core Riparian	CR2	2022	43.3	78.7	31	47.3
Core Riparian	CR2	2023	46.9	88	82.7	69.9

Appendix C Fauna Species List

Lynwood Quarry, NSW

Ecological Monitoring 2023

Holcim Australia Pty Ltd

SLR Project No.: 630.V13844.00001

5 March 2024

Table C-1: Fauna species list at Retained Vegetation Sites in 2023

Animal	Status	Scientific Name	Common Name	Observation Type	R1	R2	R3	R4
Bird	Exotic	*Acridotheres tristis*	Common Myna	Sighted		✓		
Bird	Native	*Colluricincla harmonica*	Grey Shrike-thrush	Sighted			✓	✓
Bird	Native	*Coracina novaehollandiae*	Black-faced Cuckoo Shrike	Sighted		✓		✓
Bird	Native	*Cormobates leucophaea*	White throated Treecreeper	Sighted	✓		✓	✓
Bird	Native	*Corvus coronoides*	Australian Raven	Sighted	✓	✓		✓
Bird	Native	*Cracticus tibicen*	Australian Magpie	Sighted	✓	✓	✓	✓
Bird	Native	*Cracticus torquatus*	Grey Butcherbird	Sighted		✓		✓
Bird	Native	*Dacelo novaeguineae*	Laughing Kookaburra	Sighted			✓	✓
Bird	Native	*Egretta novaehollandiae*	White-faced Heron	Spotlighted, IR camera		✓		
Bird	Native	*Grallina cyanoleuca*	Magpie Lark	Sighted, IR camera	✓	✓	✓	✓
Bird	Native	*Gymnorhina tibicen*	Australian Magpie	Sighted		✓		
Bird	Native	*Hirundo neoxena*	Welcome Swallow	Sighted	✓			
Bird	Native	*Malurus cyaneus*	Superb Fairy-wren	Sighted		✓	✓	
Bird	Native	*Manorina melanocephala*	Noisy Miner	Sighted	✓	✓		✓
Bird	Native	*Melithreptus lunatus*	White-naped Honeyeater	Sighted			✓	
Bird	Native	*Ocyphaps lophotes*	Crested Pigeon	Sighted				✓
Bird	Native	*Pachycephala rufiventris*	Rufous Whistler	Sighted			✓	
Bird	Native	*Pardalotus punctatus*	Spotted Pardalote	Sighted	✓			
Bird	Native	*Philemon corniculatus*	Noisy Friarbird	Sighted	✓			
Bird	Native	*Platycercus elegans*	Crimson Rosella	Sighted		✓		
Bird	Native	*Platycercus eximius*	Eastern Rosella	Sighted	✓	✓		✓
Bird	Native	*Rhipidura albiscapa*	Grey Fantail	Sighted	✓	✓	✓	
Bird	Native	*Sericornis frontalis*	White-browed Scrubwren	Sighted	✓	✓	✓	
Bird	Native	*Strepera graculina*	Pied Currawong	Sighted	✓		✓	✓
Bird	Native	*Todiramphus sanctus*	Sacred Kingfisher	Sighted			✓	
Bird	Native	*Vanellus miles*	Masked Lapwing	Sighted		✓		
Crustacean	Native	*Cherax destructor*	Yabby	Spotlighted		✓		
Crustacean	Native	*Paratya australiensis*	Freshwater Shrimp	Spotlighted		✓		
Frog	Native	*Crinia parinsignifera*	Eastern Sign-bearing Froglet	Heard	✓		✓	✓
Frog	Native	*Limnodynastes peronii*	Brown-striped Frog	Spotlighted/heard				✓
Frog	Native	*Litoria fallax*	Eastern Dwarf Frog	Spotlighted/heard				✓
Frog	Native	*Litoria peronii*	Peron's Tree Frog	Spotlighted/heard	✓	✓	✓	✓
Mammal	Native	*Chalinolobus gouldii*	Gould's Wattled Bat	Bat detector		✓		
Mammal	Native	*Chalinolobus morio*	Chocolate Wattled Bat	Bat detector		✓		
Mammal	Exotic	*Felis catus*	Cat	Spotlighted				✓
Mammal	Native	*Macropus giganteus*	Eastern Grey Kangaroo	Spotlighted, IR camera	✓	✓	✓	✓

Animal	Status	Scientific Name	Common Name	Observation Type	R1	R2	R3	R4
Mammal	Vulnerable	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	Bat detector		✓		
Mammal	Native	*Nyctophilus* sp.	Unidentified Long-eared Bat	Bat detector		✓		
Mammal	Exotic	*Oryctolagus cuniculus*	European Rabbit	Spotlighted		✓		
Mammal	Native	*Petaurus breviceps*	Sugar Glider	Spotlighted	✓	✓	✓	
Mammal	Native	*Petaurus* sp.	Potential Squirrel Glider	Spotlighted		✓		
Mammal	Native	*Trichosurus vulpecula*	Brushtail Possum	Spotlighted	✓		✓	
Mammal	Native	*Vespadelus vulturnus*	Little Forest Bat	Bat detector		✓		
Mammal	Native	*Vombatus ursinus*	Common Wombat	IR camera			✓	
Mammal	Exotic	*Vulpes vulpes*	Fox	Spotlighted, IR camera		✓		
Mammal	Native	*Wallabia bicolor*	Swamp Wallaby	Spotlighted			✓	
Reptile	Native	*Lampropholis* sp.	Sunskink	Sighted	✓	✓		✓

Appendix D Nest Box Inventory

Lynwood Quarry, NSW

Ecological Monitoring 2023

Holcim Australia Pty Ltd

SLR Project No.: 630.V13844.00001

5 March 2024

Table D-1: Result of Nest Box Inspection

Box ID	Box Type	Native Fauna Occupancy (Y/N)				Pests (Y/N)	Repair (Y/N)	Comment (species present, signs of use, repair etc.)	Photo/ video number
		Fauna	Nest	Eggs	Young				
JC-1-1	Squirrel Glider	Y	Y	N	Y	N	Y	Gliders (4+), potential young. Box deteriorating.	2:28
JC-1-2	Squirrel Glider	N	Y	N	N	N	N		2:52
JC-1-3	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	2:54
JC-1-4	Micro-Bat	N	N	N	N	N	N	Empty	2:50
JC-2-1	Brushtail Possum	N	Y	Y	N	N	N	Nest with medium-large eggs, feathers and leaves	1:50
JC-2-2	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	1:56
JC-2-3	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	2:14
JC-2-4	Micro-Bat	N	N	N	N	N	Y	Needs relocation to new tree, host tree has broken and fallen onto the ground	2:09
JC-2-5	Squirrel Glider	N	Y	N	N	N	Y	Leaf nest, box starting to deteriorate	2:00
JC-3-1	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	1:08
JC-3-2	Squirrel Glider	N	Y	N	N	Y	Y	Inactive wasp nest. Slight chew marks	1:06
JC-3-3	Squirrel Glider	Y	Y	N	N	N	N	Leaf nest, with Glider	1:12
JC-3-4	Micro-Bat	N	N	N	N	Y	Y	Inactive wasp nest, needs to be cleaned out	1:20
JC-4-1	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	12:48
JC-4-2	Squirrel Glider	Y	Y	N	Y	N	N	Leaf nest. Glider (x2)	12:42
JC-4-3	Brushtail Possum	N	Y	N	N	N	N	Fragments of egg shells, potentially a Wood Duck nest	12:43
JC-4-4	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	12:52
JC-4-5	Micro-Bat	N	N	N	N	N	N	Empty	12:57
JC-5-1	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	2:23
JC-5-2	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	2:29
JC-5-3	Squirrel Glider	Y	Y	N	Y	N	N	Multiple gliders in leaf nest, potential young	2:20
HMA-1-1	Brushtail Possum	N	Y	N	N	N	N	Leaf litter, eggshells. Old Wood Duck nest.	10:14
HMA-1-2	Squirrel Glider	Y	Y	N	Y	N	N	Multiple gliders in leaf nest with young	10:17
HMA-1-3	Squirrel Glider	Y	Y	N	Y	N	N	Multiple gliders in leaf nest with young	10:26
HMA-1-4	Ringtail Possum	N	N	N	N	N	N	Eggshell fragments	10:31
HMA-1-5	Micro-Bat	N	N	N	N	N	N	Empty	10:21

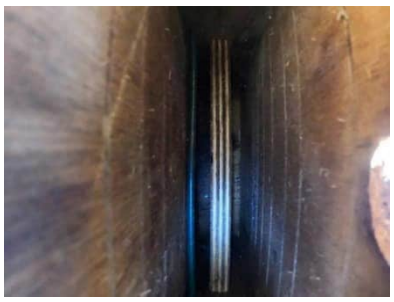
Box ID	Box Type	Native Fauna Occupancy (Y/N)				Pests (Y/N)	Repair (Y/N)	Comment (species present, signs of use, repair etc.)	Photo/ video number
		Fauna	Nest	Eggs	Young				
HMA-1-6	Owlet Nightjar	N	Y	N	N	N	N	Leaf Nest	10:18
HMA-1-7	Owlet Nightjar	N	Y	N	N	N	N	Nest with feathers	10:23
HMA-2-1	Squirrel Glider	Y	Y	N	Y	N	N	Multiple Gliders, few young, not much of a nest	9:49
HMA-2-2	Brushtail Possum	Y	Y	N	N	N	N	Wood Duck Nest with deceased duck	10:00
HMA-2-3	Rosella	N	Y	N	N	N	N	Chew marks on outside, wood duck nest inside	9:51
HMA-2-4	Owlet Nightjar	N	Y	N	N	N	N	Leaf Nest	9:57
HMA-2-5	Micro-Bat	N	N	N	N	N	N	Empty	9:52
HMA-3-1	Ringtail Possum	N	Y	N	N	N	N	Nest	8:52
HMA-3-2	Brushtail Possum	N	Y	N	N	N	N	Old fragments of eggshells	8:56
HMA-3-3	Brushtail Possum	Y	Y	N	N	N	N	Brushtail Possum	8:44
HMA-3-4	Owlet Nightjar	N	Y	N	N	N	N	Leaf nest, chew marks around outside	8:46
HMA-3-5	Rosella	N	Y	N	N	N	N	Leaf nest, chew marks around outside	8:50
HMA-4-1	Brushtail Possum	N	Y	N	N	N	N	Old eggshell fragments, leaf litter	4:02
HMA-4-2	Rosella	N	Y	N	N	N	Y	Leaf Nest. Needs to be tighter on tree (replace attachment). Chew marks	3:54
HMA-4-3	Squirrel Glider	N	Y	N	N	N	N	Leaf and feather nest	3:58
HMA-4-4	Micro-Bat	N	N	N	N	N	N	Empty	4:06
HMA-5-1	Owlet Nightjar	N	Y	N	N	N	N	Leaf nest	10:56
HMA-5-2	Micro-Bat	N	N	N	N	N	N	Empty	11:03
HMA-5-3	Rosella	N	Y	N	N	N	N	Leaf nest, chew marks	11:00
HMA-5-4	Squirrel Glider	N	Y	N	N	N	N	Leaf nest	10:37
HMA-6-1	Ringtail Possum	N	Y	N	N	N	N	Poor condition nest, old eggshell fragments	9:00
HMA-6-2	Brushtail Possum	N	Y	N	N	N	N	Old eggshell fragments	9:11
HMA-6-3	Ringtail Possum	N	Y	N	N	N	N	Leaf Litter, partial nest	9:09
HMA-6-4	Brushtail Possum	N	Y	N	N	N	N	Leaf litter, partial nest	9:06
HMA-12-2	Micro-bat	N	N	N	N	N	N	Empty	11:20
HMA-12-3	Possum/ Glider	N	Y	N	N	N	N	Leaf Nest	11:22
HMA-13-6	Possum/ Glider	Y	N	N	N	N	N	Glider, chew marks	11:23

Box ID	Box Type	Native Fauna Occupancy (Y/N)				Pests (Y/N)	Repair (Y/N)	Comment (species present, signs of use, repair etc.)	Photo/ video number
		Fauna	Nest	Eggs	Young				
HMA-13-5	Possum/ Glider	N	Y	N	N	N	N	Leaf nest	11:24
HMA-13-1	Possum/ Glider	N	Y	N	N	N	N	Leaf nest, spider web	11:29
HMA-13-2	Possum/ Glider	Y	N	N	N	N	N	Brushtail Possum	11:30
HMA-13-10	Possum/ Glider	N	Y	N	N	N	N	Leaf Nest	11:32
HMA-13-8	Possum/ Glider	N	Y	N	N	N	N	Bird nest	11:34
HMA-13-7	Possum/ Glider	N	Y	N	N	N	N	Leaf Nest	11:37

Table D-2: Photograph Thumbnails of Nest Box Inspections

		
JC-1-1	JC-1-2	JC-1-3
		
JC-1-4	JC-2-1	JC-2-2
	NA – Box not operational	
JC-2-3	JC-2-4	JC-2-5
		
JC-3-1	JC-3-2	JC-3-3
		
JC-3-4	JC-4-1	JC-4-2

		
JC-4-3	JC-4-4	JC-4-5
		
JC-5-1	JC-5-2	JC-5-3
		
HMA-1-1	HMA-1-2	HMA-1-3
		
HMA-1-4	HMA-1-5	HMA-1-6
		
HMA-1-7	HMA-2-1	HMA-2-2

		
HMA-2-3	HMA-2-4	HMA-2-5
		
HMA-3-1	HMA-3-2	HMA-3-3
		
HMA-3-4	HMA-3-5	HMA-4-1
		
HMA-4-2	HMA-4-3	HMA-4-4
		
HMA-5-1	HMA-5-2	HMA-5-3

		
HMA-5-4	HMA-6-1	HMA-6-2
		
HMA-6-3	HMA-6-4	HMA-12-3
		
HMA-12-3	HMA-13-1	HMA-13-2
		
HMA-13-5	HMA-13-6	HMA-13-7
		
HMA-13-8	HMA-13-10	

Appendix E Hoary Sunray Monitoring Plot Data

Lynwood Quarry, NSW

Ecological Monitoring 2023

Holcim Australia Pty Ltd

SLR Project No.: 630.V13844.00001

5 March 2024

Table E-1: Hoary Sunray Counts at (4m^2 plot) for 2023

Site ID	% cover estimate	Q1	Q2	Q3	Q4	Total
HS1	0.5	0	1	2	3	6
HS2	0.01	1	0	0	0.01	1.01
HS3	0	0	0	0	0	0
HS4	0	0	0	0	0	0
HS5	0	0	0	0	0	0
HS6	3	5	4	4	5	18
HS7	1	3	5	11	2	21
HS8	0	0	0	0	0	0
HS9	0.1	0	1	0	2	3
HS10	0	0	0	0	0	0
HS11	0.2	0	0	2	1	3

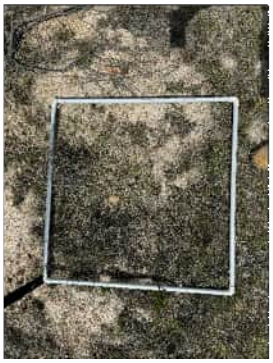
Table E-2: Hoary Sunray Health and Disturbance Impact Notes

Site ID	Erosion (Severity/Age)		Grazing (Severity/Age)		Weediness (Severity/Age)		General Health	General Notes
	Sv	Ag	Sv	Ag	Sv	Ag		
HS1	0	0	1	R	1	R	Moderate	Evidence of grazing. Sparse occurrence of HS in plot 3 surrounding area and few scattered around. Some Sifton Bush present and Leptospermum. Thin but healthy individuals.
HS2	0	0	1	R	1	R	Poor	Only couple found around plot area, very sparse. Browning-unhealthy. Evidence of native grazing. Sifton Bush around plot area.
HS3	0	0	1	R	1	R	None	Sparse few around plot, more found in plot. Evidence of native grazing. Sifton Bush and Leptospermum surrounding.
HS4	0	0	1	R	1	R	Poor	Some native grazing (scats). Few in adjacent area, none found in plot. Leptospermum surrounding.
HS5	0	0	1	R	1	R	Poor	Rocky outcrop. No HS in immediate area. Sifton Bush abundant. Some native grazing evident.
HS6	0	0	1	R	1	R	Moderate	Quite a few patches around plots and area. Not big clumps, no browning. Some native grazing evident.
HS7	0	0	1	R	1	R	Poor	Most HS in plot browning and not in best condition. Some native grazing (scats). Vegetation is dry. Sparse HS in adjacent areas.
HS8	0	0	1	R	1	R	Poor	Shaded area from Sifton Bush. Some regen eucalypts. Area dry, native grazing. None spotted in surrounding area.
HS9	0	0	1	R	1	R	Poor	Sifton Bush in area-potential to out compete. Not many in areas. Grazing of kangaroos. Past bloom, dying off. Potential shading.
HS10	0	0	1	R	1	R	Moderate	None found in plots. Some found adjacent, quite healthy condition. Some light native grazing (scats). Potentially dry weather impact. Surrounding HS not very dense.
HS11	1	NR	0	NR	1	R	Poor	Small clumps, few individuals, browning or dead. Extent reduced, recommend remapping. Dry season has potential impacts.
KEY: Health (indicated by vigour, leaf browning, size of clumps): Poor, moderate, good. Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe. Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)								

Table E-3: Photograph Thumbnails of Hoary Sunray Monitoring Plots

Site	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
HS1				
HS2				
HS3				
HS4				

Site	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
HS5				
HS6				
HS7				
HS8				

Site	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
HS9				
HS10				
HS11				

Appendix F Assessment of Completion Criteria

Lynwood Quarry, NSW

Ecological Monitoring 2023

Holcim Australia Pty Ltd

SLR Project No.: 630.V13844.00001

5 March 2024

Table F-1: Assessment of Revegetated Areas Preliminary Completion Criteria (applies to the Amenity Bund ie RM1)

Area	Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
Planting or direct seeding areas	Vegetation has been established at the revegetation area and there are no additional works required to be undertaken to assist to meet the requirements of the rehabilitation management plan or any other management plan.	Ground cover comparable to surrounding environment and the establishment of revegetation is such that it no longer requires attention to assure its successful development (>3 years of growth).	Monitor annually until condition criteria achieved.	On track. Native vegetation was planted at the western side of Amenity Bund in 2022. Ground cover improvement likely to be required.
Amenity Bund and emplacement areas	Rehabilitated areas are stable.	Areas of exposed soils are revegetated to achieve cohesive ground cover using a native plant species mix compatible with the surrounding environment and erosion has stabilised and resembles natural processes.	Monitor annually until condition criteria achieved.	On track. Light erosion noted at RM1 plot. Ongoing erosion control required for the amenity bund.
Natural areas	The site is managing significant weed or feral animal infestations	No increase in weed and feral pest populations and monitoring indicates the absence of or decline in weed species. Weeds comprise no more than 15%.	Annual weed monitoring. When monitoring indicates weeds comprise no more than 15% monitoring can be amended to every 3 years. Every 7 years feral animal monitoring is undertaken.	On track. Weed covers overall declined in 2023. Evidence of feral animals recorded at each site (mainly Rabbits) but no evidence of major infestations (eg networks of active burrows). Ongoing weed control and feral animal management required.
Planting or direct seeding areas	The rehabilitated community is representative of the targeted vegetation community being PCT1330 - Yellow Box - Blakely's Red Gum grassy woodland on the	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use. More than 56%	When monitoring indicates revegetation has established on disturbed areas and stratum has reached more than 56% established,	On track. Native vegetation was planted at the western side of Amenity Bund in 2022. Trees approximately 0.3-1m height.

Area	Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
	tablelands, South Eastern Highlands Bioregion.	of established trees are healthy and growing and the rehabilitation is recognisable as PCT 1330.	healthy trees (1.5 to 2m in height) or approximately 10 years from planting.	
Habitat areas devoid of habitat features and accessible for log and rock placement.	Use cleared trees and boulders to create habitat features in accessible habitat management areas	All logs and boulders available for relocation have been placed in habitat areas that are accessible by machinery.	Monitor every 2 years with the intent to achieve completion within 10 years of clearing activities.	Not met. No evidence of habitat feature placement noted. No evidence provided. Stockpile of logs noted in HMA.
Areas where assisted natural regeneration is primary activity.	Monitoring has indicated that natural regeneration is occurring.	Signs of seeding occurring and signs of recruitment in all strata. Or evidence to demonstrate that the ecosystem will progress towards recruitment.	When monitoring indicates natural regeneration is establishing itself and weed coverage is <15% of the area to be regenerated.	Not met. Assisted natural regeneration areas found to require Sifton Bush control and tree planting.
Fencing, exclusion, and protection works	Rehabilitated areas signposted and fenced off from active quarry operations to prevent access.	All fences are in place, no barb wire exists in the internal fencing, signs are in place and gates are secured and operational. Internal fences that are no longer required are removed.	As completed and monitored annually for maintenance purposes.	Not met. No evidence of fencing of the amenity bund.

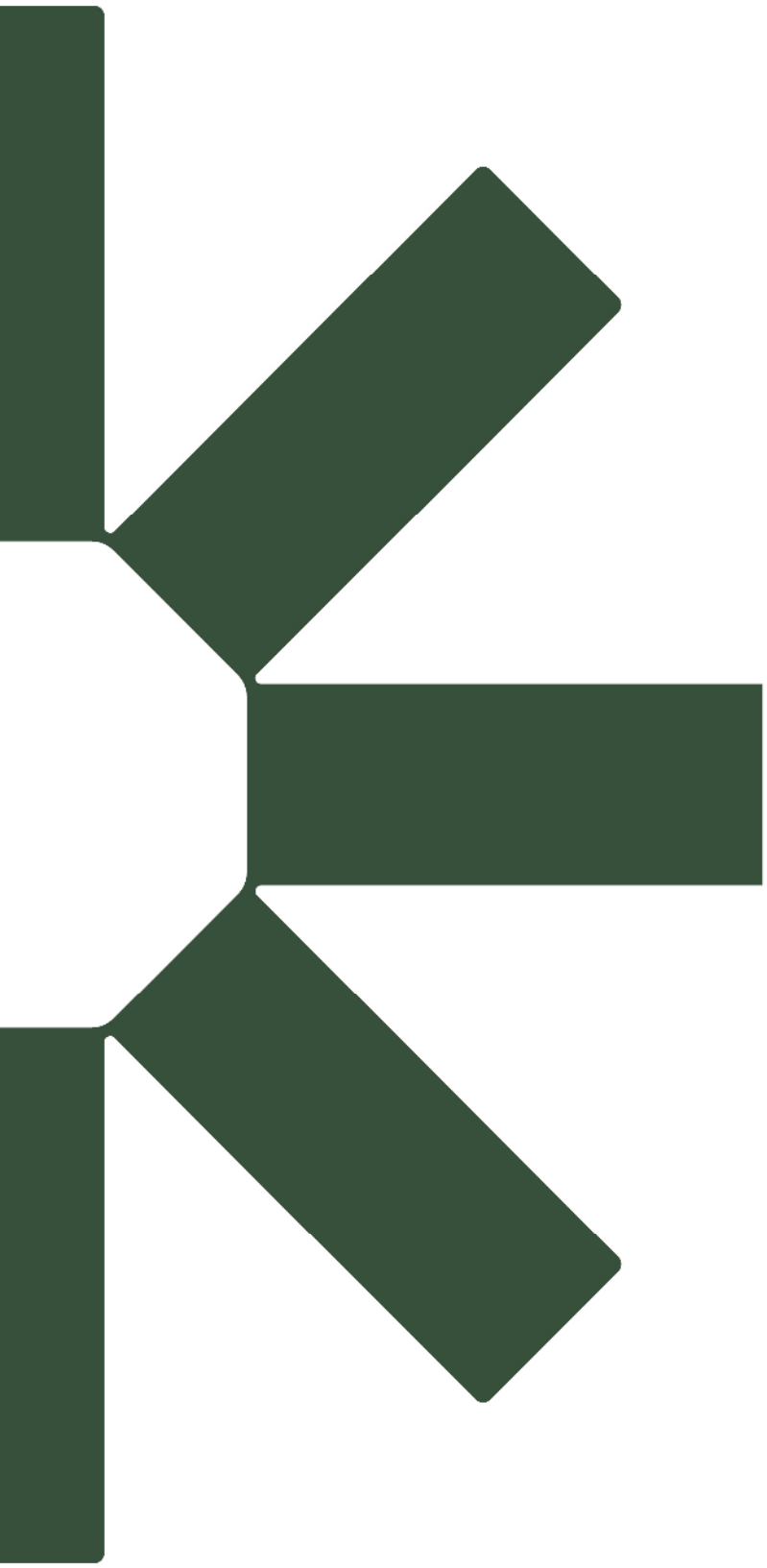
Table F-2: Assessment of Habitat Management Area Preliminary Completion Criteria (applies to the northern HMA ie RM2 and RM3)

Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
The boundary of the HMA has been fenced and internal fencing has no barb wire.	HMA signposted and fenced off from active quarry operations to prevent access. Barb wire completely removed from internal fencing.	Within 5 years of implementing the Rehabilitation and Landscape Management Plan.	Not assessed. Fencing GIS data and photos required for HMA to allow comparison to management area boundaries. Evidence of fencing was noted at RM2 and RM3.
Cattle have been excluded from the area and appropriate signage erected.	Installation of fencing around the perimeter of the HMA to exclude cattle.	Within 6 months of implementing the Rehabilitation and Landscape Management Plan.	Not assessed. Fencing GIS data and photos required for HMA to allow comparison to management areas. No evidence of cattle noted in HMA during monitoring (2020-2023).
Nest boxes have been established, monitored and are being maintained.	Nest boxes are being utilised or show signs of use by native species. Each nest box installed should be in good structural condition and functioning in the landscape.	Completed within 5 years of clearing activities	On track, fourth year of nest box monitoring completed and good evidence of usage. Minor maintenance recommended.
The site is managing significant weed or feral animal infestations with a demonstrable reduction pre-construction.	Weed and pest inspections show no increase in weed population and monitoring indicates the absence of or decline in weed species.	Annual weed monitoring. When monitoring indicates weeds comprise no more than 15% monitoring can be amended to every 3 years. Every 7 years feral animal monitoring is undertaken.	On track. Weed reduction noted in 2023. Evidence of pests generally low. Pest control evidence provided.
Natural regeneration is occurring.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment. More than 56% of trees are healthy and growing and are recognisable as PCT 1330.	When monitoring indicates revegetation has established and no longer requires assistance.	Not met. Whilst natural regeneration was found to be occurring in all layers within parts of the HMA (eg around RM2), the lower more heavily grazed sections (eg around RM3, or the southeast end of the HMA) were found to require Sifton Bush control and planting of trees.

Table F-3: Assessment of Core Riparian Corridors Preliminary Completion Criteria (applies to the Core Riparian Corridors of Jaorimin Creek and Marulan Creek)

Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
The required areas have been fenced to exclude cattle where required.	Installation of fencing around the perimeter of the corridor to exclude cattle	Within 6 months of implementing the Rehabilitation and Landscape Management Plan	Not assessed. Fencing GIS data and photos required for riparian corridor to allow comparison to management area boundaries. Evidence of fencing was noted at R2 in 2020 and CR2 in 2022.
Revegetation works have occurred along Jaorimin Creek south of the Main Southern Railway.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment. More than 56% of trees are healthy and growing.	When monitoring indicates revegetation has established on disturbed areas and stratum has reached more than 56% established, healthy trees (1.5m to 2m in height) or approximately 10 years from planting.	Not met. Rehabilitation monitoring commenced along Jaorimin Creek in 2022 with the establishment of CR1. No revegetation efforts were observed along the creek line.
Nest boxes along Jaorimin Creek have been established, monitored and are being maintained.	Nest boxes are being utilised or show signs of use by native species. Each nest box installed should be in good structural condition and functioning in the landscape	Completed within 5 years of clearing activities	On track, fourth year of nest box monitoring completed and good evidence of usage. Maintenance activities have been recommended.
The site is managing significant weed or feral animal infestations with a demonstrable reduction pre-construction.	Weed and pest inspections show no increase in weed population and monitoring indicates the absence of or decline in weed species	Annual weed monitoring. When monitoring indicates weeds comprise no more than 15% monitoring can be amended to every 3 years. Every 7 years feral animal monitoring is undertaken.	On track. Weed covers overall declined in 2023 (but still very high at CR1). Evidence of feral animals recorded at each site (mainly Rabbits) but no evidence of major infestations (eg networks of active burrows). Ongoing weed control and feral animal management required.
Monitoring has indicated that natural regeneration is occurring.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment. More than 56% of trees are healthy and growing and are recognisable as PCT 1330.	When monitoring indicates any revegetation has established and stratum has reached more than 56% establishment or approximately 10 years from any revegetation works.	Not met. Rehabilitation monitoring was established in 2022 along Jaorimin Creek (CR1) and Marulan Creek (CR2). Natural regeneration of native trees and shrubs were observed at CR2 however CR1 contained very little revegetation

Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
			and will require assistance to meet criteria through revegetation works.



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