SOUTH32
Worsley Alumina

BUSINESS BLUEPRINT

SOUTH32 WORSLEY ALUMINA (ABN 58 008 905 155)

Table of Contents

Table of Figures

Table of Tables

1 DECLARATION OF ACCURACY

I declare that:

1. *I am aware that:*
    a) *Section 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth).*
    b) *Section 112 of the EP Act makes it an offense to give or cause to be given information that to the person's knowledge is false or misleading to the Minister, the Authority, the CEO, a police officer, an inspector or an authorised person.*
    c) *The above offences are punishable on conviction by imprisonment or a fine or both.*
2. *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

[redacted]

Full name (please print)

[redacted]

Organisation (please print)

South32 Worsley Alumina

Date: 06 / 02 / 2025

2 EXECUTIVE SUMMARY

South32 Worsley Alumina Pty Ltd (Worsley), as operator for and on behalf of the Worsley Bauxite-Alumina Joint Venture, is the proponent for the Worsley Mine Expansion Revised Proposal (the Revised Proposal).

Worsley (the Proponent) proposes to continue activities that are currently approved or exempt and to expand those operations, providing access to future bauxite reserves and resources within the Primary Assessment Area (PAA) to sustain production at the Worsley Alumina Refinery near Collie. This expansion includes three main components:

- The Worsley Mining Development Envelope (WMDE), within which the next phase of mining is proposed to take place, within existing areas as well as expansion areas to the west and north of current operations. Worsley Alumina would continue to utilise existing crushing and conveying infrastructure.
- The Bauxite Transport Corridor (BTC), which would link current mining areas to new and future mining areas.
- The Contingency Bauxite Mining Envelope (CBME), which would provide for an emergency supply of bauxite close to the Refinery should it be required.

The Revised Proposal is described in its entirety in the referral for the Revised Proposal and the referral supporting document (Worsley, 2019) and the Response to Submissions document (Worsley, 2024).

This Flora and Vegetation Management Plan (FVMP) was prepared in accordance with the '*Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans*' published by the Western Australian (WA) Environment Protection Authority (EPA) (EPA, 2024) and the 'Environmental Management Plan Guidelines' published by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (DCCEEW, 2024). This FVMP details the framework for management of flora and vegetation within the Primary Assessment Area (PAA). The FVMP describes the strategies and procedures that will be implemented to assist Worsley in meeting its environmental outcomes and objectives to minimise the impact of bauxite mining and transport activities to flora and vegetation. A summary of the information contained in this FVMP is provided in Table 2-1.

Table 2-1: Flora and Vegetation Management Plan Summary Table

Proposal Name	Worsley Mine Expansion Revised Proposal
Proponent Name	South32 Worsley Alumina Pty Ltd
Ministerial Statement	Ministerial Statement 1237
Commonwealth Assessment	EPBC 2019/8437
Purpose of FVMP	This FVMP provides a framework for the management of impacts to flora and vegetation in accordance with condition B12-6 of MS1237. The FVMP is designed to fulfil the Ministers conditions set out under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Environmental Protection Act 1986 (WA)* (EP Act) and Commonwealth Approval Decision EPBC 2019/8437. The FVMP describes the strategies and procedures that will be implemented to assist Worsley with compliance with the conditions of approval and minimise the impact of bauxite mining and transport activities to flora and vegetation.
Key environmental factor/s, outcome/s and/or objectives	The key environmental factor is Flora and Vegetation **Environmental Outcomes:** (1) disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation; (2) ensure no disturbance or adverse impacts to: (a) threatened flora including *Caladenia hopperiana*; (b) *Caladenia caesarea* subsp. Mooradung;

(c) *Papistylus intropubens* and *Synaphea panhesya*;
(d) the Mount Saddleback Heath Communities Priority Ecological Community and vegetation type G4;
(e) other significant vegetation;
(f) other significant flora unless authorised by the CEO; and
(g) old growth forest.

(3) ensure no disturbance or adverse impacts to more than:
(a) 2% of the known population of *Calytrix simplex* subsp. *simplex*;
(b) 8% of the known population of *Gastrolobium* sp. Prostrate Boddington;
(c) 2% of the known population of *Hibbertia ambita*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
(d) 2% of the known population of *Halgania corymbosa*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
(e) 11.9 ha of Williams vegetation complex after the date of this Statement; and
(f) 332.5 ha of Michibin vegetation complex after the date of this Statement.

(4) ensure that the proposal does not cause or contribute to the introduction and/or spread of forest disease, including *Phytophthora cinnamomi*, outside of areas identified as infected by the pre-clearance surveys required by condition B12-3.

Environmental Objective is:

1) avoid where practicable or otherwise minimise indirect impacts to flora and vegetation including but not limited to impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation.

Condition clauses	**B12-6**	In order to meet the outcomes of condition B12-1, objectives of condition B12-2 and satisfy the requirements of condition C4, within twelve (12) months from the date of this Statement, and annually thereafter, the proponent shall prepare and submit an annual Flora and Vegetation Environmental Management Plan and submit it to the CEO on advice from DBCA. This plan shall: 1. include details of the timing, methods, limitations, survey effort and results of the pre-clearance surveys required by condition B12-3, B12-4 and B12-5 and demonstrate how the findings of the survey(s) have been considered, including identification of mitigation measures; 2. demonstrate buffer zones are appropriately sized to adequately protect the environmental values listed in conditions B12-1(2) and B12-1(3), from the effects of forest disease, dust, weeds, changes in groundwater and surface water and fragmentation; and 3. include actions to ensure that forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation, are appropriately managed to ensure the environmental outcomes listed in conditions B12-1(2) and B12-1(3) are met.
	B12-1	The proponent must ensure the implementation of the proposal achieves the following environmental outcomes: 1. disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation after the date of this Statement. 2. ensure no disturbance or adverse impacts to: (a) threatened flora including *Caladenia hopperiana*; (b) *Caladenia caesarea* subsp. Mooradung; (c) *Papistylus intropubens* and *Synaphea panhesya*;

		(d) the Mount Saddleback Heath Communities Priority Ecological Community and vegetation type G4; (e) other significant vegetation; (f) other significant flora unless authorised by the CEO; and (g) old growth forest. 3. ensure no disturbance or adverse impacts to more than: (a) 2% of the known population of *Calytrix simplex* subsp. *simplex*; (b) 8% of the known population of *Gastrolobium* sp. Prostrate Boddington; (c) 2% of the known population of Hibbertia ambita, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population; (d) 2% of the known population of *Halgania corymbosa*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population; (e) 11.9 ha of Williams vegetation complex after the date of this Statement; and (f) 332.5 ha of Michibin vegetation complex after the date of this Statement. 4. ensure that the proposal does not cause or contribute to the introduction and/or spread of forest disease, including *Phytophthora cinnamomi*, outside of areas identified as infected by the pre-clearance surveys required by condition B12-3.
	B12-2	The proponent shall implement the proposal to achieve the following environmental objective: 1. Avoid where practicable or otherwise minimise indirect impacts to flora and vegetation including but not limited to impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation.
	B12-3	Prior to clearing each area to be disturbed in the PAA, the proponent shall undertake surveys and forest disease mapping of that area consistent with DBCA's Phytophthora Dieback Interpreters Manual for Lands Managed by the Department and with DBCA's Phytophthora Dieback Management Manual, as amended or replaced from time to time.
	B12-4	Prior to clearing each area to be disturbed in the PAA, the proponent shall map the extent of old growth forest of that area in accordance with DBCA's Procedures for the assessment, identification and demarcation of old-growth forest, as amended or replaced from time to time.
	B12-5	Prior to clearing each area to be disturbed in the PAA, the proponent must undertake targeted pre-clearance vegetation and flora survey(s) of that area, in accordance with Technical guidance – Flora and vegetation surveys for environmental impact assessment, or any approved updates of these guidelines. Targeted pre-clearance surveys shall: 1. target the following species and communities, but is not limited to: (a) threatened flora; (b) priority flora; (c) new species, or undescribed species; and (d) threatened and priority ecological communities and vegetation type G4. 2. require appropriate botanists with demonstrated experience in orchid surveys in the bioregion, for pre-clearance surveys of *Caladenia caesarea* subsp. Mooradung and threatened orchid species, including *Caladenia hopperiana*.
	B12-7	The proponent shall not commence ground disturbing activities within an area subject to the annual Flora and Vegetation Environmental Management Plan under condition B12-6, unless that plan has been approved by the CEO.
Environmental Management Plan required		Yes

prior to implementation of proposal?	

3 REFERENCE TO EPA AND DCCEEW FRAMEWORKS

This FVMP has been produced to align with the following guidance documentation:

- Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024) Environmental management plan guidelines; and
- Environmental Protection Authority (EPA) (2024) How to prepare Environmental Protection Act 1986 Part IV environmental management plans.

The combined relevant contents required in each of the frameworks and where they are located in this plan are included in Table 3-1.

Table 3-1: Location of relevant contents required in WA EPA and DCCEEW EMP Frameworks

DCCEEW Framework Requirements	Plan Ref (Section)	WA EPA Framework Requirements	Plan Ref (Section)
Executive summary or introduction	Section 2	Executive summary	Section 2
Conditions of approval table	Section 4	Proposal	Section 5.1
Project description	Section 5.1	Key environmental factors	Section 5.3
Objectives	Section 6.1	Condition requirements	Section 4
Environmental management roles and responsibilities	Section 11	Rationale and approach	Section 6
Reporting	Section 10	EMP Components	Section 8
Potential environmental impacts and risks	Section 5.3.1	Outcome-based EMPs	Section 8.1
Environmental management measures	Section 6.6 Section 8	Objective-based EMPs	Section 8.2
Audit and review	Section 9	Adaptive management and review of the EMPs	Section 9
Glossary	Section 13	Stakeholder consultation	Section 12
Evaluating Risks	Appendix A - Risk Assessment	Changes to an EMP	Section 9.1 Section 15

4 CONDITIONS OF APPROVAL

The FVMP is a requirement under Ministerial Statement 1237. The relevant conditions are listed in Table 4-1.

Table 4-1: Applicable EP Act Approval Conditions

Ref	Cond.	Condition Requirement	Section	Key commitments and activities
MS1237	B12-1	The proponent must ensure the implementation of the proposal achieves the following environmental outcomes:	N/A	N/A
MS1237	B12-1(1)	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation.	8.1	Protection commitments described in Section 8.1. Outcome-based provisions described.
MS1237	B12-1(2)	Ensure no disturbance or adverse impacts to: (a) threatened flora including *Caladenia hopperiana*; (b) *Caladenia caesarea* subsp. Mooradung; (c) *Papistylus intropubens* and *Synaphea panhesya*; (d) the Mount Saddleback Heath Communities Priority Ecological Community and vegetation type G4; (e) other significant vegetation; (f) other significant flora unless authorised by the CEO; and (g) old growth forest.	8.1	Protection commitments described in Section 8.1. Outcome and objective-based provisions described.
MS1237	B12-1(3)	Ensure no disturbance or adverse impacts to more than: (a) 2% of the known population of *Calytrix simplex* subsp. simplex; (b) 8% of the known population of *Gastrolobium* sp. *Prostrate Boddington*; (c) 2% of the known population of *Hibberia ambita* until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population; (d) 2% of the known population of *Halgania corymbosa*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population; (e) 11.9 ha of Williams vegetation complex after the date of this Statement; and (f) 332.5 ha of Michibin vegetation complex after the date of this Statement.	8.1	Protection commitments described in Section 8.1. Outcome and objective-based provisions described.
MS1237	B12-1(4)	Ensure that the proposal does not cause or contribute to the introduction and/or spread of forest disease, including	8.1	Protection commitments described in Section 8.1. Outcome and objective-based provisions described.

Ref	Cond.	Condition Requirement	Section	Key commitments and activities
		Phytophthora cinnamomi, outside of areas identified as infected by the pre-clearance surveys required by condition B12-3.		Biodiversity indicators and outcome-based provisions described.
MS1237	B12-2	The proponent shall implement the proposal to achieve the following environmental objective: (1) avoid where practicable or otherwise minimise indirect impacts to flora and vegetation including but not limited to impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation.	8.2	Application of a buffer to specific environmental values within Protected Areas Dust suppression (water and / or chemical) on haul roads and open areas.
MS1237	B12-3	Prior to clearing each area to be disturbed in the PAA, the proponent shall undertake surveys and forest disease mapping of that area consistent with DBCA's *Phytophthora Dieback Interpreters Manual for Lands Managed by the Department* and with DBCA's *Phytophthora Dieback Management Manual*, as amended or replaced from time to time.	8.1	Coordinated controls and strategic controls described in Section 8.1 and Section 8.2 Outcome and objective-based provisions described.
MS1237	B12-4	Prior to clearing each area to be disturbed in the PAA, the proponent shall map the extent of old growth forest of that area in accordance with DBCA's *Procedures for the assessment, identification and demarcation of old-growth forest*, as amended or replaced from time to time.	6.6.5 8.1	Controls implemented under the Protected Areas Implementation and Management Procedure. Objective based provisions described.
MS1237	B12-5	Prior to clearing each area to be disturbed in the PAA, the proponent must undertake targeted pre-clearance vegetation and flora survey(s) of that area, in accordance with *Technical guidance – Flora and vegetation surveys for environmental impact assessment*, or any approved updates of these guidelines. Targeted pre-clearance surveys shall:		Strategic controls implemented in accordance with Section 8.1 and 6.6.
MS1237	B12-5(1)	target the following species and communities, but is not limited to: a. threatened flora; b. priority flora; c. new species, or undescribed species; and b. threatened and priority ecological communities and vegetation type G4.	8.1	Strategic controls implemented in accordance with Section 8.1 and 6.6. Objective based provisions described.
MS1237	B12-5(2)	require appropriate botanists with demonstrated experience in orchid surveys in the bioregion, for pre-clearance surveys of *Caladenia caesarea* subsp. Mooradung and threatened orchid species, including *Caladenia hopperiana*.	6.6.5	Preclearance surveys for Orchids to be undertaken by appropriately qualified botanists.

Ref	Cond.	Condition Requirement	Section	Key commitments and activities
MS1237	B12-6	In order to meet the outcomes of condition B12-1, objectives of condition B12-2 and satisfy the requirements of condition C4, within twelve (12) months from the date of this Statement, and annually thereafter, the proponent shall prepare and submit an annual Flora and Vegetation Environmental Management Plan and submit it to the CEO on advice from DBCA. This plan shall:	10.1	The FVMP has been developed to meet condition B12-6 and will be submitted annually to the CEO in accordance with the actions described in Section 10.1.
MS1237	B12-6(1)	include details of the timing, methods, limitations, survey effort and results of the pre-clearance surveys required by conditions B12-3, B12-4 and B12-5 and demonstrate how the findings of the survey(s) have been considered, including identification of mitigation measures;	8.2	The FVMP has been developed to meet condition B12-6 and will be submitted annually to the CEO in accordance with the actions described in Section 10.1.
MS1237	B12-6(2)	demonstrate buffer zones are appropriately sized to adequately protect the environmental values listed in conditions B12-1(2) and B12-1(3), from the effects of forest disease, dust, weeds, changes in groundwater and surface water and fragmentation; and	8.2	The FVMP has been developed to meet condition B12-6 and will be submitted annually to the CEO in accordance with the actions described in Section 10.
MS1237	B12-6(3)	include actions to ensure that forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation, are appropriately managed to ensure the environmental outcomes listed in conditions B12-1(2) and B12-1(3) are met.	8.2	The FVMP has been developed to meet condition B12-6 and will be submitted annually to the CEO in accordance with the actions described in Section 10.
MS1237	B12-7	The proponent shall not commence ground disturbing activities within an area subject to the annual Flora and Vegetation Environmental Management Plan under condition B12-6, unless that plan has been approved by the CEO.	10	Controls implemented in accordance with Section 10

5 CONTEXT AND SCOPE

5.1 PROPOSAL

5.1.1 Background

South32 Worsley Alumina Pty Ltd (Worsley) operates the Worsley Bauxite-Alumina Project on behalf of the Joint Venture parties. Worsley sought approval for the Worsley Mine Expansion Revised Proposal (the Revised Proposal) to continue existing mining operations and access additional ore resources to maintain the continuity of the Boddington Bauxite Mine (BBM), which has been in operation for over 40 years.

Key elements of the Revised Proposal include:

- expansion of the existing mining envelope at the BBM (to become the Worsley Mining Development Envelope – WMDE),
- establishment of a Bauxite Transport Corridor (BTC) at the BBM, and
- establishment of a Contingency Bauxite Mining Envelope (CBME) and support infrastructure / facilities at the Worsley Refinery (the Refinery).

The alumina refinery production rate remains at 4.7 million tonnes per annum. The full details of the Revised Proposal are detailed in the Worsley Environmental Review Document (Worsley, 2022) and the Response to Submissions document (Worsley, 2024).

5.1.2 Purpose and Scope

This Flora and Vegetation Management Plan (FVMP) provides a framework for the management of flora and vegetation for Worsley operations. The FVMP has been prepared to demonstrate how Worsley will meet the requirements of approval conditions under MS1237 and has been prepared in accordance with the EPA Instructions for preparing management plans (EPA, 2024).

The FVMP applies to areas approved for mining and mining-related activities within the Primary Assessment Area (PAA) (inclusive of the proposed WMDE, BTC and CBME) (Figure 5-1). Conditions under MS1237 Part B(B) ("Extended Mining Areas") are not included in the scope of this FVMP.

The FVMP includes a description of:

- The conditions of approval from the State under MS1237 and the Commonwealth EPBC 2019/8437;
- The potential impacts that have been determined as moderate to high risk from project activities;
- The Trigger and Threshold criteria applied to meet the environmental outcomes outlined in MS1237 Condition B12-1;
- The environmental management measures applied to meet the environmental objectives outlined in MS1237 Condition B12-2;
- Processes for the reporting of performance and the identification and / or adaptive management, based on pre-clearance surveys, monitoring results.

The FVMP includes mechanisms to review the flora and vegetation management techniques and assess if they meet the outcomes and objectives identified in Section 7.

In accordance with Condition C2-6 this FVEMP will be published on the South32 website and provided to the CEO in electronic form suitable for on-line publication by the Department of Water and Environmental Regulation within twenty (20) business days of being implemented, or being required to be implemented (whichever is earlier).

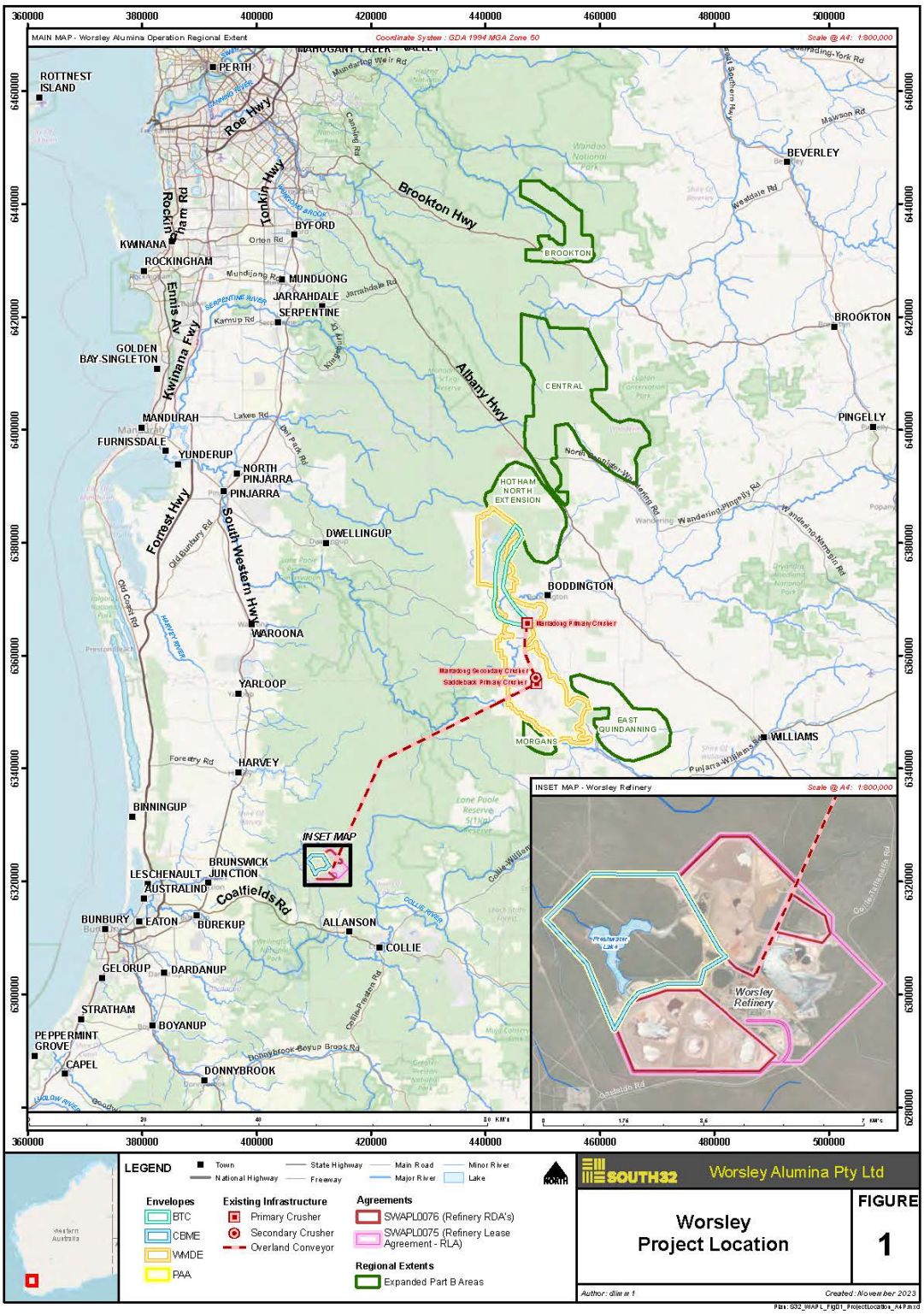

Figure 5-1: Worsley project location

5.2 LEGISLATIVE REQUIREMENTS

Works undertaken by Worsley within the PAA are governed by a range of State and Commonwealth legislation (refer to Table 5-1), with the most relevant being the Western Australian (WA) legislation *Environmental Protection Act 1986* (EP Act) and the *Biodiversity Conservation Act 2016* (BC Act), and the Commonwealth (Cth) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 5-1: Relevant Commonwealth and State legislation and regulations

Legislation	Relevance	Regulatory Authority
Commonwealth Legislation		
Environment Protection and Biodiversity Conservation Act 1999	Protection of Matters of National Environmental Significance (MNES).	Department of Climate Change, Energy, the Environment and Water (DCCEEW)
State Legislation		
Environmental Protection Act 1986	Prevention, control and abatement of pollution; and the conservation, protection and enhancement of the environment.	Department of Water and Environmental Regulation (DWER) Environmental Protection Authority (EPA)
Conservation and Land Management Act 1984	Protection and management of nature reserves, State Forest, National Parks, Timber Reserve, marine parks etc.	Department of Biodiversity, Conservation and Attractions (DBCA)
Biodiversity Conservation Act 2016	Conservation and protection of wildlife (flora and fauna). Special provisions and schedules cover protection and management of gazetted threatened flora and fauna	DBCA
Soil and Land Conservation Act 1945	Conservation of soil and land resources with the mitigation of the effects of erosion, salinity and flooding	Department of Primary Industries and Regional Development (DPIRD)
Alumina Refinery (Worsley) Agreement Act 1973	Authorises an agreement between the State relating to the establishment of a refinery to produce alumina and for incidental and other purposes.	Department of Jobs, Tourism, Science and Innovation.

5.3 KEY ENVIRONMENTAL FACTOR

This FVMP specifically addresses the EPA key environmental factor for flora and vegetation, in which the objective is ""*To protect flora and vegetation so that biological diversity and ecological integrity are maintained*".

5.3.1 Proposal Activities Potentially Affecting Flora and Vegetation

Activities associated with the Project have the potential to either directly or indirectly impact on the key environmental factor of Flora and Vegetation. Potential impacts to the environment that may result from Project activities include:

- Direct Impacts
  - The proposal will result in the direct loss of native, plantation and rehabilitated vegetation, through clearing associated with mine operations and supporting infrastructure.
  - Clearing of some locally significant vegetation communities, riparian vegetation and priority flora taxa.
- Indirect Impacts

- Further fragmentation of habitat in the local area through partial or complete clearing and associated habitat loss of isolated remnant bands or patches;
- Movement of soil and organic matter during mining operations leading to increased competition or degradation of quality of vegetation from invasive species (weeds) and/or vegetation death from invasive pathogens (e.g. dieback and Australian honey fungus);
- Dust generated during vehicle movements, mining activity and continued operations impacting on vegetation health;
- Increased water use for operations and dust suppression impacting on ecological and social values of forests;
- Changes to vegetation structure and floristic composition through altered surface water drainage patterns and flows;
- Changes to vegetation structure in Groundwater Dependent Ecosystems (GDE) due to groundwater level rise (i.e. mounding), causing localised flooding and waterlogging of vegetation; and
- Cumulative impacts in relation to the direct loss of suitable habitat.

6 RATIONALE AND APPROACH

This FVMP addresses the Flora and Vegetation environmental factor and the EPA's objective to protect flora and vegetation so that biological diversity and ecological integrity are maintained. The FVMP addresses the requirements of MS1237 and other legal requirements and identified risks related to Flora and Vegetation.

Worsley has operated in the region for over 40 years and, in this time, has conducted three detailed environmental impact assessments under Part IV of the *Environmental Protection Act 1986* (WA) to support the expansion of its operations. Worsley has a thorough understanding of the potential impacts to flora and vegetation that could occur as a result of its proposed operations.

Management measures and monitoring programs have been developed and adjusted over time in consultation with external experts, including regulators (eg DBCA), to ensure that any impacts to flora and vegetation are able to be identified and minimised. Management measures have been developed with consideration for the mitigation hierarchy (avoid, minimise, rehabilitate and offset). This section provides the rationale for the choice of monitoring and management measures to demonstrate compliance with the outcomes and objectives outlined in section 6.1.

6.1 ENVIRONMENTAL OUTCOMES AND OBJECTIVES

The intent of the FVMP is to provide a framework for the identification and management of flora species, populations and communities identified to potentially be at risk from Worsley's activities and has been prepared to fulfil requirements set out under MS1237.

This FVMP defines the outcome-based and management-based provisions to achieve the environmental outcomes and objectives outlined in MS1237. Outcome-based provisions employ the use of trigger and threshold criteria.

- *Trigger criteria* are defined as "Indicators that have been selected for monitoring to provide a warning that, if exceeded, the environmental outcome may not be achieved. They are intended to forewarn of the approach of the threshold criteria and trigger response actions."
- *Threshold criteria* are defined as "The indicators that have been selected to represent limits of impact beyond which the environmental outcome is not being met."

The primary objective of this FVMP is to minimise and monitor impacts to flora and vegetation from the Revised Proposal. This will be achieved through the following outcomes and objectives:

Environmental Outcomes:

(1) disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation;

(2) ensure no disturbance or adverse impacts to:

(a) threatened flora including *Caladenia hopperiana*;

(b) *Caladenia caesarea* subsp. Mooradung;
(c) *Papistylus intropubens* and *Synaphea panhesya*;
(d) the Mount Saddleback Heath Communities Priority Ecological Community and vegetation type G4;
(e) other significant vegetation;
(f) other significant flora unless authorised by the CEO; and
(g) old growth forest.

(3) ensure no disturbance or adverse impacts to more than:
(a) 2% of the known population of *Calytrix simplex* subsp. *simplex*;
(b) 8% of the known population of *Gastrolobium* sp. Prostrate Boddington;
(c) 2% of the known population of *Hibbertia ambita*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
(d) 2% of the known population of *Halgania corymbosa,* until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
(e) 11.9 ha of Williams vegetation complex after the date of this Statement; and
(f) 332.5 ha of Michibin vegetation complex after the date of this Statement.

(4) ensure that the proposal does not cause or contribute to the introduction and/or spread of forest disease, including *Phytophthora cinnamomi*, outside of areas identified as infected by the pre-clearance surveys required by condition B12-3.

Environmental Objectives:

1. avoid where practicable or otherwise minimise indirect impacts to flora and vegetation including but not limited to impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water[1] and fragmentation.

6.2 SURVEY AND STUDY FINDINGS

6.2.1 Baseline Surveys

The Worsley operations lie primarily within the Darling Botanical District of the South-West Botanical Province (Beard 1980) with a general classification of eucalyptus woodland. The vegetation comprises Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) forest in the west grading to Wandoo (*Eucalyptus wandoo*) and Marri woodlands in the east. Powder bark wandoo (*Eucalyptus accedens*) is dominant on the breakaways. Extensive but localised low Banksia woodlands occur on sand sheets. There are heaths on granite rocks which is common in the north and east. The Northern Jarrah Forest has moderate species richness of between 400–600 species/km^2. The PAA comprises native, rehabilitated and plantation vegetation, as well as previously cleared areas for mining or agriculture. Some wetland and swamp areas exist within the PAA however, none have been listed as areas of environmental significance under State or Commonwealth legislation.

Botanical surveys have been undertaken in accordance with the relevant temporal methodologies in the technical guidelines as outlined by EPA Guidance (2016) (Table 6-1).

Table 6-1: Vegetation community survey program

Mining Area	Description/Key Parameters Measured	Status/Timing	Survey Description
Saddleback	Forest site vegetation type classification, description and mapping	Initial survey completed 1981. Survey in July 1993. Ongoing monitoring for comparison to	Phase 1 Flora & Fauna Studies (Worsley Alumina Pty Ltd and Dames & Moore 1981, Worsley Alumina Pty Ltd 1985) Flora and Vegetation Studies on the Mount Saddleback Survey Area (Mattiske & Assoc. 1993)

[1] Indirect impacts associated with changes in groundwater and surface water are included in Worsley's Water Management Plan (01027243) required under condition 16-2 of MS1237 and are not included in this FVMP.

Mining Area	Description/Key Parameters Measured	Status/Timing	Survey Description
		rehabilitation and climate.	Northern & Central Saddleback Flora Study (Mattiske & Assoc. 1983) Worsley Alumina Project - flora and fauna studies, phase two Flora and vegetation studies on the southern Mount Saddleback survey area (Mattiske Consulting 1993) The tree component of forest vegetation in the Saddleback and Quindanning timber reserves (Pice Pty Ltd 2002)
Marradong	Forest Site Vegetation Type classification, description and mapping, Threatened flora, Priority flora	Surveyed in 1990 Revisited in 2008	Flora & Vegetation: Marradong Timber Reserve (Mattiske & Assoc. 1990, 2008)
Quindanning	Forest Site Vegetation Type classification, description and mapping, Threatened flora, Priority flora	Surveyed in 1999 and 2019	Flora and Vegetation of the Quindanning Timber Reserve (Mattiske & Assoc. 1999a), Assessment of Flora and Vegetation on Worsley mine Expansion areas (Mattiske, 2021)
Hotham North	Forest Site Vegetation Type classification, description and mapping, Threatened flora, Priority flora	Surveyed in 1999 and 2019	Worsley Alumina Boddington Gold Mine Project Flora and Fauna studies (Worsley Alumina Pty Ltd, 1999) and Assessment of Flora and Vegetation on Worsley mine Expansion areas (Mattiske, 2021)
Private Property – within WMDE	Remnant Vegetation Type classification, description and mapping, Threatened flora, Priority flora	Surveyed in 2014 with extensions in 2019	Assessment of flora and vegetation on private properties within the extension survey area (Mattiske 2014) and Assessment of Flora and Vegetation on Worsley mine Expansion areas (Mattiske, 2021)
Refinery (including CBME)	Flora and vegetation	Initial survey completed in 1981. Surveyed in 1999	Phase 1 Flora & Fauna Studies (Worsley Alumina Pty Ltd and Dames & Moore 1981, Worsley Alumina Pty Ltd 1985) Flora and Vegetation of the Collie Refinery Lease Area (Mattiske Consulting Pty Ltd (1999b))

Botanical surveys have identified the following site-vegetation types within the PAA:

- Open woodland of *Eucalyptus rudis* and *Eucalyptus wandoo*;
- Open forest of *Corymbia calophylla* and *Eucalyptus marginata*;
- Open forest to woodland of *Eucalyptus marginata* and *Corymbia calophylla*;
- Open forest to woodland of *Eucalyptus marginata* and *Corymbia calophylla* with occasional admixtures of *Banksia grandis* and *Persoonia longifolia*;
- Open woodland of *Eucalyptus wandoo*;
- Open forest of *Eucalyptus marginata* and *Allocasuarina fraseriana*;
- Open forest of *Allocasuarina fraseriana, Eucalyptus marginata, Corymbia calophylla* and *Banksia grandis*; and

- Open forest of *Eucalyptus marginata and Corymbia calophylla* with mixtures *of Allocasuarina fraseriana, Banksia grandis* and *Persoonia longifolia*.

6.2.2 Threatened and Priority Flora and Ecological Communities

There are no Threatened Ecological Communities (TECs) for the Darling Range listed by the DBCA (inclusive of the Project Area). The *Mount Saddleback Heath Communities* is listed as a Priority Ecological Community (PEC) (P1) (DBCA, 2023). These heath communities occur in the Saddleback and Hotham North mining areas within the WMDE and BTC.

One Threatened flora species has been recorded within the PAA during baseline and targeted surveys (*Caladenia hopperiana*). Several Priority flora species listed by DBCA have also been recorded. Condition B12-1 of MS1237 outlines environmental outcomes for selected conservation significant flora. The current knowledge for these species is summarised in Table 6-2 and recorded occurrences are displayed in Figure 6-1.

Table 6-2: Threatened and Priority Flora and Vegetation Communities included under Condition B12-1 of MS1237

Flora / Vegetation	BC Act Listing	EPBC Act Listing[1]	Habitat / Occurrence	Likelihood within PAA
Mount Saddleback Heath Communities	P1 PEC		Mount Saddleback heath communities are variants of site-vegetation type G (Mattiske Consulting Pty Ltd, 2021) and areas associated with shallow soils and granite outcrops. The heath types include (but are not limited to) site vegetation type G, G1 and G3 (Mattiske Consulting Pty Ltd, 2021).	High Recorded
Site vegetation Type G4			Site-vegetation Type G4: Open scrub and tall shrubland of *Hakea trifurcata* and *Hakea undulata* with admixtures of mallee species including *Eucalyptus latens* and *Eucalyptus aspersa* on clay to clay-loam soils over outcrops on slopes (Mattiske Consulting Pty Ltd, 2021).	High Recorded
Caladenia hopperiana	EN	EN	This species is concentrated in the lower valleys near swamps and Wandoo Woodlands (AY, Y) and Wandoo woodlands on mid to upper drier slopes (M). There is an occasional plant in the site-vegetation H2; which consists of and open forest of *Eucalyptus marginata* and *Corymbia calophylla* over shrub species on gravel and sandy-gravel soils of slopes and less undulating hills (Mattiske Consulting Pty Ltd, 2021).	High Recorded (QTR)
Caladenia caesarea Subsp. Mooradung	N/A	N/A	Yet to be determined. It is expected that preferred habitat will be comparable to that described for *Caladenia hopperiana*.	High (HON)
Papistylus intropubens	P1		Only known occurrence was recorded within The G3 site vegetation type (heath community) within the Tunnell Road heath Protected Area. Despite searching this species has not been identified or located since the initial identification in the 1980s.	Low
Synaphea panhesya	P1		The occurrence at Mt Saddleback was recorded as part of Phase One for South32 by Dames and Moore (1982) within the P site-vegetation type on the fringes of heath areas. Despite additional searching in Jarrah-Sheoak, Wandoo and Powder Wandoo	Low

Flora / Vegetation	BC Act Listing	EPBC Act Listing[1]	Habitat / Occurrence	Likelihood within PAA
			woodlands, as well as in nearby heath areas no additional plants have been recorded.	
Calytrix simplex subsp. *simplex*	P1		This species has been recorded near Mt Cooke within the northern extent of the Monadnocks Conservation Reserve, there is a high probability that there is an association with more shallow soils associated with granite areas and as such follows the pattern of occurring on the western, northern and eastern fringes of the Darling Ranges. Whilst the current records are concentrated near Armadale, near Mt Cooke and Mt Saddleback areas the latter may reflect the wider survey efforts with more concentrated efforts in specific locations (Mattiske Consulting Pty Ltd, 2022).	High Recorded
Gastrolobium sp. Prostrate Boddington	P1		The occurrence at Mt Saddleback and the Newmont areas to the north was mainly associated with the D, Y, L and M site-vegetation types which are associated with slopes (M site-vegetation types) and gullies supporting Wandoo (*Eucalyptus wandoo*) (Y, L) as the dominant overstorey (Mattiske Consulting Pty Ltd 2021). The D site-vegetation type supports a forest of Jarrah-Marri (Eucalyptus marginata – *Corymbia calophylla*) on the clay-loam slopes particularly near the Hotham River. This species has also been recorded regularly in the rehabilitation areas at South32 operations (Mattiske Consulting Pty Ltd, 2022).	High Recorded
Hibbertia ambita	P1		Further work is being undertaken to identify the distribution of this species following the reclassification of *Hibbertia commutata*. Known occurrences at Mt Saddleback are within the H, P and M site-vegetation types. This species has also been recorded in rehabilitation areas (Mattiske Consulting Pty Ltd, 2021).	High Recorded
Halgania corymbosa	P3		In the Boddington area this species has been recorded in site-vegetation type G2 (Mosaic of Rock Sheoak (*Allocasuarina huegeliana*) and closed heath to lithic complex on exposed or shallow granite outcrops), in granite heath communities (G1) on shallow soils over granite and in Wandoo (*Eucalyptus wandoo*) woodlands on valley floors (AY site-vegetation type) and lower slopes (Y) and in open forests of Jarrah-Marri (*Eucalyptus marginata – Corymbia calophylla*) (H site-vegetation type) to Jarrah – Sheoak (*Eucalyptus marginata – Allocasuarina fraseriana*) on sandy gravels to gravels (PS site-vegetation type) (Mattiske Consulting Pty Ltd 2021).	High Recorded

6.2.3 Additional Surveys

Targeted searches for Threatened and Priority flora species and communities occur during pre-clearance surveys (see section 6.6.5), periodically, or as otherwise required, prior to disturbance for mining purposes.

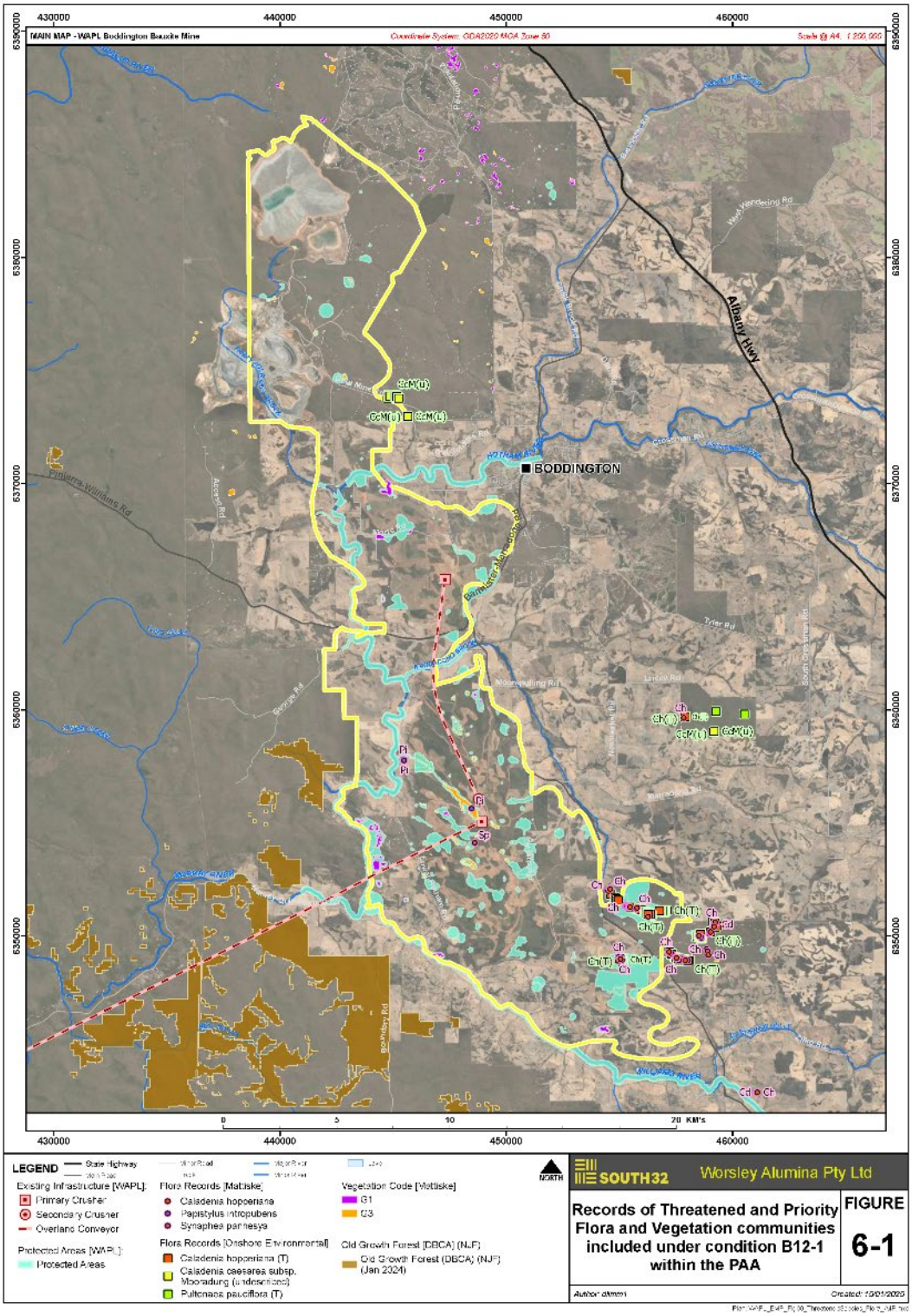

Figure 6-1: Records of Threatened and Priority flora and vegetation communities included under condition B12-1 within the PAA.

6.3 KEY ASSUMPTIONS AND UNCERTAINTIES

The key assumptions and uncertainties within this FVMP include:

- Flora surveys conducted over the last 40 years within Saddleback, Quindanning and Marradong Timber Reserves have identified all predominate vegetation types and conservation significant flora species likely to occur within the PAA;
- Abundance of conservation significant flora and vegetation has not been determined within the PAA or the region;
- Clearing footprint is indicative;
- Populations of threatened and priority flora will be updated over time as more information is collected;
- Should any newly listed TEC, PEC, Threatened flora or Priority 1 flora be identified as occurring within the PAA additional avoidance and management measures will be applied to protect these species and / or communities.

6.4 OBJECTIVE-BASED EMP – RISK BASED APPROACH

The FVMP has been developed to avoid and minimise risks to the conservation significant flora and vegetation by developing outcome and objective based management actions. Objective-based provisions have been developed for the Revised Proposal to meet the requirements of approval conditions granted under MS1237 and EPBC Approval Decision 2019/8437.

The objective-based provisions that have been developed are considered appropriate to manage risk of impacts (direct and indirect) to flora and vegetation within the PAA.

The objective-based provisions of this management plan will be monitored through opportunistic sightings, pre-clearance surveys, monitoring surveys and regular inspections. A risk assessment of the likely impacts is provided in Appendix A - Risk Assessment. The only risk that was identified with a residual risk rating of moderate relevant to flora and vegetation was the risk of the loss of habitat supporting Threatened species. This is consistent with MS1237 condition requirements.

6.5 RATIONALE FOR CHOICE OF INDICATORS AND/OR MANAGEMENT ACTIONS

This FVMP has been prepared in accordance with the following:

- Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2024);
- Environmental Management Plan Guidelines (DCCEEW, 2024); and
- condition B12 of MS1237.

The mitigation hierarchy (enhance, avoid, minimise, rehabilitate and offset) has been applied in the impact assessment for potential impacts from Worsley operations on vegetation and flora species.

Worsley has considered the objectives outlined in the relevant Commonwealth and State Recovery Plans and Threat Abatement Plans to manage environmental risks to flora and vegetation.

Recovery plans set out the research and management actions necessary to stop the decline of; and support the recovery of Threatened species or Threatened Ecological Communities. The aim of a recovery plan is to maximise the long-term survival of the identified species or community. Recovery plans should state what must be done to protect and restore important populations of Threatened species and habitat, as well as how to manage and reduce threatening processes. Recovery plans achieve this by providing a planned and logical framework for key interest groups and responsible government agencies to coordinate their work to improve the plight of Threatened species and/or ecological communities.

Threat abatement plans provide for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities. Implementing the plan should assist the long-term survival in the wild of affected native species or ecological communities.

Conservation Advice and Threat Abatement Plans relevant to Worsley's operations that were used to inform Worsley's management objectives (summarised in Section 6.1) and are listed in Table 6-3 and Table 6-4.

Table 6-3: Threatened Species Conservation Advice

Threatened Species	Conservation Advice and Recovery Plans
Caladenia hopperiana	Conservation Advice *Caladenia hopperiana* Quindanning spider orchid, (Threatened Species Scientific Committee 2018) (DoEE – now DCCEEW). In effect under the EPBC Act from 15-Feb-2018. http://www.environment.gov.au/biodiversity/threatened/species/pubs/88195-conservation-advice-15022018.pdf. Current and potential threats include the following, only some of which, are applicable to Worsley's operations (denoted with an *):

Current Threats	Potential Threats
Reduced rainfall	Timber extraction
*Controlled burning and bushfires	*Mining
*Inundation of low lying plants	Poor recruitment
*Salinity	*Groundwater extraction
Grazing and trampling	
Drought	

The impact of increased salinity is not a risk that Worsley have identified as in impact from their activities. A review of mining operations by indicate that soils proposed to be disturbed within the PAA have a low risk of either presenting current saline conditions or potential saline conditions in the future (South32, 2022).

Table 8-1, Table 8-2, Table 8-3 and Table 8-4 deal with those impacts that may occur from Worsley's activities within the PAA.

Table 6-4: Threat Abatement Plan

Threat	Threat Abatement Plan
Phytophthora Dieback	Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*, DoAWE (DoEE) 2018. http://www.environment.gov.au/system/files/resources/ee1f3b9f-6e2e-4a01-86f3-6abb167fb443/files/tap-phytophthora-cinnamomi-2018.pdf

6.5.1 External Contributing Factors

The region in which Worsley operates is large with many contributing factors that must be factored into an assessment of impacts. Of highest relevance are:

- Drying Climate: the drying climate has resulted in localised decline in vegetation throughout the region particularly following extended dry periods. An increase in the frequency of extreme weather events has also been experienced. The drying climate may lead to localised mortality, changes in habitat and habitat quality over time.
- Historic land use: areas surrounding the Worsley operation are largely used for agricultural purposes with most native vegetation historically removed. This means that remnant vegetation often occurs in isolated fragments with increased occurrence of feral animals and weeds.
- Dryland salinity: The Hotham River and Williams River are known to be impacted by salinity associated with historic land clearing in the upper catchments.

- Newmont Boddington Gold (NBG): Worsley's operations will be adjacent to the existing NBG facility. Potential cumulative impacts have been considered in the EIA process to ensure that required environmental outcomes are achieved.

6.5.2 Selected Indicators

The environmental outcomes addressed by this FVMP are largely interconnected and reflect potential direct and indirect impacts associated with the clearing of native vegetation. A summary table of the indicators selected to ensure compliance with each environmental outcome and the rationale for their selection are included in Table 6-5.

Table 6-5: Indicators Selected for ensuring compliance with environmental outcomes

Environmental Outcome	Selected Indicator	Monitoring Program	Justification and Trigger Level	Ref
Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation	Verified spatial data for disturbance	Disturbance boundary survey	Disturbance to native vegetation, plantation and rehabilitation is measured through survey of disturbance boundaries which is reconciled on a monthly basis. A trigger level of 75% of allowable disturbance has been selected to ensure controls are reviewed and adjusted as required when a reasonable allowance for clearing still remains within each category. This ensures ongoing compliance with condition B12-1(1). A threshold level of 95% has been set to allow a further verification of clearing boundaries to occur and to ensure each subsequent clearing area is closely reviewed with strict controls applied prior to clearing to ensure disturbance does not exceed the prescribed limits under MS1237.	6.6.4 Table 8-1 Table 8-2
Ensure no disturbance or adverse impacts to: (a) threatened flora including *Caladenia hopperiana*; (b) *Caladenia caesarea* subsp. Mooradung; (c) *Papistylus intropubens* and *Synaphea panhesya*; (d) the Mount Saddleback Heath Communities Priority Ecological Community and vegetation type G4;and (e) other significant vegetation; (f) other significant flora unless authorised by the CEO; and (g) old growth forest.	Verified spatial data for disturbance and proximity to Protected Areas	10 Year Mine Plan Internal Clearing Plan Pre-clearance surveys	All environmental values included under this outcome are required to be protected through the establishment of a Protected Area which must include an appropriate buffer. Pre-clearance flora and vegetation surveys ensure that any of the matters listed are identified prior to clearing and Protected Areas are assigned prior to disturbance. To ensure the achievement of this outcome any disturbance planned within 30 m of a Protected Area supporting any of the listed matters will be identified during review of the internal Clearing Plan and will have additional controls applied to prevent disturbance or adverse impacts to the designated Protected Area. Should disturbance occur within the boundary of the Protected Area this would represent an exceedance of the Threshold and be reported as a non-compliance.	6.6.4 6.6.5 6.6.1 Table 8-1
	Flora abundance: *Caladenia caesarea* subsp. Mooradung	Targeted flora – Protected Areas and Ecological Linkages	Like many other orchid species, it is anticipated that *C. caesura* subsp. Mooradung may not flower every season. The lack of a flower often makes identification during targeted surveys impossible and impacts the resulting abundance and distribution of each surveyed population. Protected Areas containing *Caladenia caesarea* subsp. Mooradung will be monitored initially on an annual basis for 3 years to establish a baseline understanding of the natural variability in flowering within each population (abundance and distribution). This information will then be used to revise the trigger and threshold values defined here, as required, through adaptive management processes. Following the establishment of baseline information, monitoring will continue on a 3 yearly basis to verify the effectiveness of management measures for protection of the species. Should the final conservation classification of this	6.6.1 Table 8-1

Environmental Outcome	Selected Indicator	Monitoring Program	Justification and Trigger Level	Ref
			species be confirmed as Threatened flora, this will be increased to annual in line with the *C. hopperiana* monitoring program. Control sites will be included in all surveys to provides a measure for comparison to understand potential impacts associated with regional impacts such as a poor rainfall season or climate change which may lead to decreased flowering across all populations. Until the baseline assessment period for this species has been completed (2025 and 2026 monitoring) an interim trigger criteria has been set at >10% decline in the average recorded abundance for any given population potentially impacted by the implementation of the Revised Proposal (i.e., within 200 m of operational areas). This only applies where the decline is inconsistent with observed declines at control sites. This is considered to be consistent with the recent recorded variability in Population 2 of *C. hopperiana* which exhibited a 7% variation in abundance over two consecutive seasons. The interim threshold criteria has been set as where further decline in abundance is observed in the survey period following a trigger level exceedance (i.e. when completing trigger level action of a follow-up survey) or where a >20% decline is observed and this decline is not aligned with observations for other populations within control sites.	
	Flora abundance: *Papistylus intropubens* *Synaphea panhesya*	Not applicable at this time	To date only one record of *Papistylus intropubens* and two records of *Synaphea panhesya* have been identified within the PAA or adjacent areas. These occurrences do not represent populations which can be monitored for abundance as a consequence no trigger and threshold levels for these species have been set at this time. It is proposed that if a population were identified through future surveys, then adaptive management would be applied to incorporate an outcome-based provision for the identified species within this FVMP on advice from external qualified consultants.	
	C. hopperiana abundance	Targeted *Caladenia hopperiana* Population Surveys	It is known that *C. hopperiana* along with many other orchid species may not flower every season. The lack of a flower often makes identification during targeted surveys impossible and impacts the resulting abundance and distribution of each surveyed population. The inclusion of control sites in surveys also provides a measure for comparison to understand potential impacts associated with the operational activities as opposed to regional impacts such as a poor rainfall season or climate change which may lead to decreased flowering across all populations. The potentially impacted population of *C. hopperiana* (Population 2) has been surveyed on 5 occasions since 2012 with detailed targeted surveys conducted in 2023 (DBCA) and 2024 (Onshore Environmental Consultants	

Environmental Outcome	Selected Indicator	Monitoring Program	Justification and Trigger Level	Ref
			Pty Ltd). The recorded abundance within this population varied from 286 to 308 flowering individuals between these two seasons. Given the current baseline information is limited to a 2 year survey period, a trigger level for abundance of *C. hopperiana* has been set where the number of flowering plants present is <282 (representing the mean minus 1 SDEV) for Population 2. However, this trigger is limited to where the measured decline is not consistent with other monitored populations to allow for variation associated with external factors (i.e. poor rainfall season). The threshold for this indicator has been set to represent where the number of flowering plants present is <266 (representing the mean minus 2 SDEV). However, this threshold is limited to where the measured decline is not consistent with other monitored populations to allow for variation associated with external factors (i.e. poor rainfall season). Further annual surveys will be conducted for all populations of *C. hopperiana* to assess the natural variability in flowering. This information may be used to revise trigger and threshold levels for this indicator through adaptive management processes.	
	Flora distribution	Targeted flora – Protected Areas and Ecological Linkages	Protected Areas containing flora species listed under this outcome will be monitored on a 3 yearly basis to verify the effectiveness of management measures for protection of flora. This program will include targeted Threatened and priority flora surveys which will assess the abundance and distribution of known populations of the species listed under this outcome. It is known that *C. hopperiana* along with many other orchid species may not flower every season. The lack of a flower often makes identification during targeted surveys impossible and impacts the resulting abundance and distribution of each surveyed population. Changes in distribution in corresponding control sites will also be taken into account to address potential changes associated with climate change (e.g., further contraction of distribution to lower lying areas) and seasonality. Populations of each listed species within the PAA will continue to be surveyed on an annual basis to improve the understanding of natural variation in flowering to verify the trigger level applied within this FVMP. Where a decline in distribution of >10% is observed and this is not mirrored in control populations then the trigger response actions must be applied. This includes the requirement for a follow up survey within 2 years. If follow-up surveys identify further decline in distribution from the previous survey and this remains unaligned with observations for populations within control sites then threshold contingency actions will be applied.	6.6.1 Table 8-1
	Decline in vegetation condition from baseline	Targeted vegetation condition – Protected	Protected Areas (including those containing environmental values listed under this outcome) will be monitored on a 3 yearly basis to verify the	6.6.1

Environmental Outcome	Selected Indicator	Monitoring Program	Justification and Trigger Level	Ref
		Areas and Ecological Linkages	effectiveness of management measures for protection of environmental values. This program will include as assessment of vegetation condition by external qualified consultants. This assessment will focus on perennial species rather than short lived annuals and will include observation of relevant indicators of vegetation health including but not limited to local plant deaths, changes in vegetation structure, changes in healthy vegetation cover, evidence of impacts from pathogens/pests, dust deposition and water stress. The assessment will include collection of photographs for comparison with historic and future survey observations and forest control sites to allow for exclusion of regional impacts (e.g., climate change). The trigger for this indicator is an observed decline in vegetation condition that cannot be attributed to other regional or non-project related impacts (e.g. climate change). Should this occur, trigger response actions must be completed including the requirement for a follow up survey within 12 months to reassess vegetation condition. Should the area continue to experience decline in vegetation condition inconsistent with control sites this will trigger the threshold criteria for this indicator and threshold contingency actions will be applied.	Table 8-1
	Identification of other significant vegetation or other significant flora Verified spatial data for disturbance	Pre-clearance surveys Disturbance boundary survey	Occurrences of other priority flora or vegetation within the PAA will be detected through the completion of pre-clearance surveys. The proposed trigger for this outcome is the identification of any other significant flora species or other significant vegetation within the pre-clearance surveys. Where the trigger criteria is met the mitigation hierarchy must be applied to minimise potential impacts on the identified location(s). The threshold for this criteria is the identification of unauthorised disturbance of an area containing other significant vegetation or other significant flora. This will be determined through regular analysis of disturbance boundary survey data. Should unauthorised disturbance occur it would represent a direct impact to the environmental value and therefore a non-compliance with MS1237.	
Ensure no disturbance or adverse impacts to more than: (a) 2% of the known population of *Calytrix simplex* subsp. *simplex*; (b) 8% of the known population of *Gastrolobium* sp. Prostrate Boddington; (c) 2% of the known population of *Hibbertia ambita*, until it	Number of plants disturbed		Pre-clearance flora and vegetation surveys ensure that any of the matters listed under this outcome are identified within disturbance areas prior to clearing. The known population for each species will be adjusted as pre-clearance and targeted surveys are completed. All individuals will have GIS data recorded and incorporated into priority flora layers for tracking of disturbance. Following the completion of each years pre-clearance survey activities a total allowable disturbance (number of plants) for each species will be determined. Proposed disturbance layers will be reviewed against this value and clearing areas will be adjusted where required to ensure compliance with B12-1 (3).	6.6.5 Table 8-1 Table 8-3

Environmental Outcome	Selected Indicator	Monitoring Program	Justification and Trigger Level	Ref
can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population; (d) 63% of the known population of *Halgania corymbosa*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;			A trigger level of 75% of allowable disturbance has been selected for disturbance of priority flora plants to ensure controls are reviewed and adjusted as required when a reasonable allowance for disturbance remains for each species. This ensures ongoing compliance with condition B12-1(3). A threshold level of 95% has been set to allow a further verification of clearing boundaries to occur and to ensure each subsequent clearing area is closely reviewed with strict controls applied prior to clearing to ensure disturbance does not exceed the prescribed limits under MS1237.	
(e) 11.9 ha of Williams vegetation complex; after the date of this Statement and (f) 332.5 ha of Michibin vegetation complex after the date of this Statement.	Reconciled spatial data		Disturbance to native vegetation is measured through survey of disturbance boundaries which is reconciled on a monthly basis. The areas of Williams and Michibin within the PAA are well understood and Clearing Plans will be assessed against these boundaries prior to approval. A trigger level of 75% of allowable disturbance has been selected to ensure controls are reviewed and adjusted as required when a reasonable allowance for clearing still remains within each category. This ensures ongoing compliance with condition B12-1(3). A threshold level of 95% has been set to allow a further verification of clearing boundaries to occur and to ensure each subsequent clearing area is closely reviewed with strict controls applied prior to clearing to ensure disturbance does not exceed the prescribed limits under MS1237.	Table 8-1 Table 8-3
Ensure that the proposal does not cause or contribute to the introduction and/or spread of forest disease, including *Phytophthora cinnamomi*, outside of areas identified as infected by the pre-clearance surveys required by condition B12-3.	*Phytophthora cinnamomi* occurrence	Dieback Interpretation	*Phytophthora cinnamomi* (dieback) is known to occur in restricted areas within the PAA though is widespread within the CBME. Areas of proposed for disturbance must be assessed for the presence of dieback prior to disturbance. The trigger for this indicator is the identification of a new dieback infestation through dieback interpretation. When this trigger is reached additional control measures must be applied for any activities occurring within the area to ensure that the risk of spread of the infestation is minimised. The threshold for this indicator is the identification of a new dieback infestation likely to have been caused by Worsley operations. Any such occurrence must be reported to Regulators and managed to prevent any further spread by Worsley operations.	6.6.6 Table 8-1

6.6 MANAGEMENT AND MITIGATION CONTROLS

The following management and mitigation controls are applied to the Worsley operation in accordance with the mitigation hierarchy, and its application is effectively applied to minimise the impacts on flora and vegetation as outlined in Appendix A - Risk Assessment.

6.6.1 Protected Areas

Protected Areas are those areas of lands that Worsley will protect from operational clearing activities. Protected Areas include those areas that are:

- Formal conservation reserves / parks, as defined in the Forest Management Plan 2024-2033 (Conservation Commission of Western Australia) (Map 2) (e.g. National Parks / Nature / Conservation Reserves), in compliance with the CALM Act and Regulations (2002);
- Areas identified under the EPBC Act, BC Act or through agreements with regulators;
- Areas within the PAA that Worsley has committed to protect as an offset; or
- Identified rehabilitation areas designated to be protected from further clearing (Protected Rehabilitation) as identified in the 10-Year Mine Plan.

Protected Areas are the primary avoidance measure applied to Threatened and Priority flora and vegetation communities located within and adjacent to operational areas within the PAA.

Baseline flora and vegetation surveys (including targeted searches) are the primary basis by which Protected Areas are defined for flora and vegetation within the PAA. When establishing a new Protected Area, buffers must be applied unless the Protected Area itself represents a buffer (e.g. stream buffers) to ensure the intrinsic values contained within the Protected Area are maintained and indirect impacts are minimised.

The following flora and vegetation must be protected:

- TECs (minimum 50 m buffer);
- PECs (minimum 30 m buffer);
- Threatened flora (minimum 50 m buffer);
- Priority flora species included under condition B12-1 (2) of MS1237;
- Old growth forest areas (minimum 30 m buffer);
- Plan W areas (areas of wandoo, heath and she-oak identified in consultation with DBCA)
- Heaths and granite rock outcrops, where they occur in areas of remnant vegetation within the Michibin Complex

In addition to the above, consideration must be given to the protection of other Priority flora through establishment of Protected Areas.

6.6.1.1 Allowable Disturbance within Protected Areas

Disturbance within a Protected Area will only be permitted where approved by the CEO or where it occurs in the course of:

- Ecological restoration / rehabilitation activities (e.g. weed control, feral animal control, rehabilitation, rehabilitation maintenance etc.) to enhance the quality, or reduce potential adverse impacts to the Protected Area;
- ;
- Maintenance and / or decommissioning of existing infrastructure (e.g. roads, bores, fences, powerlines etc.);
- Environmental monitoring activities (including installation and decommissioning of monitoring equipment and sites); and
- activities carried out to ensure compliance with legislation or approvals (including the conditions of MS1237).

All disturbance activities within a Protected Area must be included in the Annual Environmental Report (AER) and the 10-Year Mine Plan.

6.6.1.2 Monitoring within Protected Areas

Protected Areas must be monitored to verify the effectiveness of management measures for protection of conservation significant flora and vegetation. Targeted vegetation condition surveys will be conducted on a 3 yearly basis within a representative sample of Protected Areas and associated control sites as advised by qualified external consultants. Vegetation condition will be assessed through field surveys with targeted searches for signs of plant and vegetation stress (e.g. general decline in vegetation structure, signs of water stress, localised plant deaths, increased incidence of insect attack, introduction of plant pathogens etc). Methods used to assess vegetation condition may be modified over time through adaptive management adopting new technologies and monitoring processes as appropriate. Photos will be taken at each survey site to support condition assessments.

Groundwater monitoring programs, as detailed within the Water Management Plan (01027243), will also be completed to support this assessment. Annual and triennial reviews of groundwater monitoring information will be completed and, if concerning trends are identified, this review will trigger the commencement of more frequent vegetation condition assessments in potentially impacted Protected Areas. For further information refer to section 4.10.2.1 of the Water Management Plan (01027243).

Targeted surveys for flora species described in Condition B12-1(2) will be conducted on a triennial basis to understand changes in abundance and distribution of populations within Protected Areas and control sites. Should other Threatened flora populations be identified during pre-clearance surveys these will be assigned to Protected Areas in accordance with section 6.6.1 and will be incorporated into this targeted flora monitoring program through adaptive management processes.

In addition, regional vegetation condition will be assessed on a 5 yearly basis using remote sensing technologies. Relative condition of vegetation within and adjacent to the PAA will be compared with areas of comparable vegetation types outside the potential impact area to identify any potential areas of vegetation decline associated with the Worsley operations. If areas of concern are identified during the desktop survey, additional targeted surveys will be initiated to verify the findings and, where verified, further investigations will be conducted to determine the contributing factors for the decline in vegetation condition. This program will include a review of Protected Areas against comparable control sites.

6.6.2 Protection Commitments

Where the complete avoidance of areas of potentially high conservation value is not possible, Worsley has committed to limit impact by setting a level of protection, known as a Protection Commitment. Protection Commitments have limits to the amount of clearing allowed within a broader and defined spatial area that has been identified as having potential high conservation value. The Protection Commitment that has been made in relation to flora and vegetation is:

- High Quality Wandoo – Locations of high-quality wandoo have been identified and Worsley has committed to disturb no more than 295 ha of the 1,184 ha of high quality wandoo habitat identified within the PAA.

NOTE: high quality wandoo areas have been identified from aerial photography in some areas. These areas will be verified in the field by June 2025. At that time this protection commitment and associated maps will be updated to reflect the confirmed total area of wandoo. Protection will be maintained at 75% of high quality wandoo regardless of confirmed total extent.

6.6.3 Ecological Linkages

Ecological linkages have been established across the landscape within new mining areas. These Ecological Linkages allow the movement of fauna (including pollinators) through the landscape reducing the risk of genetic isolation for flora species.

6.6.4 Vegetation Disturbance Planning

The 10-Year Mine Plan is developed annually and submitted to the EMLG in the last quarter of the calendar year. The plan includes the anticipated clearing for both State Forest and private land for both mining and infrastructure,

as well as maps and advises on the addition or removal of areas deferred from mining. The EMLG reviews the clearing areas within the 10-Year Mine Plan and provides feedback and acceptance on behalf of the Minister.

In addition to clearing areas, the 10-Year Mine Plan outlines the proposed exploration, resource definition and grade control drilling programs for the next available ten years, identifies Ecological Linkages (corridors), displays areas deferred from mining and the rehabilitation plan for the next 12 months. Acceptance of the 10-Year Mine Plan by the Minister endorses the next two (2) years of clearing.

The 10-Year Mine Plan aims to minimise clearing wherever possible. This is achieved by identifying options for utilising existing disturbance areas and placement of infrastructure and stockpiles over planned mining disturbance, thus allowing for a smaller disturbance footprint for the operation as a whole.

6.6.5 Pre-Clearance Surveys

Pre-clearance surveys are required to be completed prior to clearing of native vegetation in accordance with conditions B12-4 and B12-5 of MS1237. These conditions include requirements for:

- Assessment of old growth forest in accordance with DBCA's Procedures for the assessment, identification and demarcation of old-growth forest (as amended from time to time)
- Targeted searches in accordance with *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (or any approved updates of these guidelines) for:
    - Threatened flora;
    - Priority flora;
    - New species, or undescribed species; and
    - TECs and PECs and vegetation type G4.

All vegetation and flora pre-clearance surveys must be completed by appropriately qualified individuals. Targeted pre-clearance surveys for *C. caesarea* subsp. Mooradung and Threatened orchid species must be completed by appropriate botanists with demonstrated experience in orchid surveys in the bioregion as required by Condition B12-5 (2).

Targeted surveys will be completed within likely habitat both within and surrounding the proposed disturbance area. Where the Pre-clearance surveys identify the presence of Threatened or Priority flora and / or vegetation additional avoidance or management measures must be applied.

All pre-clearance surveys must be completed within 5 years prior to clearing to be considered relevant.

A summary of the pre-clearance surveys and management activities required to be completed for flora and vegetation is provided in Table 6-6.

Table 6-6: Flora and Vegetation Pre-Clearance Survey and Management Summary

Species	Habitat	Survey Timing*	Pre-Clearance Monitoring and Management Activities
Caladenia hopperiana (Quindanning Spider Orchid), *Caladenia caesarea subsp.* Mooradung (Mooradung Mustard Orchid)	Vegetation types A, M, Y in low lying areas of the landscape Note: habitat for *Caladenia caesarea subsp.* Mooradung is yet to be formally described.	Spring (Sep-Oct)	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with application of a minimum 50 m buffer.
Diuris micrantha (Dwarf Bee Orchid)	Vegetation type A	Spring (Sep-Oct)	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with application of a minimum 50 m buffer.
Pultenaea pauciflora (Narrogin Pea)	Vegetation types M, M2 and G	Not restricted (identification possible without flowers)	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with application of a minimum 50 m buffer.
Papistylus intropubens	G3	Spring	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with appropriate buffer.
Synaphea panhesya	P	Spring	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with appropriate buffer.
Gastrolobium sp. Prostrate Boddington	Vegetation types D, Y, L and M	Not restricted (identification possible without flowers)	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Avoidance as required to ensure compliance with Condition B12-1(3)(b).
Hibbertia ambita	Vegetation types H, P and M *Note: this may alter following further targeted surveys.*	Spring (Sep-Oct)	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Avoidance as required to ensure compliance with Condition B12-1(3)(c).

Species	Habitat	Survey Timing*	Pre-Clearance Monitoring and Management Activities
Calytrix simplex subsp. *simplex*	Primarily G3	Summer	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Avoidance as required to ensure compliance with Condition B12-1(3)(a).
Halgania corymbosa	AY, G1, H, PS and Y	Not restricted (Spring preferable)	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Avoidance as required to ensure compliance with Condition B12-1(3)(d).
Mount Saddleback Heath Communities	Variants of site-vegetation type G and areas associated with shallow soils and granite outcrops.	Not restricted	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with appropriate buffer.
Vegetation Type G4	Clay to clay-loam soils over outcrops on slopes	Not restricted	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Protection of any identified individuals with appropriate buffer.
Old Growth Forest	Limited history of logging / disturbance (refer DBCA criteria)	Not restricted	• Areas identified as of moderate to high potential for old growth forest to be assessed against DBCA criteria for old growth forest. • Protection of any identified old growth forest with application of a minimum 30m buffer.
Other Priority flora previously known within the PAA	Variable	Variable	• Targeted searches in likely habitat (inside and within 200 m of proposed clearing) prior to harvesting. • Reporting of survey findings and any subsequent disturbance within annual reporting
Other significant flora (as defined under MS1237)	Variable	Variable	• Notify EPA of any other significant flora identified during pre-clearance surveys. • Do not allow disturbance of other significant flora unless authorised by the CEO in accordance with condition B12-1(2)(f).

***** All preclearance surveys which are being relied on must be current and have been undertaken within 5 years prior to clearing, if the survey is older than 5 years the area proposed for clearing must be resurveyed.

6.6.6 Forest Hygiene

6.6.6.1 Phytophthora Dieback

The EPBC Act lists dieback, caused by the root-rot fungus *Phytophthora cinnamomi*, as one of the key threats to Australian biodiversity. Disturbance and rehabilitation have the potential to facilitate the spread of this disease and others such as *Armillaria luteobubalina* (Australian honey fungus). Dieback is widespread in the Jarrah forest, with

known locations within the PAA. Dieback has been recorded in 10 areas within the WMDE (Glevan 2020). The CBME area has been identified as almost completely infested by dieback, with a small section declared unprotectable (Glevan 2020).

The DBCA requires Worsley to survey and map all proposed clearing areas for forest disease such as *P. cinnamomi* and *A. luteobubalina* prior to disturbance. Areas of disease are recorded and reported and must be considered in mining operation planning. Once disease risk has been determined, appropriate hygiene management procedures are implemented.

6.6.6.2 Forest Hygiene Management

Working Arrangements with the DBCA recognise that Worsley's activities are undertaken in areas of Timber Reserve and on adjacent areas of private land supporting remnant bush and developed pastures. Many of Worsley's activities involving ground and vegetation disturbance have the potential to introduce and spread disease and / or weeds, including dieback and Australian honey fungus. Under the Working Arrangements, Worsley is responsible for maintaining hygiene management systems in its areas of operation and provides for DBCA input into the revision of these hygiene management systems. Key management actions to reduce the spread of forest disease to disease-free areas within the Project Area include:

- Forest areas must be mapped (interpreted) for the presence of dieback prior to any planned disturbance (interpretation is considered current for up to 3 years);
- Gravel and topsoil must not be relocated from Crown to private land or vice-versa without the specific approval of the relevant government agency and / or land owner.
- A Forest Hygiene Management Plan must be formulated for each infested area that is to be mined. Infested topsoil must be stockpiled separately and then returned to the demarcated infested area after mining is complete.
- Private properties influenced by agriculture are likely to be considered unmappable/uninterpretable. Standard practice when accessing Private property must include clean on entry and clean on exit (when entering forested areas).

Where appropriate, DBCA will be consulted to ensure the measures taken to manage Phytophthora dieback are consistent with DBCA objectives, and Worsley will review and update site procedures as required.

6.6.6.3 Dieback Research

Worsley supports relevant research into various aspects of forest disease caused by dieback to improve the knowledge on the biology of the disease and develop management options. Previous research support has focussed on control techniques, including use of phosphite and techniques for detection of *Phytophthora cinnamomi* undertaken by the CPSM at MU. Worsley has also supported research into diagnostic techniques (PRC method), and the mechanisms of infection and resistance through the CPSM, UWA and CU.

6.6.7 Weed Management

Disturbance caused by mining activities, including rehabilitation operations such as topsoil movement, presents an opportunity for weeds and forest diseases to spread and become established within new areas. The extent of weed invasion in the Project Area covered with intact jarrah forest is assessed during baseline surveys. Vegetation surveys undertaken to date indicate weed presence is variable, with greater presence in forest areas adjacent to cleared agricultural areas. A variety of weeds, common in agricultural areas, occur within the cleared portions of the estate including grass species (e.g. Wild Oats, Veldt Grass) and flat-leaf species (e.g. Cape Weed, Clover sp.). Weed control is mostly achieved through hygiene procedures (see Section 6.6.6.2). This includes ensuring topsoil from infested areas is kept adjacent to agricultural areas. Specific weed control is implemented through location-specific treatment programs for significant infestations or regular inspections for any identified spot infestations within the Project Area (including Worsley Joint Venture (JV) properties).

Weed inspections and treatment will be completed regularly for known populations and prior to commencement of development activities. Upon identification, new populations will be added to a maintained map of known declared weed locations. Annual assessments of impacts and success of treatment programs will be documented within the metadata of the GIS layer.

6.6.8 Forest Rehabilitation

Worsley conducts progressive rehabilitation of disturbed forest areas within the Project Area. The re-establishment of native vegetation minimises the potential for indirect impacts associated with fragmentation, edge effects and changes in groundwater and surface water in adjacent forested areas. Rehabilitation completed by Worsley must be consistent with the requirements of Condition B14-1 of MS1237.

To ensure these outcomes are met in relation to the Revised Proposal, Worsley will prepare and submit a Rehabilitation Performance Report in accordance with the requirements of Condition B14-2 within 12 months of receipt of MS1237. The intent of this Report is to outline the historic developments and improvements in rehabilitation, detail completion criteria and biodiversity indicators and their relevance to the rehabilitation development, as well as document Worsley's monitoring, measurement and adaptive management processes.

These requirements and associated monitoring and reporting are detailed in full within the Annual Rehabilitation Plan required by condition B14-3 of MS1237.

Please refer to the Rehabilitation Performance Report and the Annual Rehabilitation Report for further detail on rehabilitation practices and outcomes.

6.6.9 Threatened Flora Research Partnerships

Worsley will establish, where available, a research program with King's Park Botanical Gardens to collect and safely store viable seed from Threatened flora located within the PAA. At this time *C. hopperiana* is the only known Threatened flora within the PAA. Seed and plant material have been collected and storage management programs are ongoing. Should other Threatened flora be identified within the PAA a similar process will be applied where appropriate as a mitigative control measure for any potential impact on the species.

6.6.10 Water Management Plan (01027243)

In accordance with the requirements of MS1237 (condition B16-2) Worsley has compiled a Water Management Plan (WMP) (01027243) which details the potential impacts on groundwater, surface water and Groundwater Dependent Ecosystems (GDEs) and indirect impacts on conservation significant flora, fauna and ecological communities associated with changes to surface water and/or groundwater attributable to the Worsley operation. The WMP also outlines the management, monitoring and mitigation measures implemented to ensure that these direct and indirect impacts are minimised to achieve the environmental outcomes.

The WMP was prepared in accordance with the 'Instructions: How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans' published by the Western Australian Environment Protection Authority (EPA) (EPA, 2024) and the 'Environmental Management Plan Guidelines' published by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (DCCEEW, 2024). WMP has been written to be consistent with the requirements of conditions C4-1 and C5-1 of MS1237. In accordance with condition C1-1 no ground disturbing activities may take place until the CEO has confirmed in writing that this WMP meets the requirements of condition B16-2 of MS1237.

7 FLORA AND VEGETATION MONITORING PROGRAMS

Flora and vegetation monitoring programs have been designed and implemented to identify potential impacts and assess outcomes of mitigation activities associated with operations within the PAA. The purpose, locations and frequencies of each monitoring program are outlined in Table 7-1. The flora monitoring programs include the monitoring required under MS1237. Monitoring programs are designed to allow assessment of outcomes and objectives as outlined in Section 8. Survey methodologies are determined by independent qualified third parties and comply with applicable EPA and DCCEEW guidelines.

Monitoring programs will be adapted with evolving technology and development in scientific knowledge.

Table 7-1: Flora and Vegetation Monitoring Programs – Revised Proposal

Monitoring Program	Frequency	Location(s)	Purpose
Targeted flora surveys – Protected Areas	3 yearly	Protected Areas Control Sites	Assess abundance and distribution of targeted flora species within

Monitoring Program	Frequency	Location(s)	Purpose
			Protected Areas against baseline condition. Identify contributing factors for any observed decline.
Follow-up Targeted flora surveys – Protected Areas	As required (within 12 months of trigger)	Impacted sites Control sites Additional monitoring sites (as required to support investigations)	Assess abundance and distribution of targeted flora species within Protected Areas against baseline condition and previous survey results Identify contributing factors for any observed decline Assess health of individual plants
Targeted Vegetation Condition Assessment – Protected Areas and Ecological Linkages	3 yearly	Protected Areas Ecological Linkages GDEs (representative sample from each location type) Forest control sites	Assess vegetation condition through field survey. Identify contributing factors for any observed decline.
Follow-up Targeted Vegetation Condition Assessment – Protected Areas and Ecological Linkages	As required (within 2 years of trigger)	Impacted sites Control sites Additional monitoring sites (as required to support investigations)	Assess vegetation condition Identify contributing factors for any observed decline.
Flora and vegetation establishment – Rehabilitation	At age 18 months, 5, 10, and every subsequent 10 years	Rehabilitation areas	Assess performance against completion criteria Identify areas requiring management activities Verify success of recalcitrant species programs
Forest Controls	5 yearly	Established vegetation and forest control monitoring plots (STR, QTR, MTR). *Note: Additional forest control plots will be established as mining moves into new areas.*	Monitor regional changes in native vegetation and provide a baseline for assessment of rehabilitation establishment.
Pre-clearance flora and vegetation surveys (see section 6.6.5)	Ongoing	Areas of future disturbance as defined by 10 Year Mine Plan	Identify flora and vegetation of conservation significance as well as old growth forest. Apply avoidance and management measures to ensure impacts on conservation significant flora and vegetation are minimised.
Targeted *Caladenia hopperiana* population surveys	Annual	Known occurrences of *C. hopperiana* within QTR	Assess abundance and distribution of *C. hopperiana*.
Forest Hygiene Mapping	Annual	Areas of future disturbance as defined by 10 Year Mine Plan	Assess for presence of *Phytophthora cinnamomi* and *A. luteobubalina*.
Regional fragmentation assessment	5 yearly	PAA and wider Region	Assess changes in fragmentation across the landscape over time using spatial data and aerial imagery.

Monitoring Program	Frequency	Location(s)	Purpose
Regional vegetation condition assessment	5 yearly	PAA and wider Region	Assessment of Regional changes in vegetation health using remote sensing data. Comparison of Protected Areas and forest control sites information. Trigger additional field surveys in areas of potential concern.

Additional flora monitoring programs may be initiated on recommendation from independent qualified third parties, at the request of relevant Regulators, or as a result of applying adaptive management processes to achieve the required outcomes and objectives of this FVMP.

7.1 TARGETED FLORA SURVEYS – PROTECTED AREAS

Targeted flora and vegetation surveys will be completed in accordance with EPA Technical Guidelines by external qualified flora consultants during 2025 and 2026 to establish the baseline distribution and abundance of conservation significant flora and vegetation within relevant Protected Areas within the PAA. During this period, control plots will also be defined within the region to allow identification of regional impacts.

Following the establishment of baseline conditions follow-up assessment will be completed every 3 years in accordance with relevant EPA Technical Guidelines. During these surveys the potential cause for any observed decline in abundance or distribution will be assessed with further survey requirements defined as recommendations by the expert external consultant as required.

7.2 TARGETED VEGETATION CONDITION ASSESSMENT – PROTECTED AREAS AND ECOLOGICAL LINKAGES

Targeted vegetation condition assessment will be completed in conjunction with the Targeted Flora Surveys - Protected Areas (see section 7.1). Baseline condition will be established during 2025 and 2026 by qualified external flora consultants in accordance with relevant EPA Technical Guidelines with control sites also being established. Follow-up monitoring will be completed on a 5 yearly basis by qualified external flora consultants in accordance with relevant EPA Technical guidelines.

Vegetation condition assessment will focus on perennial species rather than short lived annuals and will include observation of relevant indicators of vegetation health including but not limited to local plant deaths, changes in vegetation structure, changes in healthy vegetation cover, evidence of impacts from pathogens/pests, dust deposition and water stress. The assessment will include the collection of photographs for comparison of historic and future survey observations and forest control sites to allow for exclusion of regional impacts (e.g., climate change).

7.3 FLORA AND VEGETATION ESTABLISHMENT – REHABILITATION

Worsley has an extensive ongoing flora monitoring program to assess the progress of the rehabilitation. The vegetation monitoring program has developed since the first assessment of rehabilitation performance in 1987 by Mattiske Consulting Pty Ltd. A revised monitoring program was established in 2017 by Mattiske Consulting Pty Ltd and Worsley, upon the review of historical data, success parameters and draft completion criteria. Permanent vegetation plots are established in the rehabilitated area to assess the development of trees and understorey. Currently, for each year of rehabilitation, a range of plots are repeatedly assessed when the rehabilitation reaches 18 months, 5, 10, and every subsequent 10 years of age. Frequency of monitoring may alter if any significant vegetation anomalies are identified. Floristic assessments are undertaken during spring on the number of individuals and percentage cover of each species. The tree component is assessed during winter (to avoid the spring floristic workload).Please refer to the Rehabilitation Performance Report and the Annual Rehabilitation Report for further detail on rehabilitation monitoring and outcomes.

7.4 FOREST CONTROLS

Forest control monitoring plots are monitored on a rotational basis with each plot monitored every 5 years. The monitoring of forest control plots is completed in conjunction with the Flora and Vegetation Establishment – Rehabilitation monitoring program to maintain an understanding of the flora and vegetation in the region and understand any regional impacts that may be impacting flora and vegetation (i.e. climate change). As part of the implementation of the Revised Proposal, additional forest control plots will be established as required to ensure sufficient coverage within areas of the PAA that have not previously been impacted by Worsley operations (e.g., Hotham North Mining Region) to support adaptive management processes for forest rehabilitation activities.

7.5 PRE-CLEARANCE FLORA AND VEGETATION SURVEYS

Preclearance surveys are completed for priority and Threatened flora. These are described in detail in section 6.6.5.

7.6 TARGETED *CALADENIA HOPPERIANA* POPULATION SURVEYS

Targeted surveys for *C. hopperiana* will be completed in accordance with the EPA's Technical guidance – *Flora and vegetation surveys for environmental impact assessment* by external qualified flora consultants with demonstrated experience in orchid surveys in the bioregion. Surveys will be completed on an annual basis for all known populations of *C. hopperiana* within the PAA (see Figure 6-1). A summary of surveys for *C. hopperiana* completed within the last 7 years, and the associated abundance as determined at the time, is provided in Table 7-2. These surveys form the baseline understanding of abundance and distribution for the species. Annual targeted surveys of all populations will assist in determining the natural variation in flowering each year and this additional information will support amendments to the trigger and threshold targets for Outcome-based provisions through adaptive management.

Table 7-2: Summary of recorded *C. hopperiana* abundance over time

Survey Period	Surveyed by	Confirmed Abundance (Flowering)	
		All locations	Population 2
2012/13	DBCA	~227*	11*
2017	DBCA	Not assessed	36*
2019	Mattiske Consulting Pty Ltd	312	32
2023	DBCA	388	308
2024	Onshore Environmental Consultants Pty Ltd	805	286

* Values interpreted from shapefiles provided by DBCA in March 2024.

7.7 TARGETED *CALADENIA CAESAREA SUPSP MOORADUNG* POPULATION SURVEYS

Targeted surveys for *C. caesarea* subsp. Mooradung will be completed in accordance with the EPA's Technical guidance – *Flora and vegetation surveys for environmental impact assessment* by external qualified flora consultants with demonstrated experience in orchid surveys in the bioregion. Surveys will be completed on an annual basis for all known populations within the PAA (see Figure 6-1) for three years to establish baseline conditions and natural variability in abundance for the species. Annual targeted surveys of all populations will assist in determining the natural variation in emergence and support refinement of trigger and threshold targets for Outcome-based provisions through adaptive management. Upon establishment of a baseline monitoring will be reduced to three yearly. If the conservation classification of this species is assessed as Threatened then the frequency of monitoring will increase to annual.

7.8 FOREST HYGIENE MAPPING

Forest hygiene mapping is completed in a progressive manner as part of the pre-clearance process for mining operations. Interpretation of forested areas is completed by qualified external consultants in accordance with the

current DBCA manual, *"Phytophthora Dieback Interpreters Manual for lands managed by the Department"* and all dieback reports are submitted for validation in accordance with DBCA requirements. Dieback interpretation is valid for three years from the date of survey after which the area must be re-interpreted prior to any clearing activities taking place.

7.9 REGIONAL FRAGMENTATION ASSESSMENT

A regional fragmentation assessment will be conducted encompassing the Wider Mapped Area surrounding the PAA (as outlined in Worsley, 2024). This assessment will use regional aerial imagery and internal spatial information (including flora and vegetation mapping and surveyed operational boundaries) to assess the extent and interconnectedness of remnant native vegetation, rehabilitation vegetation and restoration vegetation within the Wider Mapped Area. This assessment includes a process to determine the number of native vegetation parcels present and the respective size of each of these parcels. This process was first completed in 2023 to inform the Environmental Impact Assessment. Subsequent assessments will be completed on a five yearly basis commencing in 2028.

7.10 REGIONAL VEGETATION CONDITION ASSESSMENT

This monitoring program will be designed in consultation with external expert consultants and carried out on a five yearly basis. The intent is that spatial information (including NDVI) will be used to complete a vegetation health within the region within and surrounding the PAA. The assessment will assess changes in vegetation health over time and flag areas of potential concern that require ground truthing to verify the outcomes of the desktop survey activity. The report will review the current monitoring programs and make recommendations, as required, to improve these through adaptive management processes.

8 EMP PROVISIONS

8.1 OUTCOME-BASED PROVISIONS

This section describes the outcome-based provisions of this FVMP, which when implemented, will achieve the EPA objective for the environment factors Flora and Vegetation and manage impacts associated with Worsley's operations. These are based on the rationale outlined in Section 6.

The provisions included in this FVMP reflect management actions taken by Worsley, specifically targeting significant vegetation and flora species. Management actions for aspects relevant to significant fauna are addressed in the Conservation Significant Fauna Management Plan (200001091).

The purpose of these outcome-based provisions is to meet legal requirements under MS1237 condition B12-1. These outcome-based provisions are further detailed in Table 8-1.

Table 8-1: Outcome-based Provisions

EPA factor/s and objective/s: Flora and Vegetation is "*to protect flora and vegetation so that biological diversity and ecological integrity are maintained*".

Outcome/s:

(1) disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation;

(2) ensure no disturbance or adverse impacts to:
- (a) threatened flora including *Caladenia hopperiana*;
- (b) *Caladenia caesarea* subsp. Mooradung;
- (c) *Papistylus intropubens* and *Synaphea panhesya*;
- (d) the Mount Saddleback Heath Communities Priority Ecological Community and vegetation type G4;
- (e) other significant vegetation;
- (f) other significant flora unless authorised by the CEO; and
- (g) old growth forest.

(3) ensure no disturbance or adverse impacts to more than:
- (a) 2% of the known population of *Calytrix simplex* subsp. *simplex*;
- (b) 8% of the known population of *Gastrolobium* sp. Prostrate Boddington;
- (c) 2% of the known population of *Hibbertia ambita*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
- (d) 2% of the known population of *Halgania corymbosa*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
- (e) 11.9 ha of Williams vegetation complex after the date of this Statement; and
- (f) 332.5 ha of Michibin vegetation complex after the date of this Statement.

(4) ensure that the proposal does not cause or contribute to the introduction and/or spread of forest disease, including *Phytophthora cinnamomi*, outside of areas identified as infected by the pre-clearance surveys required by condition B12-3.

Key environmental values: Threatened Ecological Communities, Priority Ecological Communities, Threatened flora, priority flora, forest hygiene

Key impacts and risks: Loss of biodiversity, spread of forest disease

	Outcome:	**Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation**			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
MS1237 Condition B12-1 (1)					
Outcome 1	**Indicator:** *Reconciled spatial data* **Trigger Criteria:** The total reconciled area of disturbance for the environmental values as outlined under condition B12-1 (1) reaches 75% of the	**Trigger level actions:** • Notify EH&A Manager and Production Planning Manager. • Review planned further disturbance activities during current harvesting / clearing cycle to ensure total	10 Year Mine Plan to include forecasting of disturbance for all environmental values outlined under Condition 12-1 (1). Disturbance boundary surveys.	Annual Monthly summary	Total disturbance against each environmental value included in Annual Environmental Report (AER). Compliance Assessment Report

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
	permitted disturbance area approved for clearing (see Table 8-2).	disturbance will not exceed limits outlined in Condition B12-1 (1). • Conduct an audit to ensure relevant controls are in place and effective to ensure compliance with limits outlined in Condition B12-1 (1).	Clearing reconciliation process to verify total area cleared.	Annual	Total disturbance and forecast disturbance included in the 10-Year Mine Plan Reporting in accordance with MS1237 (as required).
	Threshold Criteria: The total reconciled area of disturbance for any environmental value as outlined under condition B12-1(1) reaches 95% of permitted disturbance (see Table 8-2).	**Contingency response actions:** • Notify EH&A Manager and Production Planning Manager. • Suspend all disturbance of the applicable environmental value until current disturbance boundaries have been surveyed and values have been verified. • EH&A Manager must approve any further disturbance for the applicable environmental value with additional controls applied (as deemed necessary) to ensure compliance with MS1237.			
Condition B12-1 (2)					
Outcome 2	**Indicator:** *Proximity of disturbance to Protected Areas* **Trigger Criteria 1:** Disturbance proposed within 30 m of a defined Protected Area containing an environmental value listed under Condition B12-1 (2) of MS1237.	**Trigger Level Actions:** • Clearing to be reviewed by Environmental Specialist with additional operational controls applied as necessary to ensure ongoing Protection of environmental values.	Clearing Plan sign-offs. Survey of disturbance boundaries	As required. Reconciled monthly.	Clearing areas reported within 10 Year Mine Plan and AER. Incident and clearing boundaries to be included in AER and 10 Year Mine Plan. Compliance Assessment Report Incident reports to regulators.
	Threshold Criteria 1: Disturbance within Protected Areas defined for protection of environmental	**Threshold contingency actions:** • Report disturbance to regulator (within 2 working days of becoming aware of the incident).			

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
	values listed under Condition B12-1 (2).	• Investigate the extent of any impact on applicable environmental matters outlined under condition B12-1(2) and the proposed response actions. • Submit findings from the investigation and proposed response actions to the regulator within 30 days of identification of the incident. • Implement response actions as agreed with regulator.			
Outcome 2	**Indicator:** *Abundance (number of flowering plants) Caladenia caesarea subsp. Mooradung.* **Trigger Criteria 2:** >10% decline in abundance from baseline* within a given population of *Caladenia caesarea* subsp. Mooradung where decline is found to be inconsistent with control sites.	**Trigger level actions:** • Investigate potential cause of decline in abundance in consultation with an independent qualified expert. • Implement preventative actions as appropriate to address findings from investigation. • Conduct follow-up targeted flora monitoring including assessment of health for each plant and any obvious signs of indirect impacts (e.g. dust deposition) during the next appropriate monitoring period.	Targeted *Caladenia caesarea* Population Survey (see section 7.6). Targeted flora surveys – Protected Areas and Ecological Linkages (see section 6.6.1.2) Follow-up Targeted flora surveys (including assessment of health)	Annually (for 3 years) 3 yearly (following completion of baseline) Next available flowering period (Spring)	Summary of results from monitoring programs to be included in AER. Compliance Assessment Report Incident reports to regulators.
	Threshold Criteria 2: A sustained decline in abundance of *Caladenia caesarea* subsp. Mooradung is identified during follow-up Targeted surveys OR a decline in abundance >20% from baseline* is recorded within a given population of *Caladenia caesarea* subsp. Mooradung where decline is found to be inconsistent with control sites.	**Threshold contingency actions:** • Report outcomes of follow-up monitoring program to Regulator. • Conduct a detailed investigation supported by qualified external experts to determine the cause of any identified decline in presence and/or condition of matters listed under Condition B12-1(2).			

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
	** baseline represents the mean abundance as determined through completion of 3 consecutive annual targeted surveys for any given population.*	• Submit findings from the investigation and proposed response actions to the regulator. • Implement agreed response actions.			
Outcome 2	**Indicator:** *Abundance (number of flowering plants) of Caladenia hopperiana within Population 2.* **Trigger Criteria 3:** Abundance of *C. hopperiana* within Population 2 is <282** individual flowering plants, where decline in abundance is found to be inconsistent with control sites. **The mean abundance from surveys conducted in 2023 and 2024 minus 1 standard deviation.	**Trigger level actions:** • Investigate potential cause of decline in flora abundance in consultation with an independent qualified expert. • Implement preventative actions as appropriate to address findings from investigation. • Include assessment of health for each plant and any obvious signs of indirect impacts (e.g. dust deposition) during the next appropriate monitoring period.	Targeted *Caladenia hopperiana* Population Survey (see section 7.6).	Annual	Summary of results from monitoring programs to be included in AER. Compliance Assessment Report Incident and investigation reports to regulator(s).
	Threshold Criteria 3: Abundance of *C. hopperiana* within Population 2 recorded as <266*** individual plants, where decline in abundance is found to be inconsistent with control sites. *** The mean abundance from surveys conducted in 2023 and 2024 minus 2 standard deviation.	**Threshold contingency actions:** • Cease native vegetation clearing within 200 m of the *C. hopperiana* population until an investigation has been completed. • Report threshold exceedance to the applicable regulator(s). • Conduct a detailed investigation supported by qualified external consultants to determine the cause of the identified decline in abundance. • Submit findings from the investigation and proposed response actions to the relevant regulator(s). • Implement agreed response actions.			

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
Outcome 2	**Indicator:** *Vegetation condition (as assessed by qualified external consultant)* **Trigger Criteria 4:** A decline in vegetation condition from baseline for PEC, vegetation type G4 or old growth forest areas where decline is found to be inconsistent with control sites.	**Trigger level actions:** • Investigate potential cause of decline in vegetation condition (i.e. evidence of dust deposition, review of relevant groundwater monitoring information, comparison with control sites etc). • Implement preventative actions as appropriate to address findings from investigation. • Conduct follow-up vegetation condition monitoring within 2 years to reassess areas of potential decline, include additional locations within Protected Areas and additional control sites (as appropriate) to understand external contributing factors such as climate change.	Targeted vegetation condition – Protected Areas and Ecological Linkages (see section 6.6.1.2) Follow-up vegetation condition survey	5 Yearly Within 2 years of trigger exceedance	Summary of results from monitoring programs to be included in AER. Compliance Assessment Report Incident reports to regulators.
	Threshold Criteria 4: A sustained or further decline in vegetation condition from baseline for PECs, vegetation type G4 or old growth forest areas (as identified during follow-up survey) which is potentially attributable to implementation of the Revised Proposal.	**Threshold contingency actions:** • Report findings of monitoring program to Regulator. • Conduct a detailed investigation with qualified external experts to determine the cause of any identified decline in condition of PECS, vegetation type G4 and / or old growth forest areas. • Submit findings from the investigation and proposed response actions to the regulator. • Implement agreed response actions.			

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
Outcome 2	**Indicator:** *Identification of other significant vegetation or other significant flora* **Trigger Criteria 5:** A decline in vegetation condition from baseline for PEC, vegetation type G4 or old growth forest areas where decline is found to be inconsistent with control sites.	**Trigger level actions:** • Notify EH&A Manager and Production Planning Manager of identified other significant vegetation / flora. • Apply the mitigation hierarchy to minimise impacts on the other significant vegetation / flora. • Review requirement for additional targeted surveys to understand distribution and abundance of other significant vegetation / flora. • If avoidance is not practicable submit request for disturbance to the CEO of DWER for assessment.	Pre-clearance surveys in accordance with condition B12-5 (see section 6.6.5). Survey of disturbance boundaries Follow-up Targeted flora / vegetation surveys (if required)	Variable and dependent on requirements for species identification Monthly As required	Summary of results from monitoring programs to be included in AER. Compliance Assessment Report Incident reports and investigation findings to appropriate regulators.
	Indicator: *Reconciled Spatial data* **Threshold Criteria 5:** Unauthorised disturbance to other significant vegetation or other significant flora identified from annual audit of spatial data for disturbance boundaries.	**Contingency response actions:** • Report incident to the appropriate Regulator. • Conduct an investigation to determine the cause of the incident and identify additional controls to be implemented to prevent recurrence. • Submit findings from the investigation and proposed response actions to the regulator. Implement agreed response actions.			
MS1237 Condition B12-1 (3)					
Outcome 3	**Indicator:** *number of plants disturbed or reconciled spatial data* **Trigger Criteria 6:** The total disturbance for the environmental values as outlined	**Trigger level actions** • Notify EH&A Manager and Production Planning Manager. • Review planned further disturbance activities during current harvesting /	Clearing Plan sign-offs. Survey of disturbance boundaries	As required. Reconciled monthly.	Total disturbance against each environmental value included in Annual Environmental Report (AER).

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
	under condition B12-1(3) exceeds the trigger criteria outlined in Table 8-3.	clearing cycle to ensure total disturbance will not exceed limits outlined in Condition B12-1 (3). • Conduct an audit to ensure relevant controls are in place and effective to ensure compliance with limits outlined in Condition B12-1 (3).			Compliance Assessment Report Total disturbance and forecast disturbance included in the 10-Year Mine Plan Reporting in accordance with MS1237 (as required). Compliance Assessment Report
	Threshold Criteria 6: The total disturbance for the environmental values as outlined under condition B12-1(3) exceeds the threshold criteria outlined in Table 8-3.	**Threshold contingency actions:** • Notify EH&A Manager and Production Planning Manager. • Suspend all disturbance of the applicable environmental value until current disturbance has been verified. • EH&A Manager must approve any further disturbance for the applicable environmental value with additional controls applied (as deemed necessary) to ensure compliance with MS1237.			
MS1237 Condition B12-1 (4)					
Outcome 4	**Indicator:** *Phytophthora cinnamomi occurrence* **Trigger Criteria 7:** New *Phytophthora cinnamomi* (dieback) infestation identified during dieback interpretation.	**Trigger level actions:** • Report findings to applicable regulators. • Restrict access to the area. • Develop and implement a pit specific Forest Hygiene Management Plan for all operations planned within the infested area.	Dieback interpretation of proposed clearing areas. Additional investigative dieback interpretation. Resurvey of known infestations (including rehabilitation). Audit of compliance with Forest Hygiene Management Plans.	Annual As required 5-yearly As required	Annual Environmental Report. Compliance Assessment Report Incident reports
	Threshold Criteria 7:	**Threshold contingency actions:** • Report incident to regulator.			

	Outcome:	Disturb no more than 3,855 ha of native vegetation, 604 ha of rehabilitation vegetation and 74 ha of plantation vegetation			
Relevant Outcome/s	**Indicator** **Trigger criteria & Threshold criteria**	**Response actions**	**Monitoring**	**Timing / frequency of monitoring**	**Reporting**
	Identification of a new dieback infestation likely to have been caused by Worsley operations.	• Investigate potential cause of pathogen spread. • Determine additional management measures required to prevent recurrence in consultation with regulator. • Review and update operational procedures and plans as required.			

Table 8-2: Trigger and Threshold values for Environmental Values for MS1237 Condition B12-1(1)

Environmental Value	MS1237 Limit	Trigger (75%)	Threshold (95%)	Tolerance after 95%
Native Vegetation	3,855 ha	2,890 ha	3,662 ha	193 ha
Rehabilitation Vegetation	604 ha	450 ha	570 ha	34 ha
Plantation Vegetation	75 ha	56 ha	70 ha	5 ha

Table 8-3: Trigger and Threshold values for Environmental Values for MS1237 Condition B12-1(3)

Environmental Value	MS1237 Limit	Known Population*	Trigger (%)	Trigger Value*	Threshold (%)	Threshold Value*
Calytrix simplex subsp. simplex	2% of known population	2,058	1.5%	30 plants	2%	41 plants
Gastrolobium sp. Prostrate Boddington	8% of known population	27,405	6%	1,644 plants	8%	2,192 plants
Hibbertia ambita	10% of known population (>100 individuals)	398	7.5%	29 plants	10%	39 plants
Halgania corymbosa	2% of known population (<100 individuals)	79	1.5%	1 plant	2%	1 plant
Williams vegetation complex	11.9 ha	N/A	75%	8.9 ha	95%	11.3 ha
Michibin vegetation complex	332.5 ha	N/A	75%	249.4 ha	95%	316.0 ha

*Values accurate as at January 2025. The known population and associated trigger and threshold values may change following completion of additional flora surveys, this will be included in the annual report.

8.2 OBJECTIVE-BASED PROVISIONS

This section describes the objective-based provisions for conservation significant flora and vegetation, which when implemented, will achieve the EPA objective for the environment factor of Terrestrial Flora and Vegetation and manage impacts associated with Worsley's operations. These objective-based provisions are based on the approach described in Section 9.

The objective-based provisions included in this FVMP reflect management actions taken by the operation specifically targeting conservation significant flora species and vegetation. Management actions for aspects relevant to conservation significant fauna are included in the CSFMP (200001091).

The purpose of the objective-based provisions is to meet the legal requirements under MS1237 condition B12-2. These objective-based provisions are further detailed in Table 8-4.

Table 8-4: Objective-based Provisions

EPA factor/s and objective/s: Flora and Vegetation is "*to protect flora and vegetation so that biological diversity and ecological integrity are maintained*".

Objective/s:

1. Avoid and minimise indirect impacts to flora and vegetation including but not limited to impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water[2] and fragmentation.

Key environmental values: Flora and vegetation, ecosystem function, biodiversity

Key impacts and risks: Loss of biodiversity, spread of forest disease

Management Targets	Management actions	Monitoring	Timing/frequency of monitoring	Reporting
MS1237 Condition B12-2(1)				
Forest disease				
No new dieback infestation as a result of Worsley operations within the life of the proposal (15 years).	• Prior to clearing each area to be disturbed in the PAA, forest disease mapping will be undertaken in line with DBCA's *Phytophthora Dieback Interpreters Manual for Lands Managed by the Department* and DBCA's *Phytophthora Dieback Management Manual* (DBCA, 2020), as amended or replaced from time to time.[3] Dieback mapping must have been completed within 3 years prior to the proposed disturbance to be considered current. • If dieback is identified within a proposed disturbance area, a detailed site specific Hygiene Management Plan must be developed prior to disturbance occurring. This will include considerations for: o Mine planning; o Clearing and pit development; o Topsoil and subsoil removal and stockpiling; o Mining and reshaping earthworks; o Rehabilitation of the stockpile areas; o Revegetation; o Contaminated material management; and o Ongoing monitoring.	Forest Disease Mapping Reassessment of known pathogen infestations within operational areas	Annual (areas identified within 10 Year Mine Plan) 3 Yearly	Annual Environmental Reporting. Compliance Assessment Report Submission of Forest Disease Mapping to DBCA Incident reports to regulators.

[2] Indirect impacts associated with changes in groundwater and surface water are included in Worsley's Water Management Plan (01027243) required under condition 16-2 of MS1237 and are not included in this FVMP.

[3] As per MS1237 Condition B12-3.

Management Targets	Management actions	Monitoring	Timing/frequency of monitoring	Reporting
	• Hygiene management plans of high-risk locations may be reviewed by DBCA for completeness and best practise management processes. • Infested topsoil shall be stockpiled separately within dieback infested areas and then returned to the demarcated infested area after mining is complete. • Gravel and topsoil must not be relocated from Crown to private land or vice-versa without the specific approval of the relevant government agency and / or land owner. • Access is restricted for known dieback infestations. • Dieback training required for all personnel with a Minesite Driver's Permit. • All vehicles must be clean of soil and vegetation prior to entry to site. • Vehicles and personnel must be clean on entry and clean on exit from private properties. • Areas that are identified as being infested with dieback resulting from mining and associated activities will be rehabilitated in a manner deemed appropriate to the level of impact. The rehabilitation process of each area will be included in the area-specific soil hygiene management plan. • Where appropriate, DBCA will be consulted to ensure the measures taken are consistent with DBCA objectives, and Worsley will review and update the procedures accordingly as required.			
Native Flora and Vegetation				
Total disturbance for the environmental values, as outlined under condition B12-1 (3), is maintained within allowable limits for the duration of the operation.	• Complete targeted pre-clearance surveys for conservation significant flora and apply associated management actions in accordance with section 6.6.5. • Establish Protected Areas for any identified conservation significant flora and vegetation in accordance with section 6.6.1.	Pre-clearance surveys Vegetation Condition – Protected Areas and Ecological Linkages	Ongoing (in accordance with 10 Year Mine Plan) 5 yearly	Annual Environmental Reporting. Compliance Assessment Report Incident reports to regulators.

Management Targets	Management actions	Monitoring	Timing/frequency of monitoring	Reporting
	• Report findings from pre-clearance surveys and management measures applied within the annual Flora and Vegetation Management Plan. • Conduct an annual review of the EPBC Act and BC Act listed species to identify any changes or additions to relevant conservation significant flora and vegetation. Amend pre-clearance monitoring programs as required through adaptive management processes.			
Disturbance within High Quality Wandoo areas within the PAA will not exceed 25% for the duration of the project. Note: spatial definition of High Quality Wandoo areas within the PAA will be completed by June 2025.	• Areas identified by aerial photography as high-quality Wandoo to be verified by June 2025. • The verified High Quality Wandoo areas must be maintained as a formal layer within site GIS system. • 10 Year Mine Plan will be used to monitor and forecast impacts to High Quality Wandoo annually. Impacts will be minimised where practicable. • Annual and cumulative clearing must be included in the Annual Environmental Report including tracking against management target.	Validate high-quality Wandoo areas within the PAA by June 2025. Survey of disturbance boundaries	ONe off (by June 2025) Annual (10 Year Mine Plan) Monthly	Annual and cumulative clearing of high quality Wandoo will be included in the AER. Forecast disturbance of High Quality Wandoo for the following 2-3 years will be included in the 10 Year Mine Plan.
	• •	Groundwater monitoring (in accordance with the WMP (01027243) Targeted Vegetation Condition Assessment – Protected Areas and Ecological Linkages		Annual Environmental Reporting. Compliance Assessment Report 10-Year Mine Plan to EMLG
A progressive reduction in fragmentation within the PAA is observed from the 2028 assessment period for the duration of the project.	• Implement Ecological Linkages in accordance with section 6.6.3. • Implement Protected Areas and Protection Commitments in accordance with section 6.6.1and 6.6.2 respectively. • Complete progressive rehabilitation in accordance with 6.6.8.	Regional Fragmentation Assessment	5 yearly	Rehabilitation and restoration activities reported in AER. Outcomes of 5 yearly Regional Fragmentation Assessment and progress against target reported in AER. Rehabilitation deficit reported in 10 Year Mine Plan.

Management Targets	Management actions	Monitoring	Timing/frequency of monitoring	Reporting
Note the baseline assessment completed in 2023 is not applied given fragmentation will increase in the initial 5 years of implementation due to establishment of long term infrastructure.	• Implement ecological restoration in accordance with the Local Offset Management Plan (200001090). • Monitor regional fragmentation on a 5 yearly basis to understand effectiveness of management measures and implement adaptive management as required.			
Weeds				
No new outbreaks of weeds of national significance or declared plants as a result of Worsley operations within the life of the proposal (15 years).	• Monitoring for weed presence in areas prior to disturbance and following rehabilitation. • Include identification of likely declared weed species in site training packages and encourage reporting by all personnel. • Regular inspection and treatment for known weed populations and prior to commencement of development activities. • New populations identified will be added to a maintained map of known declared weed locations. • Where appropriate, DBCA will be consulted to advise on the measures taken are consistent with DBCA objectives, and Worsley will review and update the procedures accordingly as required. • Monitor progress and effectiveness of management activities. • Alternate topsoil management practices may be applied in areas with a high weed load (i.e. pasture to bush). Trials are currently underway to assess best management techniques and adaptive management will be applied as required. • Forest Hygiene management practices as outlined in section 6.6.6.2. • Weed management measures as outlined in section 6.6.7.	Rehabilitation Establishment Inspections of known declared weed populations	At age 2, 5, 10, and every subsequent 10 years As required	Annual Environmental Reporting. Compliance Assessment Report. Incident reports.
Dust				

Management Targets	Management actions	Monitoring	Timing/frequency of monitoring	Reporting
No recorded deaths of conservation significant flora or vegetation because of dust impacts from Worsley operations within the life of the proposal (15 years).	• Dust suppression applied on haul roads and within fixed plant. • Speed restricted to 60km/h onsite. Further speed restrictions applied during high dust conditions. • Monitoring of dust in accordance with Part V of the EP Act. • Protected Areas established in accordance with section 6.6.1 to include buffers of at least 30 m for all sensitive flora and vegetation. • 5 yearly vegetation condition monitoring to be completed for Protected Areas, Ecological Linkages and Groundwater Dependent Ecosystems (GDEs)[4] to assess extent of indirect impacts on flora and vegetation.	Ambient dust monitoring program Targeted flora and vegetation condition – Protected Areas and Ecological Linkages	In accordance with Part V 5 yearly	Incident reports to regulator in accordance with Part V approvals and within AER. Summary of results and conclusions from Targeted flora and vegetation condition – Protected Areas and Ecological Linkages monitoring program included in AER.
Fire				
No uncontrolled fires effecting >20 ha of remnant native vegetation, as a result of Worsley operations, for the duration of the operation (15 years).	• Installation and maintenance of fire breaks. • Compliance with fire, harvest and vehicle movement bans issued by local Shire. • Regular inspections of adjacent forested areas for spot fires must be completed during forest debris burning and a response vehicle must be on-hand. • Site emergency response team and equipment to be maintained to allow efficient response to wildfire in the local area. • If required, emergency clearing may be completed to minimise impacts from uncontrolled fires. • Compliance with requirements of DBCA/Worsley Working Arrangements.	Firebreak inspections	Annual	Incident reports to regulators and within AER and CAR.
Groundwater and Surface Water				
No negative impacts to conservation significant flora and vegetation	• Minimise native vegetation disturbance and utilise existing cleared areas or areas that will be disturbed for future mining pits where possible.	Ongoing monitoring in accordance with the WMP (01027243) including	Variable (see WMP)	Summary of water monitoring data, water abstraction and triennial aquifer reviews provided within AER.

[4] Impacts on GDEs are included in Worsley's Water Management Plan (01027243 required under condition 16-2 of MS1237 and are not included in this FVMP.

Management Targets	Management actions	Monitoring	Timing/frequency of monitoring	Reporting
associated with groundwater mounding as a result of Worsley operations, for the duration of the operation (15 years).	• Implement the WMP (01027243) including: ○ groundwater and surface water monitoring programs with associated outcome- and objective- based provisions . ○ Application of stream buffers. ○ Installation of water management infrastructure (sumps, drainage lines etc.) for all operational areas including haul roads. ○ Obtain Bed and Banks permits under the RIWI Act for any disturbance required to stream beds and banks. ○ Reshape disturbed areas to match surrounding contours during progressive rehabilitation to minimise impacts on surface water drainage patterns. ○ Regular sustainable yield testing for all production bores in the shallow and the deep fractured rock aquifer (6 yearly). ○ Progressive rehabilitation of disturbed land.	application of TARP requirements. Triennial aquifer reviews by hydrogeologist Monitoring of abstraction rates against sustainable yield. Sustainable Yield Assessment Regular inspection and maintenance of sumps.	3 Yearly Monthly 6 Yearly Annual	Reporting of incidents and associated corrective actions to Regulator in accordance with applicable TARPs. Compliance Assessment Report. Rehabilitation maintenance works and environmental incidents are included in the AER. Reporting in accordance with requirements of Part V approvals.

9 ADAPTIVE MANAGEMENT AND REVIEW

9.1 ADAPTIVE MANAGEMENT AND PLAN REVIEW

This content of the FVMP will be reviewed triennially by Worsley to assess effectiveness, ongoing relevance and incorporate improved management strategies derived from assessment of monitoring, research and positive corrective actions from incident investigations.

The review will consider:

- Changes to relevant legislation, policy, guidelines, guidance material and industry practices;
- Results from surveying and monitoring programs;
- Specialist advice and stakeholder consultation, including DBCA;
- Implementation and effectiveness of control measures;
- Maintaining compliance to environmental commitments;
- Reviewing and updating for “at risk species”;
- Extending protection capabilities for newly identified critical habitats or species;
- Implementing buffers for Protected Areas;
- Conducting and committing to recommendations from research;
- Targeted use of available land for improving environmental outcomes and objectives;
- Ongoing identification and management of Ecological Linkages and wildlife corridors;
- Maintaining supporting documentation Performance indicators and any corrective actions; and
- Changes to operational activities leading to changes in the risk.

The FVMP will be submitted to the CEO within twelve months from the date of the approved Ministerial Statement, and an appendix to the plan will be submitted (Annual Flora and Vegetation Management Plan) annually thereafter to include the reporting conditions as outlined in Condition B12-6 (1)-(3).

9.2 COMPLIANCE AUDITING

The FVMP is audited against the compliance assessment plan (CAP) in accordance with MS1237 Condition D2-1. Any non-compliances of the provisions set out in this CAP are identified via events registered within the internal incident, risk reporting and management system (G360) and will be reported within the AER. Audit findings are communicated internally through G360 and to the CEO through the annual Compliance Assessment Report (CAR). All corrective actions are assigned to relevant areas for close-out.

The CAR must be provided in a form suitable for publication on the South32 website and online by DWER, as required by MS1237 Condition D2-4(5).

10 REPORTING

10.1 REPORTING UNDER MINISTERIAL CONDITIONS

Reporting will be completed in accordance with the requirements of MS1237 as follows:

Reporting under condition D-2 (1):

“*The proponent must provide an annual Compliance Assessment Report to the CEO for the purpose of determining whether the implementation conditions are being complied with*.”

Reporting under condition B12-6:

“In order to meet the outcomes of condition B12-1, objectives of condition B12- 2 and satisfy the requirements of condition C4, within twelve (12) months from the date of this Statement, and annually thereafter, the proponent shall prepare and submit an annual Flora and Vegetation Environmental Management Plan and submit it to the CEO on advice from DBCA. This plan shall:

1. *include details of the timing, methods, limitations, survey effort and results of the pre-clearance surveys required by conditions B12-3, B12-4 and B12-5 and demonstrate how the findings of the survey(s) have been considered, including identification of mitigation measures;*
2. *demonstrate buffer zones are appropriately sized to adequately protect the environmental values listed in conditions B12-1(2) and B12-1(3), from the effects of forest disease, dust, weeds, changes in groundwater and surface water and fragmentation; and*
3. *include actions to ensure that forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation, are appropriately managed to ensure the environmental outcomes listed in conditions B12- 1(2) and B12-1(3) are met.*

Reporting under condition C3-2:

"*The proponent must submit as part of the Compliance Assessment Report required by condition D2, a compliance monitoring report that:*

(1) outlines the monitoring that was undertaken during the implementation of the proposal;

(2) identifies why the monitoring was capable of substantiating whether the proposal limitation and extents in Part A are exceeded;

(3) for any environmental outcomes to which condition C3-1(2) applies, identifies why the monitoring was scientifically robust and capable of detecting whether the environmental outcomes in Part B are met;

(4) outlines the results of the monitoring;

(5) reports whether the proposal limitations and extents in Part A were exceeded and (for any environmental outcomes to which condition C3-1 (2) applies) whether the environmental outcomes in Part B were achieved, based on analysis of the results of the monitoring; and

(6) reports any actions taken by the proponent to remediate any potential non-compliance."

10.2 ANNUAL ENVIRONMENTAL REPORT

The AER outlines the progressive implementation of environmental management and research programs and provides a detailed performance and compliance report regarding statutory environmental requirements. The AER also meets the requirements for reporting detailed in the Ministerial Statement as outlined above. Information reported in the AER applicable to this FVMP is outlined in Table 8-1 to Table 8-4

During the reporting period, any environmental incidents are reported to the relevant government department and are investigated with corrective measures identified and actioned. The report is accepted by the members of the EMLG at the annual meeting and can be provided publicly upon request.

10.3 WORSLEY STATE AGREEMENT AND 10-YEAR MINE PLAN

Worsley is bound by the provisions of the Worsley State Agreement. Clause 16 (10) of this agreement requires Worsley to produce a Plan of Bauxite Mining Operations for the coming ten years (10-Year Mine Plan). This plan is produced and updated every year in consultation with the EMLG for submission to the State Government for endorsement. In preparation of the 10-Year Mine Plan, the following aspects of flora, vegetation and rehabilitation are considered:

- The sequence of mining and rehabilitation;
- Access for mining and future management;
- Location of mine facilities;
- Dieback hygiene;
- Water management systems and water course protection;
- Land use priorities; and
- Buffer zones for fire protection.

10.4 ANNUAL FLORA AND VEGETATION MANAGEMENT PLAN (ANNUAL COMPLIANCE)

In accordance with Condition B12-6 of the MS1237, a FVMP must be prepared annually and submitted to the CEO on advice from the DBCA. The FVMP will be assessed annually through the CAR and an annual report will be provided that addresses the following:

- Details of the timing, methods, limitations, survey effort and results of the pre-clearance surveys and demonstrate how the findings of the survey(s) have been considered, including identification of mitigation measures for *Phytophthera*, old growth forests and Threatened flora, Priority flora, new species and/or undescribed species, and TECs and PECs and vegetation type G4.
- Demonstrate buffer zones are appropriately sized to adequately protect from the effects of forest disease, dust, weeds, changes in groundwater and surface water and fragmentation for:
  - *Caladenia hopperiana*;
  - *Caladenia caesarea* subsp. Mooradung;
  - *Papistylus intropubens* and *Synaphea panhesya*;
  - Mount Saddleback Heath Communities PEC and vegetation type G;
  - Other significant vegetation;
  - Other significant flora;
  - Old growth forest;
  - Known population of *Calytrix simplex subsp. simplex*;
  - Known population of *Gastrolobium* sp. Prostrate Boddington;
  - Known population of *Hibbertia ambita*;
  - Known population of *Halgania corymbosa*;
  - Williams vegetation complex; and
  - Michibin vegetation complex.
- Detail management actions taken to minimise indirect impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation in order to meet the environmental outcomes and objectives (refer to Section 6.1).

11 ENVIRONMENTAL MANAGEMENT ROLES AND RESPONSIBILITIES

The roles and responsibilities for the implementation of the FVMP are described within Table 11-1.

Table 11-1: Roles and Responsibilities

Role	Responsibility
Manager Environment, Heritage and Approvals	• Oversees that flora and vegetation monitoring is included in planning and budgeting processes. • Present flora and vegetation survey findings and proposed avoidance actions to the Worsley Lead Team. • Manages and investigates reports of dieback, Threatened flora observations and incidents; and communicates management and/or mitigation and monitoring measures to relevant regulatory authorities outlined in Section 5.2,Table 5-1.
Environment Supervisor	• Develop schedules for review and audit of Environmental Management Plans. • Monitor compliance to commitments. • Review and submit AER.
Environment Specialists	• Commission flora and vegetation monitoring programs within remnant vegetation and rehabilitation areas. Implement remedial actions as required. • Implement weed management where required.

Role	Responsibility
	• Develop mapping layers for Protection Commitments and Protected Areas. • Communicate findings and recommendations from flora and vegetation surveys to relevant internal and external stakeholders. • Provide spatial information to Superintendent Mine Development Planning. • Conduct annual Protected Matters Review. • Monitor progress of rehabilitation against completion criteria. • Prepare AER. • Work with DBCA to complete regular reviews of the DBCA – WAPL[5] Working Arrangements. • Oversees that the appropriate environmental content is included in site training packages. • Acquire and organise installation of Ecological Linkage signage. • Prepare and audit compliance with pit specific Soil Hygiene Management Plans. • Commission dieback interpretation in line with the 10-Year Mine Plan requirements. • Order supplies for rehabilitation to support the 10-Year Mine Plan and maintain an adequate seed store (i.e. seed, recalcitrant plants, fertilizer etc).
Superintendent Mine Development Planning	• Oversee the preparation of the 10-Year Mine Plan • Maintain mapping layers for Protection Commitments and Protected Areas in Mine Planning software. • Track progressive disturbance for reporting against Protection Commitments • Report on Protected Areas and Protection Commitments in the 10-Year Mine Plan. • Plan rehabilitation to support Ecological Linkages. • Conduct annual audit of surveyed clearing areas against the Protection Commitments.
Principal Long-Term Planning	• Plans establish Protected Areas • Incorporates the long term mine plans and maintain Protection Commitments through prioritisation of areas for the life of the operation. • Long term mine plans reach rehabilitation commitments. • Identify and endorse areas of rehabilitation for protection.
Mine Services	• Complete rehabilitation works in accordance with site plans, procedures, standards and specifications.
Principal – Environmental Approvals	• Commission surveys for biodiversity monitoring for new mining areas. • Incorporate updates associated with new approvals into management plans and procedures. • Develop and maintain Protected and Protection Commitment mapping layers.

[5] South32 Worsley Alumina Pty Ltd (WAPL)

Role	Responsibility
	• Process and maintain records of Recommendation for Area Protection Forms. • Manage external approvals for disturbance as required.
Principal – Environmental Offsets	• Development and implementation of Offset Plans. • Commission Offset confirmation surveys.
Draftsperson Design Services	• Compile all spatial information for clearing within the RLA (completed and proposed) for the Annual Clearing Reconciliation process.
All Staff and Contractors	• Report dieback, Threatened flora observations and incidents to Manager Environment, Heritage and Approvals.

12 STAKEHOLDER CONSULTATION

12.1 ENVIRONMENTAL MANAGEMENT LIAISON GROUP (EMLG)

The EMLG has been established under the Worsley State Agreement and formalised under Ministerial Statement 423 and Ministerial Statement 719. The group has representatives from the DBCA, DWER, DPIRD, and the Department of Energy Mines, Industry Regulation and Safety. The EMLG currently meets annually to review Worsley's mining plans and environmental performance in general. Any amendments to management plans prepared in accordance with the Proponent Commitments of MS719 are reviewed and endorsed by the EMLG.

12.2 DEPARTMENT OF BIODIVERSITY, CONSERVATION & ATTRACTIONS

The FVEMP outlines the management practices undertaken at Worsley to minimise the risk to flora and vegetation and is required to be prepared in consultation with DBCA (condition B12-6). Flora and vegetation management and development of processes and practices have been developed in consultation with DBCA since commencement of the Worsley State Agreement Act.; Condition 16(8) of the Act states “As may reasonably be required by the Conservator [DBCA], the Joint Venturers [Worsley] shall from time to time and at their expense take adequate measures “16(8)(1) for the progressive restoration and re-afforestation of the forest destroyed” and further condition 5(1) which required the approval of an environmental review and management program. Worsley is bound by the provisions of both the Worsley agreement and the approved ERMPs (including 1979 and April 2006) – both which include objectives and undertakings in regard to rehabilitation.

The agreement in relation to state forest rehabilitation was further formalised with the development of a Rehabilitation Prescription which outlines the mechanisms by which the DBCA and Worsley will provide for progressive mine-pit rehabilitation in Timber Reserve areas (as defined in Section 6(2) of the Conservation and Land Management Act 1984) of the South32 Worsley Alumina Principal Mineralised Area (i.e. Saddleback, Quindanning and Marradong forest blocks). Further to this DBCA and Worsley have developed and continue to review and agree on a set of Working Arrangements, first developed in 2002 and reviewed every 5 years, which sets out the responsibilities for each party in the rehabilitation process.

DBCA has been an integral member of the Worsley Environmental Management Liaison Group (EMLG) since the group was formed following approval of the Worsley expansion in 1994 with Ministerial Statement 423. The purpose of the EMLG as outlined by MS423 was to “continue to review the mining plans of the proponent and review the proponent’s environmental performance in accordance with the Environmental Plan required by condition 4-1”. The ongoing review of the mining plan and annual environmental reports has continued on at least an annual basis since this time.

The FVEMP has evolved from the Biodiversity and Forest Management Plan (BFMP) which has been a requirement for the Worsley Operation since approval was provided for the Efficiency and Growth Expansion in 2006, in accordance with MS719. The BFMP was updated as an appendix to the Worsley ERD (2022) and Response to Submissions Document (2024) (Appendix B1). Comments from DBCA as part of the review of the Revised Proposal approval application documents (Environmental Review Document and Response to Submission document) during the consultation phase have been incorporated into the BFMP and subsequently into this FVEMP. This consultation is outlined below in Table 12-1.

In addition to the requirements of this FVEMP, Worsley will also submit applications under section 40 of the *Biodiversity Conservation Act 2016* and ensure compliance with the condition on any provided section 40 Authorisation.

Table 12-1 DBCA Consultation Regarding Development of Flora and Vegetation Management and Development of this Management Plan

Date	Discussion	Outcome
2 Yearly	**Rehabilitation prescription** The aim of Rehabilitation prescription is to outline the mechanisms by which the Department of Biodiversity, Conservation and Attractions (DBCA) and South32 Worsley Alumina (Worsley) will provide for progressive mine-pit rehabilitation in Timber Reserve areas (as defined in Section 6(2) of the Conservation and Land Management Act 1984), of the South32 Worsley Alumina Principal Mineralised Area (i.e. Saddleback, Quindanning and Marradong forest blocks). To achieve this aim, the document sets out the responsibilities of each party and develops a set of policies, objectives, strategies and review mechanisms for rehabilitation planning. These provide a framework from which a rehabilitation prescription will be prepared annually. The framework ensures that full advantage can be taken of the resources and experiences of both organisations and that the prescription is responsive to new information from trials, research and operational experience. It is also anticipated that the regular process of review built into the mechanism will identify aspects of rehabilitation requiring trial and experimentation. The Prescription is reviewed every two years between DBCA and Worsley.	Rehabilitation prescription is provided annually to DBCA to review, updates are made based on feedback.
Annual	An appendix to the Rehabilitation Prescription is provided annually to DBCA to provide details on the specific revegetation treatment for each rehabilitation area, including areas rehabilitated, seeding rates (to explain vegetation complexes targeted for rehabilitation and targeted tree seeding rates) and details of recalcitrant species incorporated into the years program.	
Annual	**10 Year Mine Plan** In accordance with Clause 16(10) of the Worsley State Agreement, submission of a plan with reasonable detail of the proposed mining operations upon areas of Sate Forest and Crown land during the succeeding ten years thereafter must be provided	DBCA has the opportunity to provide comments annually on the proposed clearing and rehabilitation activities. Clarification is provided where required on an annual basis and updates are made to the document and planning processes as required. An example was the addition of planning for ecological linkages in Marradong and the inclusion of an annually updated record of disturbance and percentage of remnant vegetation within the Timber Reserves. DBCA also requested s40 applications are submitted to support the 10 year plan proposed clearing areas, while this application is undertaken independently, it was raised in the feedback for the 10 year plan.
5 Yearly	**DBCA/Worsley Working Arrangements** Outlines the mechanisms by which DBCA and Worsley integrate working arrangements for Worsley's bauxite alumina activities on State lands managed by DBCA as outlined in the *Alumina Refinery (Worsley) Agreement Act 1973.* The document sets out the responsibilities of each	Working arrangements are awaiting update for 2024, and have been under review with DBCA since September 2023, Worsley are awaiting feedback so the arrangements can be finalised. Matters that will be updated include ensuring

Date	Discussion	Outcome
	party and provides a framework from which detailed working arrangements will be prepared or reviewed. The framework intends that full advantage can be taken of the resources and experiences of both organisations and that the arrangements are responsive to new information from operational experience, trials and research.	alignment with the 2024-2033 Forest Management Plan, interaction with public in recreational reserves and access and track management for exploration.
	Completion Criteria Worsley Alumina have drafted completion criteria based on the most recently agreed Completion Criteria for the Northern Jarrah Forest (agreed between the proponent and DBCA). Worsley Alumina have also undertaken a review against the WA Biodiversity Science Institute (WABSI) Completion Criteria Framework as they apply to forest rehabilitation at the Boddington Bauxite Mine (this assessment, including the proposed criteria are presented in Appendix C4). The Worsley Alumina draft completion criteria were provided to DBCA in 2017 for consideration and comment, but unfortunately due to resourcing issues reported by the regulator, have not progressed to finalisation. Until DBCA endorses the draft Completion Criteria, Worsley Alumina will continue to implement rehabilitation in accordance with these draft criteria. While the completion criteria are still considered draft, Worsley Alumina has included review against the draft criteria, where appropriate, into the current monitoring programs.	Condition B14-2 of MS1237 requires the submission of a Rehabilitation Performance Report which will include the proposed biodiversity indicators and completion criteria. In accordance with condition B14-3 of MS1237 Worsley will include monitoring and reporting of finalised completion criteria in the Annual Rehabilitation Report. This EMP outlines the monitoring against these completion criteria as a monitoring activity to demonstrate the environmental outcomes are being met.
12 Sep 2022	**DBCA ERD DMA Response**	
	Caladenia hopperianna The proponent provides further information or undertakes further investigations (targeted surveys) to clarify the full extent of impacts (direct and indirect) of the revised proposal on individuals of the threatened flora *Caladenia hopperiana*, prior to implementation of the revised proposal, if approved. If the proposal is considered acceptable, the proponent seeks Ministerial Authorisation under the section 40 of the BC Act for the potential take (direct or indirect) of individuals of *Caladenia hopperiana.*	Table 6-6 & Table 7-1 and Section 6.6.5 of this EMP addresses this feedback and Table 8-1 outlines the outcome based provisions related to protection of the species. Worsley will submit s40 applications for clearing in the areas that may have an indirect impact to *C. hopperianna.*
	Potentially new orchid species It is recommended that targeted surveys for *C. caesarea* subsp. 'Mooradung' are undertaken prior to disturbance in suitable habitat (i.e. seasonally moist flats and drainage lines) within the vicinity of the PAA, and impacts (direct and indirect) from the revised proposal on this species are avoided and/or minimised.	Table 6-6 & Table 7-1 and Section 6.6.5 of this EMP addresses this feedback and Table 8-1 outlines the outcome based provisions related to protection of the species.
	Priority Flora That the proponent provides further information or undertakes further investigations (targeted surveys) to clarify the full extent of impacts (direct, indirect and cumulative) of the revised proposal on individuals of conservation significant flora.	Table 7-1 and Sections 6.2.2 & 6.6.5 of this EMP addresses this matter
	Priority Ecological Communities There should be no impacts (direct and indirect) on the Priority 1 Mount Saddleback Heath Communities ecological community resulting from the implementation of the revised proposal.	Sections 6.2.2 & 6.6.5 and Table 6-6 & Table 7-1 of this EMP addresses this matter and Table 8-1 outlines the outcome based provisions related to

Date	Discussion	Outcome
	DBCA previously advised the proponent on 4 February 2021 that the G4 site-vegetation type, while not representative of the PEC, is considered to be of conservation significance and potentially requires consideration for listing as a separate priority ecological community.	protection of the Mount Saddleback Heath communities. While G4 is still not formally rated as a community of conservation significance, it has been incorporated into the protected communities. Sections 6.2.2 & 6.6.5 and Table 10 & Table 11 of this EMP addresses this matter and Table 12 outlines the outcome based provisions related to protection of the G4 community.
	Forest Hygiene If the proposal is considered acceptable, Phytophthora dieback interpretation, mapping and hygiene management should be undertaken in accordance with DBCA guidance (which includes review at regular intervals) to ensure that the proposal does not result in the introduction or spread of Phytophthora dieback or other pathogens. If the proposal is considered acceptable the proponent will need to provide DBCA, with each of the following documents prior to the clearing of native vegetation: • Dieback assessment information, (including GPS point evidence that supports each assessment) • Risk assessments, (including for all drilling exploration) • Dieback Management Plans prepared in accordance with the relevant guidance.	Section 6.6.6 of this EMP addresses this feedback
	Old Growth Forest That Old-growth forest is mapped prior to implementation of the revised proposal, in accordance with relevant guidance (and with review at regular intervals), and that appropriate management measures are implemented to ensure that the proposal does not result in impacts on old-growth forest.	Sections 6.6.1 & 6.6.5 and Table 6-6 & Table 7-1 of this EMP addresses this matter and Table 12 outlines the outcome based provisions related to protection of old growth forest.
	Other Requirement for the development and implementation (and regular review) of relevant management plans that specifies objectives and monitoring protocols to identify and manage impacts to conservation significant flora, fauna, and ecological communities.	Development of this EMP addresses this matter. Please see Section 9 for details on review and adaptive management proposed for this EMP.
Nov 2024	EMP sent to DBCA for feedback	
31Jan 2025	RFI received from EPA-S to be addressed	
7 Feb 2025		FVMP V2.0 updated to reflect requests for further information from EPA-S on 31 Jan 2025t

12.3 OTHER STAKEHOLDER CONSULTATION

Additional relevant stakeholder consultation in association with this FVMP is outlined in Table 12-2.

Table 12-2: Stakeholder Consultation Summary

Stakeholder	Consultation	Comments/Advice	Response
EPA-S	Oct 2024 - Provision of drafts for review and comments	Survey timing to be justified	Further justification added to the FVMP. Triggers from within the WMP relating to reviews of annual and triennial groundwater monitoring data that trigger increased frequency for assessment of vegetation condition in Protected Areas has also been added.
		Further detail on timing of surveys required specifically what year are they planned for and how these will fit into the 10 year Mine Plan	Clarification added to section 6.6.5 and Table 6-6
		Provide further details on the parameters and specifics of trigger criteria 2 related to targeted flora and vegetation condition in protected areas, specifically how a decline in presence / condition will be determined and how this will be attributable to the proposal	Additional information added to Section 6.6.1.2 and monitoring programs for Vegetation Condition and Targeted Flora surveys in Protected Areas have been split with additional detail added in Table 7-1.
		Please review the triggers and threshold levels presented in Table 14. It is unclear how these numbers have been developed and how they relate to condition B12-1(3)	Note added to Table 8-3 that the known population is as of 2024. Corrected values for vegetation complex trigger levels which were incorrect. Removed alternate values for trigger levels (as included in EPA Report 1768) with only values as proposed within the s106 Report included in this version.
		Draft condition B12-2 requires the implementation of the proposal to achieve the following environmental objective: (1) avoid and minimise indirect impacts to flora and vegetation including but not limited to impacts from forest disease, dust, weeds, fire, changes in groundwater and surface water and fragmentation. Table 15 provides management actions to address the above however no information on potential indirect impacts from changes in groundwater and surface water. Please revise the plan to include management and monitoring measures to ensure the objective is met.	Key information from the WMP has been transferred into an additional line item in Table 8-4 for Groundwater and Surface water

		Draft condition B12-6 requires the FVMP to be submitted to the CEO on advice from DBCA. Section 12.1 of this plan states that the EMLG has been established under the Worsley State Agreement and formalised under Ministerial Statement 423 and Ministerial Statement 719. The group has representatives from the DBCA, DWER, DPIRD, and the Department of Energy Mines, Industry Regulation and Safety. Please update section 12 to include information regarding the consultation with DBCA.	Section 12.2 has been added to the FVMP to address this.
DCCEEW	Oct 2024 - Provision of drafts for review and comments	No feedback required	

13 DEFINITIONS, TERMS AND ABBREVIATIONS

Table 13-1: Terms and Abbreviations

Term	Description
AER	Annual Environmental Report
BBM	Boddington Bauxite Mine
BC Act	*Biodiversity Conservation Act 2016*
FVMP	Flora and Vegetation Management Plan
BTC	Bauxite Transport Corridor
CAP	Compliance Assessment Plan
CAR	Compliance Assessment Report
CBME	Contingency Bauxite Mining Envelope
CEO	Chief executive officer of the Department (currently Department of Water and Environmental Regulation)
DAZ	Disturbance Avoidance Zone
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environment Regulation
EMLG	Environmental Management Liaison Group
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*

Term	Description
ERD	Environmental Review Document
FMP	Forest Management Plan 2024-2033
FHZ	Forest Habitat Zone
Known Population	In accordance with MS1237 refers to identified and documented facts about the location or locations of a group or groups of flora of the same species, including through surveys for the relevant species, within the region delineated by the PAA surrounded by a 20 km buffer.
MNES	Matters of National Environmental Significance
MS719	Ministerial Statement No. 719
MS1237	Ministerial Statement No. 1237
PAA	Primary Assessment Area
PEC	Priority Ecological Community
RLA	Refinery Lease Area
the Refinery	Worsley Refinery
The Revised Proposal	Worsley Mine Expansion (Revised Proposal) as referred for assessment under the EP Act and EPBC Act.
TEC	Threatened Ecological Community
Threatened	A species listed under Section 178 of the EPBC Act in any one of the following categories: • extinct • extinct in the wild • critically endangered • endangered • vulnerable • conservation dependent
WMDE	Worsley Mining and Development Envelope
Worsley	South32 Worsley Alumina Pty Ltd
Worsley State Agreement	*Alumina Refinery (Worsley) Agreement Act 1973*

Term	Description
	MS1237 Definitions • **Native vegetation** - Native vegetation is defined by section 3(1) of the Environmental Protection Act 1986 and means indigenous aquatic or terrestrial vegetation and includes dead vegetation unless that dead vegetation is of a class declared by regulation to be excluded but does not include vegetation in a plantation. Section 51A further defines that native vegetation includes vegetation that was intentionally sown, planted or propagated as required under the Act or another written law. However, in relation to the native vegetation to be cleared in the PAA this does not include rehabilitation vegetation. • **Rehabilitation vegetation** - Rehabilitation commences when earthworks, including ripping and contouring, occur in preparation for the area to receive topsoil and woody debris. • **Plantation vegetation** - One or more groups of trees, shrubs or plants intentionally sown, planted or propagated with a view to commercial exploitation. • **Threatened flora** - Flora listed as threatened under the BC Act or the EPBC Act. • **Old growth forest** - Ecologically mature forest where the effect of unnatural disturbance is negligible. Criteria for determining old growth forest are maintained by DBCA. • **Other significant flora** - Any other new flora species, undescribed flora species or priority flora species other than: *Acacia horridula; Asteridea gracilis; Banksia subpinnatifida var. imberbis; Banksia subpinnatifida var. subpinnatifida; Calothamnus quadrifidus subsp. teretifolius; Goodenia katabudjar; Lasiopetalum cardiophyllum; Senecio leucoglossus; Stylidium marradongense; Tetratheca pilifera*; recorded in the pre-clearance surveys required under condition B12-5. • **Environmental values** – A beneficial use, or ecosystem health condition. • **Known population** - Previously identified and documented facts about the location of a group of flora of the same species as amended by pre-clearance surveys undertaken. • **Vegetation type G4** - A vegetation grouping described as open scrub and tall shrubland of *Hakea trifurcata* and *Hakea undulata* with admixtures of mallee species including *Eucalyptus latens* and *Eucalyptus aspersa* on clay to clay-loam soils over outcrops on slopes. • **Threatened ecological communities** - Ecological communities listed as threatened under the BC Act or the EPBC Act 1999. • **Priority ecological communities** - Ecological communities listed as priority by DBCA.

14 REFERENCES

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15 DOCUMENT CONTROL

Version Control

Version	Change	Date
1.1	First draft submitted to EPA-S for review.	23 Oct 2024
1.2	Modification of outcome-based provisions (Table 8-1) and associated monitoring programs (Table 7-1 and section 6.6.1.2) and rationale (section 6.5) to address comments received from EPA-S.	26 Nov 2024
1.3	Updated Ministerial Statement references and condition numbers throughout document, added internal document reference numbers and revised internal signatories.	15 Jan 2025
2.0	Internal signatures applied. Final as submitted under MS1237.	16 Jan 2025
2.1	Updates made based on EPA-S feedback	6 Feb 2025
3.0	Internal signatures applied. Final as submitted under MS1237.	6 Feb 2025

Reviewer Circulation

Role	Name	Endorsed	Date
Environmental Specialist	Paul Bullock	✓	06.02.2025
Acting Production Manager - Mine	Jason Leach	✓	06.02.2025
Manager Production Planning	Cameron McKean	✓	06.02.2025

Approval Circulation

Role	Name	Approved	Date
Manager Environment, Heritage & Approvals	Claire Reid	✓	06.02.2025
General Manager Mine & Materials	Trever Stockil	✓	06.02.2025

APPENDIX A - RISK ASSESSMENT

A risk assessment has been undertaken for the potential impacts described within the FVMP. The risk assessment comprises an evaluation of the likelihood and consequence of each of the identified impacts to manage and mitigate risks effectively, with the purpose of minimising the likelihood of the risk occurring.

Table 1: Measure of Likelihood

Qualitative measure of likelihood (after controls are in place)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 2: Measure of Consequence

Qualitative measure of consequence (with controls in place)	
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table 3: Risk Matrix

	Consequence				
	Minor	**Moderate**	**High**	**Major**	**Critical**
Highly Likely	**Medium**	**High**	**High**	**Severe**	**Severe**
Likely	**Low**	**Medium**	**High**	**High**	**Severe**
Possible	**Low**	**Medium**	**Medium**	**High**	**Severe**
Unlikely	**Low**	**Low**	**Medium**	**High**	**High**
Rare	**Low**	**Low**	**Low**	**Medium**	**High**

Table 4 Risk Assessment

Risk Identification				Risk Evaluation and Control Effectiveness Assessment			
Area	**Risk Event**	**Causes (Direct & Contributing)**	**Expected Impact / Consequences**	**Controls (preventative and mitigating)**	**Severity**	**Likelihood**	**Risk Rating**
All	Unauthorised clearing within a Protected Area or Protection Commitment Area	Insufficient signage Mapping layers not maintained Operator error Escaped Fire	Loss of areas of high conservation value Increased fragmentation of fauna habitat Potential loss of Threatened or Priority flora species Non-compliance with legal requirements	FVMP Clearing Planning process Sign off of Clearing Plans Clearing Permit System (non-production related clearing) GPS systems in SME Site GIS layers for Protected Areas and Protection Commitments Clearing boundaries surveyed and inspected Sign posting or flagging of Protected Areas when clearing is occurring adjacent BBM Clearing and Burning Operations manual	Moderate	Unlikely	Low
All	Spread of weeds leading to additional competition and decreased habitat quality	Poor topsoil management Failed soil hygiene management	Increase in weeds Loss of native flora	FVMP Driller's induction Forest Management Plan (2024-2033), DBCA Weed spraying or removal (as required) Pit specific Forest Hygiene Management Plans Topsoil and gravel handling restrictions applied for high weed load areas	Minor	Possible	Low
All	Unauthorised clearing	Operator Error Insufficient training / supervision Failure to follow site procedures	Loss of native vegetation / fauna habitat Legal non-compliance	10-Year Mine Plan Clearing Planning Process GPS units in surface mobile equipment Operator Training and Competencies Standard Work Instructions Land Clearing Flow Charts Internal Clearing Permit review and sign-off process (non-mining related)	Minor	Unlikely	Low

Risk Identification				Risk Evaluation and Control Effectiveness Assessment			
Area	Risk Event	Causes (Direct & Contributing)	Expected Impact / Consequences	Controls (preventative and mitigating)	Severity	Likelihood	Risk Rating
All	Spread of Forest Disease: Dieback (Phytophthora) or Armillaria leading to decreased habitat quality	Breach of Soil Hygiene Management Plan Working in an area of unknown soil hygiene status Non-compliance with Forest Hygiene Management Procedure Lack of signage Poor drainage design	Spread of Dieback and/or Armillaria Loss of biodiversity Decline in susceptible species Spread between mine/OBC and public areas	Green Card training for Drillers Wash down facilities on site Pit specific Forest Hygiene Management Plans Working Arrangements with DBCA Dieback awareness training for Mine Site Driver's Permit holders Dieback Management included in Site Inductions Drains and sumps cleared during summer Minimum design standards for drainage structures OBC Vehicle authorisation Signage Flora and Vegetation Management Plan (200001092) Vehicle clean down requirements Operate in dry conditions required for some activities Dieback surveys and mapping Restricted access Perimeter Tracks around clearing areas Clearing Planning Procedure Sealed roads along OLC Pit specific soil hygiene management plans Soil Hygiene management in Extractive Industries (Dieback Working Group) Exploration is often restricted to dry soil conditions Forest Hygiene Management Plans are developed where spread of dieback is assessed as a risk. Regular review of best practice dieback management for adaptive management	High	Rare	Low
BBM	Isolation of genetic pools - flora and fauna	Presence of linear barriers (e.g. conveyors) Increased fragmentation of vegetation	Reduced movement of fauna between isolated areas. Reduced genetic exchange between populations	10-Year Mine Plan - Figure 7 (Ecological Linkages) Ecological Linkages Protection Commitment Interagency Agreement with DBCA Wildlife Corridor (George Block) Fauna monitoring programs	High	Rare	Low

Risk Identification				Risk Evaluation and Control Effectiveness Assessment			
Area	**Risk Event**	**Causes (Direct & Contributing)**	**Expected Impact / Consequences**	**Controls (preventative and mitigating)**	**Severity**	**Likelihood**	**Risk Rating**
BBM	Increased competition or predation by introduced (feral) animals on Threatened Species	Increased fragmentation of vegetation	Increased predation from feral animals Increased competition from feral animals	Feral animal management program Ecological Linkages Conservation Significant Fauna Management Plan (200001091) Research program (adaptive management)	Minor	Likely	Low
BBM	Indirect impacts on Threatened Flora and Fauna from noise, dust and vibration	Construction and operation activities	Decreased vegetation health Change to local fauna population distribution (avoidance of impacted areas)	Dust suppression (water and / or chemical) on haul roads and open areas Dust suppression in fixed plant Noise suppression technology applied to SME Noise monitoring for compliance with Noise Regulations	Minor	Likely	Low
All	Forest rehabilitation fails to meet completion criteria	High grazing (kangaroos, rabbits) Insufficient management Extreme weather event Non-compliance with rehabilitation procedures	Rehabilitation requires additional management (i.e. thinning, replanting, weed management, drainage etc) Rehabilitation takes longer than expected to provide habitat values for native fauna	Flora and Vegetation Management Plan (200001092) Annual Rehabilitation Plan DBCA Working Arrangements Completion Criteria and targets for early stage rehabilitation Rehabilitation monitoring program Rehabilitation maintenance (e.g. reseeding, tree planting, weed control) Rehabilitation research program (adaptive management) Seed store maintained on site Recalcitrant species program Deep ripping to remove compaction Rehabilitation pit design process Operator training	Moderate	Unlikely	Low

Risk Identification				Risk Evaluation and Control Effectiveness Assessment			
Area	**Risk Event**	**Causes (Direct & Contributing)**	**Expected Impact / Consequences**	**Controls (preventative and mitigating)**	**Severity**	**Likelihood**	**Risk Rating**
All	Loss of habitat supporting Threatened Species	Clearing of native vegetation	Displacement or reduction of local populations of Threatened Species Increased fragmentation and associated edge effects	Minimise clearing through Mine Planning processes. Establishment of Protected Areas, Protection commitments and Biodiversity Areas of Interest. Progressive Rehabilitation. Ecological Linkages. Biodiversity Offsets.	Moderate	Likely	Moderate
BBM	Loss / deterioration in quality of topsoil leading to reduced quality of rehabilitation for use as habitat by Threatened Species	Erosion Poor topsoil management Poor planning and scheduling topsoil movements (wet)	Decrease in quality of rehabilitation Inability to use topsoil Direct Return annual targets not met. Failure to meet completion criteria	Annual direct return topsoil targets Rehabilitation designed to surrounding landform Rehabilitation monitoring and maintenance Strict controls on topsoil handling and movement (e.g. wet weather, tenure boundaries, weed load, dieback etc) Forest Management Plan (2024-2033)	Minor	Unlikely	Low
All	SRE unable to be supported in rehabilitation	Specific habitat requirements Clearing of native vegetation Lack of scientific knowledge	Restricted range of some SRE to undisturbed native vegetation	Targeted SRE monitoring program to improve understanding of distribution and utilisation of rehabilitation Rehabilitation research program Ecological Linkages Protected Areas	Moderate	Possible	Medium

FLORA & VEGETATION MANAGEMENT PLAN

Annual Report – 2025

Contents

Table of Figures

List of Tables

1 Purpose

The purpose of this Annual Flora and Vegetation Management Plan is to provide the annual reporting component of the Flora and Vegetation Management Plan as required by Ministerial Statement 1237 (MS1237) Condition 12-6.

2 Pre-clearance Survey

Prior to clearing in the Primary Assessment Area (PAA) South32 Worsley Alumina (Worsley Alumina) is required to undertake pre-clearance surveys to meet the requirements of Condition B12-3 to B12-5 of MS1237. These conditions require surveys to be undertaken for forest disease, old growth forest, threatened and priority flora, new and undescribed species, threatened and priority ecological communities and vegetation type G4.

Specialist consultants were engaged to undertake the surveys for each of the required elements listed above. Details of their relevant experience and qualifications are provided in the relevant reports referenced below.

2.1 Forest Disease

As outlined by condition B12-3 of MS1237 surveys and forest disease mapping must be undertaken prior to commencing clearing each area, consistent with DBCA's Phytophthora Dieback Interpreters Manual for Lands Managed by the Department and with DBCA's Phytophthora Dieback Management Manual (as amended or preplaced from time to time).

Survey's undertaken for the proposed clearing areas have been undertaken in 2022-2025 by suitably qualified and certified dieback interpreters Glevan Consulting consistent with the above-mentioned documents. A total of 2,204ha have been interpreted as shown in Figure 1 1.

2.1.1 TIMING

Surveys for dieback must be completed within three years of the clearing taking place, in which case, for the areas proposed to be cleared in the coming season, all surveys must have been undertaken before 2022.

- Dieback surveys in 2022 were completed between March – May 2022.
- Dieback surveys in 2023 were completed between March – May 2023.
- Dieback surveys in 2024 were completed between March – August 2024.
- Dieback surveys in 2025 were conducted in January 2025 (and are ongoing).

2.1.2 METHOD

All *Phytophthora* Dieback detection, diagnosis and mapping are performed to standards and procedures defined in FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department (DPAW 2015), Chapter 6. These procedures are grounded on the presence of indicator species in the vegetation, and the observance of deaths in these plants. An indicator species is a plant species that is reliably susceptible to *Phytophthora cinnamomi*. Indicator Species Deaths (ISDs) alone do not necessarily indicate disease presence, and it is necessary to consider all environmental and ecological factors that may be present. These other factors (as listed in FEM047) include:

- Chronology of deaths,
- Pattern of deaths,
- Topographical position,
- Vectoring – causal agencies, and

- Biomass and biological diversity reduction.

Other causes of plant deaths need to be considered when determining the presence of Phytophthora Dieback, including (from FEM047):

- Armillaria Root Disease,
- Various cankers,
- Insects,
- Drought, wind scorch and frost,
- Salinity and waterlogging,
- Fire and lightning,
- Senescence and competition,
- Physical damage, and
- Herbicides and chemical spills.

The assessment type included a combination of comprehensive and linear assessments (featuring transect lines) using standards defined by Chapter 8, FEM047. Prior to assessment, all information relevant to the project was assembled to assist the interpretation process (as defined in Chapter 7, FEM047). This information included previous assessments of the area, history of burning and possible other disturbances.

2.1.3 LIMITATIONS

Portions of the project area are excluded from the surveys based on the of disturbance of the vegetation, based on the Keighery Vegetation Condition Scale. They are generally located on pastures with little to no existing vegetation and do not boarder other Dieback categories. These are outlined as “Excluded” in section 2.1.4 below.

2.1.4 RESULTS

2022

In 2022 an area of 212.4ha of area was surveyed for Phytophthora dieback with the results available in Table 2-1 below.

Table 2-1 2022 Dieback Assessment Results

Category	Area (ha)	% total area
Infested	0.18	0.18
Uninfested	182.55	85.95
Uninterpretable	4.39	2.07
Temporarily uninterpretable	0	0
Assessed Area		187.12
Excluded	25.28	11.90
Total area		**212.40**

2023

In 2023 an area of 738.25ha of area was surveyed for Phytophthora dieback with the results available in Table 2-2 below.

Table 2-2 2023 Assessment Results

Category	Area (ha)	% total area
Infested	2.01	0.3
Armillaria	1.88	0.3
Uninfested	361.6	49.0
Uninterpretable	129.86	17.6
Temporarily uninterpretable	0.09	<0.1
Assessed Area		498.47
Excluded	242.78	33.0
Total area		738.25

2024

In 2024 an area of 398.94ha of area was surveyed for Phytophthora dieback with the results available in Table 2-3 below.

Table 2-3 2024 Assessment Results

Category	Protectable Area (ha)	Unprotectable Area (ha)	% total area
Infested	0	2.25	0.56
Uninfested	122.47	0	30.7
Uninterpretable	51.37	0	12.88
Temporarily uninterpretable	0	1.8	0.45
Assessed Area	173.84	4.05	
Excluded	221.05		55.41
Total area	394.89	4.05	

2.1.5 OUTCOMES

2022

Vegetation within the area was observed to be predominately Uninfested, with some areas of Uninterpretable vegetation. Good vegetation health was observed within the Uninfested vegetation, however some scattered deaths of *Banksia grandis* and *Xanthorrhoea preissii* were observed throughout the region. Strategic sampling of *Banksia grandis* and *Xanthorrhoea preissii* deaths supported field observations that deaths of indicator species throughout the three assessment areas could be attributed to environmental factors other than *Phytophthora cinnamomi*.

A single infestation was observed within the assessment period along the conveyor on Lower Hotham Road. The infestation was identified as part of a previous assessment, resulting in the continuation of previous demarcations.

2023

Three Phytophthora Dieback infestation were observed during the assessment. One of the infestations (adjacent to the conveyor corridor west of Lower Hotham Road) had been previously mapped. The infestation was rechecked for disease front movement and the demarcation was adjusted accordingly. Only minor disease spread was observed and the disease boundary remains largely unchanged.

Previously unmapped infestations were identified at the Saddleback site, one on Tunell Road (and another to the southeast of the Admin/Workshop area.

2024

Two infestations of Phytophthora Dieback disease were observed within the assessment areas, both within the Saddleback mining region. Both infestations are along the mine access road, with the southern infestation extending to bushland adjacent to a clearing.

Vegetation within the two mining regions was observed to be predominately Uninfested, with some areas of Uninterpretable and Excluded vegetation. Good vegetation health was observed within the Uninfested vegetation, however some scattered deaths of Banksia grandis and *Xanthorrhoea preissii* were observed throughout the region. Strategic sampling of indicator species deaths supported field observations that these deaths throughout the assessment areas could be attributed to environmental factors other than *Phytophthora cinnamomi*.

A single infestation of Armillaria Rot Disease was demarcated in the Marradong mining region, west of Ashcroft Road. Significant decline in *Eucalyptus wandoo* was observed within the area.

MAIN MAP - Boddington Bauxite Mine (BBM)

Coordinate System: GDA2020 MGA Zone 50

Scale @ A3: 1:125,000

435000 440000 445000 450000 455000 460000 465000

6385000 6380000 6375000 6370000 6365000 6360000 6355000 6350000 6345000

BODDINGTON

Marradong Primary Crusher

Marradong Secondary Crusher

Saddleback Primary Crusher

Albany Hwy

Bannister-Marradong Rd

West Wandering Rd

Bannister Rd

Plantation Rd

Chalk Brook Rd

Gold Mine Rd

Old Soldiers Rd

Siding Rd

Access Rd

Robins Rd

Farmers Av

Mitchell Cr

Crossman Rd

Crossman-Dwarda Rd

Davis Rd

Tyler Rd

Lucev Rd

South Crossman Rd

Moorapulling Rd

Newmarket Rd

Marradong Rd

Lower Hotham Rd

Fletcher Rd

Boundary Rd

George Rd

Zilko Rd

Warrening Gully Rd

ADELUP RIVER

THIRTY FOUR MILE BROOK

LONG GULLY

MARRADONG BROOK

HOTHAM RIVER

MURRAY RIVER

BELL BROOK

WILLIAMS RIVER

WARRENING GULLY

BANNISTER RIVER

CROSSMAN RIVER

STOVEY CREEK

0 5 10 20 KM's

LEGEND

Town | State Highway | Main Road | Minor Road | Track | Major River | Minor River | Lake

Existing Infrastructure:
- Primary Crusher
- Secondary Crusher

Dieback [WAPL]:
- Surveyed Areas (2022-2024)

MS1237 Approved Envelopes:
- WMDE
- PAA

NORTH

SOUTH32

Worsley Alumina Pty Ltd

Areas of Forest Disease Interpretation 2022-2025

FIGURE 2-1

Author: dlimm1

Created: February 2025

Plan: WAPL_FVMP_AR25_Fig02_01_ForestDiseaseInterp_A3P.mxd

2.2 Old Growth Forest

Old growth forest was surveyed in the pre-clearance areas by Mattiske Consulting at the same time as surveys for priority species were being undertaken. The survey locations are shown in Figure 2-3.

2.2.1 TIMING

Surveys for Old Growth Forest were undertaken between August and December 2024.

2.2.2 METHOD

The assessment of old growth values was based on the approach defined in the Department of Parks and Wildlife (2017) for the procedures associated with assessing old growth values. This included an assessment of the following:

- Tenure and Reserve Status;
- Phytophthora dieback occurrence (if present this excludes consideration as defined as a significant disturbance);
- Other Disturbance including grazing, mining, and previous farming;
- Types of forest types;
- Harvest History (evident from logs, stumps and track disturbances);
- Other clearing activities for infrastructure and historical railway, tracks and bridges; and
- Fire history and mining history.

This survey effort was undertaken during the targeted flora survey on 20m part traverses or 10m apart traverses as defined in Section 2.3.2.2.

2.2.3 LIMITATIONS

No limitations or constrains were identified during the surveys.

2.2.4 RESULTS

The areas as assessed varied between highly modified farmlands, infrastructure areas and areas adjacent to current mining operations)near Newmont operations in the north and Worsley Alumina operations in the south).

To summarize the findings the targeted areas in 2024 have been subdivided into sub-areas:

- the northern area to the north of the Hotham River. This area has largely been cleared historically for farming and plantations or it abuts the southern waste dump areas of the Newmont mining area. Within the Newmont mining area during the early phases of operation exploration tracks were cleared on a regular basis (from 25m apart to 100m apart and as such this resulted in canopy breaks and loss of trees along these alignments).
- the areas adjacent to Hotham River supported farming and highly modified areas, a historic railway line that went from Dwellingup to Boddington (which indirectly supported the targeted Gastrolobium sp. Prostrate Boddington (M. Hislop 2130) on the old railway line infrastructure), to current farming areas.
- the forested areas near the Marradong mining operations and southwards to the Pinjarra William Road were primarily disturbed with only a few regrowth stands on the steeper slopes. The remaining areas remain fragmented and in some areas support heaths and wandoo woodlands rather than Jarrah forests,
- the areas within the current Mt Saddleback forested areas that were assessed remain as small

remnants within largely mined landscapes and rehabilitation areas.
- the southern area near the conveyor corridor to Collie is largely a former farm and as such the condition of the vegetation has been influenced historical activities.

In summary, the degree of disturbance in the majority of the areas and the resulting fragmentation restricted the potential for any old growth areas. The stands that still persist in the northern area abut Newmont mining operations (on the western side) and a road on the eastern side. The only other forested area of size is the elevated hill on the north-west section of the Marradong forest area that has not been mined or cleared for farming. As this area supported stumps and tracks with variable growth of forest trees it is not considered an old growth area.

2.2.5 OUTCOMES

No areas of old growth forest were observed within the pre clearance survey areas.

2.3 Threatened & Priority Flora

As outlined by condition B12-5(1) of MS1237 requires targeted pre clearance surveys (in accordance with Technical guidance – Flora and vegetation surveys for environmental impact assessment, or any approved updates of these guidelines) must by undertaken prior to clearing for:

a. threatened flora;
b. priority flora;
c. new or undescribed species, and
d. threatened and priority ecological communities and vegetation type G4.

ConditionB12-5(2) specifically requires “appropriate botanists with demonstrated experience in orchid surveys in the bioregion, for pre-clearance surveys of *Caladenia caesarea* subsp. Mooradung and threatened orchid species, including *Caladenia hopperiana*.” These surveys were undertaken by Onshore Environmental (Onshore Environmental 2025) and the survey teams were comprised of expert botanists with demonstrated experience in identification of orchid, particularly *Caladenia*, species. The pre-clearance surveys required in accordance with condition B12-5(1) were undertaken in spring 2024 by Mattiske Consulting Pty Ltd (Mattiske Consulting Pty Ltd 2025).

Survey Locations for Onshore Environmental are shown in Figure 2-2 and survey locations for Mattiske Consulting are shown in

Figure 2-3.

Condition B12-1(3) of MS1237 ensures no disturbance or adverse impact to each of the following species as per the following percentages to the known population of each species:

a. 2% of the known population of *Calytrix simplex* subsp. *simplex*
b. 8% of the known population of *Gastrolobium* sp. Prostrate Boddington;
c. 2% of the known population of *Hibbertia ambita*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
d. 2% of the known population of *Halgania corymbosa*, until it can be demonstrated that more than 100 individuals have been recorded, in which case 10% of the known population;
e. 11.9 ha of Williams vegetation complex after the date of this Statement; and
f. 332.5 ha of Michibin vegetation complex after the date of this Statement.

2.3.1 TIMING

2.3.1.1 Onshore Environmental

Timing of the orchid (Quindanning, Mooradung and dwarf bee) and Narrogin pea surveys was determined based on a list of dates where mature flowering specimens had been recorded. This was used to determine a "flowering window" around which field work was planned. Targeted surveys commenced by visiting known populations to confirm flowering and to ensure survey personnel were familiar with each species. In this instance field work undertaken between 16th September and 30th October. In addition to searching in areas surrounding the future clearing, Onshore environmental also conducted targeted surveys in appropriate habitat at a regional scale to attempt to locate the target species. No individuals were located outside currently understood populations.

2.3.1.2 Mattiske Consulting

Surveys were conducted between August and December 2024 for targeted flora searches for Worsley Alumina within the pre-clearance areas.

2.3.2 METHOD

2.3.2.1 Onshore Environmental

Orchid surveys comprised of a number of steps to ensure compliance with the EPA guidelines. As previously mentioned, optimal timing of the surveys was determined using existing known data on flowering times and by observing known populations. Survey areas were determined based on known habitat preferences for the species and these areas were the focus of targeted searches and a 200 meter buffer survey area was included around these areas.

In areas where targeted species have not previously been detected but may potentially occur (based on GIS mapping and an in-depth analysis of previous populations), a random 'meander' survey was conducted. This allowed the coverage of large areas of potential habitat to determine the presence/absence of orchid species. Following this, where target orchid species were found, a detailed and systematic targeted search was undertaken. This involved the use of parallel transects approximately 5 – 10 metres apart. The width of the transect path was determined by the visibility of the orchid species, the density of vegetation and the landforms encountered (Onshore Environmental 2025).

2.3.2.2 Mattiske Consulting

Targeted flora searches for pre-clearance areas were conducted over 56 field days by botanists from

Mattiske Consulting between August and December 2024. Parallel foot traverses were undertaken on regular grid systems whilst recording location and number of plants. Initially transects were located at 20m apart and if any targeted species were recorded this was decreased to 10m apart transects, Figure 1.

GPS locations were recorded along with number (or density categories), condition and reproductive state of the species. The likelihood of the threatened and priority flora species occurring in the survey areas was based on FloraBase (DBCA 2024), extracted presence data from previous extensive gridding surveys, experience in the survey area by the authors and data collected over 40 years in the respective baseline and rehabilitation areas.

All plant specimens collected during the field survey were dried and processed in accordance with the requirements of the WAH. All plant specimens were identified through comparisons with pressed specimens at the Mattiske Consulting herbarium and WAH. Where appropriate, plant taxonomists with specialist skills were consulted.

2.3.3 LIMITATIONS

2.3.3.1 Onshore Environmental

No limitations or constraints were identified during the surveys as outlined below.

Table 2-4 Onshore Environmental – Analysis of Potential Survey Limitations

CONSTRAINT	RELEVANCE
Availability of contextual information at a regional and local scale	**Not a Limitation** There has been at least eight previous flora and vegetation surveys conducted by Mattiske Consulting between 1996 and 2022 that intersect native vegetation forming the study area (Mattiske Consulting and Ninox Wildlife Consulting 1996, Mattiske Consulting 2002, 2005, 2010a, 2010b, 2012, 2019, 2021, 2022). This provided a comprehensive local database: A large body of previous work exists for the area, both locally and regionally
Proportion of flora recorded and/or collected, any identification issues	**Not a Limitation** The targeted flora and vegetation survey was scheduled to coincide with the optimum Spring flowering period and extended over a six week period from mid-September through to early November 2024. This maximised the likelihood of recording target conservation significant flora species. There were no specific collection or taxonomic issues resulting from survey timing..
Survey timing, rainfall, season of survey	**Not a Limitation** Field surveys were completed in September and October 2024 during the peak flowering periods for target species, and within seasonal windows recommended by the EPA (2016). While drought was experienced between October 2023 and April 2024 (36.6 mm across seven months), average falls were recorded across the four months preceding the Spring 2024 field survey (392.4 mm from May-August 2024).
Disturbance that may have affected the results of the survey such as fire, flood or clearing	**Not a Limitation** While there were a number of historical disturbances influencing native vegetation condition, none of the disturbances recorded within the study area prevented sampling or influenced survey outcomes. Disturbances within the study area included clearing, historical hardwood logging, *Phytophthora* dieback, mining, powerline and unsealed road corridors, ground disturbance by pigs, salinisation, weed encroachment, and edge effects along land use boundaries.
Was the appropriate area fully surveyed (effort and extent)	**Not a Limitation** The study area was extensively searched by five botanists working as a group along grid lines and extending into modelled search areas over a wider regional

CONSTRAINT	RELEVANCE
	area. Access into native vegetation fringing the Newmont Gold Mine could not be facilitated and remained a minor limitation that will be addressed in Spring 2025.
Access restrictions within the survey area	**Not a limitation** The study area was accessed by 4WD vehicle along formed access tracks and on foot. Access did not pose any restrictions to undertaking the field survey with the exception of vegetation fringing operational areas adjacent to Newmont's Boddington Gold Mine.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed	**Not a Limitation** The Principal Botanists working on the survey (Dr Darren Brearley and Dr Jerome Bull) have over 20 years' experience working locally and have completed numerous surveys around Boddington and Quindanning dating back to 2005. They were supported by long time orchid enthusiasts and contract native seed collectors Mr Keith Smith and Mrs Vicki Smith who found the first populations of *Caladenia hopperiana* and *Caladenia caesarea* subsp. Mooradung and have worked extensively around Boddington for the past 15 years. Mr Thomas Mott is an Ecologist with one years' field experience who was familiarised with target species and worked closely alongside one of the two Principal Botanists.

2.3.3.2 Mattiske Consulting

There were no limitations associated with conducting the surveys (see Table 2-5) however there are limitations specific to each species which are outlined below.

Previous State Herbarium records do not delineate *Calytrix simplex* subsp. simplex population numbers as this is a recent introduction to data collection requirements. State Herbarium specimens of this species have been previously collected in shallow soils on flats and slopes of granite outcrops which has not been extensively encountered during the targeted search period.

Previous State Herbarium records do not delineate *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) population numbers as this is a recent introduction to data collection requirements. There are few limitations associated with searching for this species as it is very easy to identify through its leaf morphology and prostrate habit. This perennial species flowers and sets seed in late spring and early summer but can be recorded at any time due to its persistence and resilience as a perennial species and its prostrate habit.

Previous State Herbarium records do not delineate *Halgania corymbosa* population numbers as this is a recent introduction to data collection requirements.

Previous State Herbarium records do not delineate *Hibbertia ambita* population numbers as this is a recent introduction into data collection requirements. *Hibbertia commutata* is a dominant species in the Boddington baseline and rehabilitation areas. It is very difficult to identify *Hibbertia ambita* without flowering specimens. This proved to be a major constraint relating to the need to have full flowering material to separate this species in the later months of the survey with the majority of specimens having returned to their vegetative state. The seasonal conditions have been varying in recent years with drying climatic conditions and as a result timing of survey efforts is a more major constraint for this species than for other conservation species.

Table 2-Mattiske Consulting – Analysis of Potential Survey Limitations

POTENTIAL SURVEY LIMITATION	IMPACT ON SURVEY
Sources of information and availability	**Not a constraint**: A large body of previous work exists for the area, both locally

POTENTIAL SURVEY LIMITATION	IMPACT ON SURVEY
of contextual information (i.e. pre-existing background versus new material).	and regionally
Not a constraint: A large body of previous work exists for the area, both locally and regionally	**Not a constraint**: Due to the timing of the survey, all life forms were sampled adequately during the time of the survey. All site characteristics were adequately sampled during the time of the survey, including multiple efforts in spring months. The Priority *Gastrolobium* sp. Prostrate Boddington (P1) can be identified in all seasons due to its habit of growth and distinguishing foliage characteristics.
Proportion of flora collected and identified (based on sampling, timing and intensity).	**Not a constraint:** The intensity of the survey effort was such that a very high proportion of the flora was sampled and identified, particularly in view of the degree of disturbance of the understorey from agricultural activities and also the degree of past clearing.
Completeness and further work which might be needed (i.e. was the relevant survey area fully surveyed).	**Not a constraint**: The entire survey area was traversed during the survey period.
Mapping reliability.	**Not a constraint**: Aerial survey maps were sufficient for the work that was undertaken, along with the multiple assessments and targeted work undertaken on the flora.
Timing, weather, season, cycle.	**Not a constraint**: the survey was conducted during Spring which is considered to be the ideal sampling period for the Jarrah Forest (EPA 2004; EPA 2016a and 2016b).
Disturbances (fire flood, accidental human intervention, etc.).	**Not a constraint**: No disturbances impacted upon the survey
Intensity (in retrospect, was the intensity adequate).	**Not a constraint**: All remnant vegetation in the Hotham Farm survey area was assessed.
Resources (i.e. were there adequate resources to complete the survey to the required standard).	**Not a constraint**: Adequate resources were provided for the completion of the survey work.
Access problems (i.e. ability to access survey area).	**Not a constraint**: Existing tracks enabled adequate access to survey the vegetation within the survey area.
Experience levels (e.g. degree of expertise in plant identification to taxon level).	**Not a constraint:** All survey personnel have the appropriate training in sampling and identifying the flora of the region. Experienced botanists were consulted where plants could not be identified in the field.

2.3.4 RESULTS

Figure 2-4 shows the locations of known threatened species, priority species and old growth forest.

2.3.4.1 Onshore Environmental

Caladenia dorrienii (Cossack Spider-orchid)

No evidence of this species was recorded during the Spring 2024 surveys in the areas proposed to be cleared.

Caladenia hopperiana (Quindanning Spider-orchid)

No individuals were recorded within the areas proposed to be cleared.

A total of 805 flowering plants were recorded from five populations. An additional 1,427 individuals

were recorded as leaves or buds near to recorded plants and were considered very likely to be Caladenia hopperiana, with a number of the buds confirmed late in the season (after flowering) (Offshore Environmental 2024). Additional individuals were found adjacent to the QTR protected area, which resulted in an increase of the area protected (see Section 2.3.5 and Section 3).

Caladenia caesarea subsp. Mooradung (Mooradung Mustard Orchid)

No individuals were recorded in the areas planned to be cleared.

A total of 147 flowering plants were recorded from two populations. An additional 208 individuals were recorded as leaves or buds near to recorded plants and were considered very likely to be *Caladenia caesarea* subsp. Mooradung, with a number of the buds confirmed late in the season (after flowering). The smallest population comprising eight flowering plants was recorded from a minor drainage line occurring on granite in the central southern sector of the Mooradung Nature Reserve. The larger population comprising 140 flowering plants occurred on a broad minor drainage line within native vegetation either side of Gold Mine Road, i.e. east of Newmont's Boddington Gold Mine (Onshore Environmental, 2024)

Diuris micrantha (Dwarf Bee-orchid)

No individuals were recorded in the pre-clearance survey area. A population of 607 individuals were recorded on the Collie- Williams Road, outside of the WMDE,

Pultenaea pauciflora (Narrogin Pea)

No individuals were found within the Worsley Mine Development Envelope (WMDE) or Indicative Disturbance Footprint (IDF). Two individuals were recorded in the Mooradung Nature reserve.

Other significant flora

During targeted surveys for orchids the following other priority species were identified.

- *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) (P1) – 4 populations, one within WMDE and three outside WMDE
- *Banksia recurvistylis* (P2) – 1 population outside WMDE
- *Grevillea dissectifolia* (P3) – 2 populations outside WMDE
- *Grevillea pimeleoides* (P4) – 1 individual within WMDE and in the IDF.
- *Lasiopetalum cardiophyllum* (P4) – 2 populations outside WMDE

2.3.4.2 Mattiske Consulting

Calytrix simplex **subsp. simplex (P1)**

No individuals were recorded in the areas to be cleared.

Gastrolobium **sp. Prostrate Boddington (M. Hislop 2130) (P1)**

Gastrolobium sp. Prostrate Boddington was recorded during the targeted work in August-December 2024. Further survey is being undertaken for *Gastrolobium* sp prostrate Boddington as the species can be identified without flowering. If required, this report will be re-submitted prior to the normal annual timing of the next submission to include the findings from these surveys.

Hibbertia ambita **(P1)**

During the survey period an additional 337 plants were identified, increasing the known population to over 100. Increasing the maximum impact to 10% in accordance with condition B12-(3)(c), see Table 2-6.

***Halgania corymbosa* (P3)**

No individuals of this species were recorded within the areas to be cleared. The maximum impact in accordance with condition B12-3(d) remains at 2% see Table 2-6.

Table 2-5 Results of Surveys for Species Identified in Condition B12-1(3)

Species	Number of Plants found in 2025	Known Population	Maximum % impact	Maximum Number of Plants which could be disturbed in 2025
Hibbertia ambita	337	398	10%#	39
Halgania corymbosa	0	79	2%^	1

Increased to 10% as more than 100 individuals have been recorded in the known population
^ 2% as more than 100 individuals have not been recorded in the known population

Future annual reports will continue to build on the total number of plants discovered and the number cleared in any given year.

2.3.4.3 Other priority flora within preclearance area

In addition to the target species several additional priority species were identified as a result of the surveys including:

- *Banksia recurvistylis* (P2)
- *Stylidium marrodongenese* (P3)
- *Grevillea dissectifolia* (P3)
- *Styphelia filifolia* (P3)
- *Grevillea dissectifolia* (P3)
- *Grevillea pimeleoides* (P4)
- *Lasiopetalum caridophyllum* (P4)

2.3.5 OUTCOMES

2.3.5.1 Onshore

Survey results indicate that there are no threatened or priority species within the pre-clearance area. With the exception of *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) and one individual of *Grevillea pimeleoides* (P4).

No clearing of *Banksia recurvistylis, Grevillea dissectifolia or Grevillea pimeleoides* is proposed. Should clearing be proposed in the future disturbance will first need to be authorized by the CEO in accordance with condition B12-1(f) of MS1237.

2.3.5.2 Mattiske

No individuals of *Halgania corymbosa*, *Calytrix simplex* subsp. simplex or *Hibbertia ambita* were recorded during the surveys and present no limitation to undertaking the required clearing.

3,938 individuals of Gastrolobium sp. Prostrate Boddington were recorded within the clearance areas which represents more than 8% of the currently known population of 27,405 individuals. Further work is progressing to identify additional individuals, and the submission will be updated if they are located. Alternatively, Worsley will ensure that no more than 8% of the population is cleared.

While the surveys were designed to specifically search for the target species, the timing and location also supported the ability to search for and record other priority and threatened species, as such during the surveys the following species were also recorded:

- *Lasiopetalum caridophyllum* (P4) 234 individuals within clearance area (<7% of known population, 3495 individuals)
- *Stylidium marrodongenese* (P3) – 0 individuals within clearing area
- *Grevillea dissectifolia* (P3) – 0 individuals within clearing area
- *Styphelia filifolia (P3)* - 0 individuals within clearing area

MAIN MAP - Boddington Bauxite Mine (BBM)

Coordinate System: GDA2020 MGA Zone 50

Scale @ A3: 1:125,000

435000 440000 445000 450000 455000 460000 465000

6385000 6380000 6375000 6370000 6365000 6360000 6355000 6350000 6345000

BODDINGTON

Marradong Primary Crusher

Marradong Secondary Crusher

Saddleback Primary Crusher

Albany Hwy

Bannister-Marradong Rd

West Wandering Rd

Pinjarra-Williams Rd

Gold Mine Rd

Old Soldiers Rd

Farmers Av

Crossman Rd

Crossman-Dwarda Rd

Tyler Rd

Lucev Rd

Moorapulling Rd

Marradong Rd

Access Rd

Siding Rd

Morts Rd

Robins Rd

Mitchell Cr

Davis Rd

Newmarket Rd

South Crossman Rd

George Rd

Lower Hotham Rd

Fletcher Rd

Boundary Rd

Plantation Rd

Chalk Brook Rd

Bannister Rd

Thirty Four Mile Brook

Long Gully

Stoney Creek

Hotham River

Murray River

Bell Brook

Marradong Brook

Crossman River

Williams River

Warrening Gully

0 5 10 20 KM's

LEGEND

Town | State Highway | Main Road | Minor Road | Track | Major River | Minor River | Lake

Existing Infrastructure:
- Primary Crusher
- Secondary Crusher

Onshore Environmental:
- Targeted Survey Locations

MS1237 Approved Envelopes:
- WMDE
- PAA

NORTH

SOUTH32

Worsley Alumina Pty Ltd

Target Survey Locations for Onshore Environmental

FIGURE 2-2

Author: dlimm1

Created: February 2025

Plan: WAPL_FVMP_AR25_Fig02_02_TargetSurveyLocations_OnshoreEnv_A3P.mxd

MAIN MAP - Boddington Bauxite Mine (BBM)

Coordinate System: GDA2020 MGA Zone 50

Scale @ A3: 1:125,000

435000 440000 445000 450000 455000 460000 465000

6385000 6380000 6375000 6370000 6365000 6360000 6355000 6350000 6345000

BODDINGTON

Marradong Primary Crusher

Marradong Secondary Crusher

Saddleback Primary Crusher

Albany Hwy

Bannister Marradong Rd

West Wandering Rd

Bannister Rd

Plantation Rd

Chalk Brook Rd

Gold Mine Rd

Old Soldiers Rd

Crossman Rd

Crossman-Dwarda Rd

Davis Rd

Mitchell Cr

Farmers Av

Access Rd

Robins Rd

Pinjarra-Williams Rd

Tyler Rd

Moorapulling Rd

Lucev Rd

South Crossman Rd

Newmarket Rd

George Rd

Marradong Rd

Lower Hotham Rd

Fletcher Rd

Boundary Rd

Zilko Rd

Warrenning Rd

ALCOA HARVEY RIVER

BANNISTER RIVER

CROSSMAN RIVER

THIRTY FOUR MILE BROOK

MARRADONG BROOK

LONG GULLY

STONEY CREEK

HOTHAM RIVER

MURRAY RIVER

BELL BROOK

WARRENNING GULLY

WILLIAMS RIVER

0 5 10 20 KM's

LEGEND

Town | State Highway | Main Road | Minor Road | Track | Major River | Minor River | Lake

NORTH

Existing Infrastructure:

- Primary Crusher
- Secondary Crusher

Mattiske Consulting:

- Priority Survey Area 1
- Priority Survey Area 2

MS1237 Approved Envelopes:

- WMDE
- PAA

SOUTH32

Worsley Alumina Pty Ltd

Target Survey Locations for Mattiske Consulting

FIGURE 2-3

Author: dlimm1

Created: February 2025

Plan: WAPL_FVMP_AR25_Fig02_03_TargetSurveyLocations_Mattiske_A3P.mxd

MAIN MAP - Boddington Bauxite Mine (BBM)

Coordinate System: GDA2020 MGA Zone 50

Scale @ A3: 1:125,000

BODDINGTON

Marradong Primary Crusher

Marradong Secondary Crusher

Saddleback Primary Crusher

Albany Hwy

Bannister Marradong Rd

West Wandering Rd

Bannister Rd

Plantation Rd

Gold Mine Rd

Siding Rd

Old Soldiers Rd

Crossman Rd

Crossman-Dwarda Rd

Days Rd

Farmers Av

Mitchell Cr

Access Rd

Robins Rd

Morts Rd

Pinjarra-Williams Rd

Tyler Rd

Lucev Rd

Moorapulling Rd

Newmarket Rd

South Crossman Rd

George Rd

Hotham Rd

Lower Hotham Rd

Fletcher Rd

Marradong Rd

Boundary Rd

Warrening Gully Rd

Zilko Rd

Chalk Brook Rd

ADELUP RIVER

BANNISTER RIVER

THIRTY FOUR MILE BROOK

MARRADONG BROOK

CROSSMAN RIVER

LONG GULLY

SLOWEY CREEK

HOTHAM RIVER

MURRAY RIVER

BELL BROOK

WILLIAMS RIVER

WARRENING GULLY

Lc

Gpb

Ha

Sm

Ch(T)

CcM(u)

0 5 10 20 KM's

LEGEND

Town | State Highway | Main Road | Minor Road | Track | Major River | Minor River | Lake

Existing Infrastructure:
- Primary Crusher
- Secondary Crusher

MS1237 Approved Envelopes:
- WMDE
- PAA

Flora Records (Mattiske Consulting):

Priority 1 Species:
- Gastrolobium sp. Prostrate Boddington (M. Hislop 2130)
- Hibbertia ambita

Priority 3 Species:
- Stylidium marradongense
- Styphelia filifolia

Priority 4 Species:
- Lasiopetalum cardiophyllum

Flora Records (Onshore Environmental):
- Caladenia hopperiana (T)
- Banksia recurvistylis (P2)
- Grevillea dissectifolia (P3)
- Grevillea pimeleoides (P4)
- Caladenia caesarea subsp. Mooradung (undescribed)

Old Growth:
- Old Growth Forest

NORTH

SOUTH32

Worsley Alumina Pty Ltd

Threatened Species, Priority Species and Old Growth Forest Locations

FIGURE 2-4

Author: dlimm1

Created: February 2025

Plan: WAPL_FVMP_AR25_Fig02_04_TandP_Species_OldGrowth_A3P.mxd

2.4 Threatened and Priority Vegetation

No further threatened or priority vegetation areas were identified as part of the pre-clearance surveys.

3 Buffer Zones

During the pre-clearance surveys additional *Caladenia hopperiana* individuals were located within the PAA on the eastern edge of the population in the Quindanning Timber Reserve north of Pinjarra Williams Road. In addition, further individuals of *Caladenia hopperiana* and *Caladenia caesarea* subsp. Mooradung were located outside the PAA. In accordance with the Flora and Vegetation Management Plan, all identified locations for these two species were protected through the allocation of a Protected Area, representing a 50 m buffer from the known locations, to minimise the risk of direct and indirect impacts to the species.

QUINDANNING TIMBER RESERVE (QTR) – WITHIN THE PAA

Appropriate buffers were determined considering the following:

Forest disease

Forest hygiene surveys have been conducted for the areas surrounding the location of the newly identified *C hopperiana* individuals as outlined in Section 2.1. Much of the proposed clearing area in QTR area was surveyed for forest disease in 2023 and was interpreted as uninfested. There were small pockets of wandoo that were classified as uninterpretable due to a lack of indicator species; however these were surrounded by uninfested forest.

Given the assessed dieback status within and surrounding the area containing the *C. hopperiana* individuals, the location was classified as low risk for potential dieback infestation and a 50 m buffer, in conjunction with Worsley management measures, was considered adequate to minimise the risk of dieback to the identified individuals.

Dust, weeds, fragmentation

The location of the newly identified individuals is within the existing defined Ecological Linkage for QTR where disturbance is only permitted for infrastructure, roads or access and not mining as described by MS1237 figure 5. The location is also adjacent to the existing Protected Area and "additional protected area" as described by MS1237 figure 6 including early rehabilitation areas; therefore, impacts related to weeds, dust and fragmentation are consistent with the assessment already undertaken for the previously known individuals. Under this assessment process an external qualified consultant advised that a 50 m buffer be applied to the individuals identified in QTR to minimise the risk of indirect impacts (Mattiske, 2021). Given the potential impacts to these individuals are consistent with the individuals included under the original assessment a 50m buffer is considered to be appropriate to minimise impacts to the individuals.

Ground and Surface water

Studies and local monitoring demonstrate that the Revised Proposal is unlikely to impact water availability within the QTR Protected Areas because the overall soil-water holding capacities of sites are not significantly impacted by bauxite mining, despite the removal of several meters of soil profile. Also due to the deep weathered profile, the high infiltration capacity of the profile means that mined orebody areas can drain internally, which limits the risk of erosion and turbidity while vegetation cover is absent or low. The addition of shallow groundwater monitoring bores to the groundwater monitoring program allows for early detection of any increase in groundwater levels or decline in groundwater

quality locally and as a result of the Worsley operation. These bores are and will continue to monitor local changes to groundwater in accordance with the Water Management Plan required by condition B16-2. The monitoring and management of the new individuals is no different to the assessment provided previously for the known population, the buffer of 50 m for the new individuals is therefore determined to be appropriate.

BUFFERS FOR AREAS OUTSIDE THE PAA

The newly identified individuals for both *C hopperiana* within the QTR and *Caladenia caesarea* subsp. Mooradung north of Gold Mine Road are located outside of the PAA. Worsley has defined a Protected Area representing a buffer of 50 m on these known locations to ensure that ancillary activities (such as feral animal baiting) will not directly impact the species, noting that the approval provided by MS1237 does not include ground disturbing activities outside the PAA. As these additional individuals are within known populations for both species, the assessment conducted to provide MS1237 has already considered the potential impacts and found the management measures to be sufficient to limit the risk of adverse impact. The buffer of 50 m is considered appropriate to limit the risk, noting Worsley had not provided a buffer previously for these locations as they are outside the PAA.

Worsley notes the company has no influence over the activities undertaken in the QTR or the area North of Gold Mine road by the public and the buffers will therefore only apply to Worsley controlled activities.

No further buffers were applied within or adjacent to the pre-clearance areas as a result of the surveys.

MAIN MAP - Boddington Bauxite Mine (BBM)

Coordinate System: GDA2020 MGA Zone 50

Scale @ A3: 1:125,000

440000 445000 450000 455000 460000 465000 470000

6385000 6380000 6375000 6370000 6365000 6360000 6355000 6350000 6345000

MAP INSET 1: 1:25,000

Caladenia ceasura subsp. Mooradung

Gold Mine Rd

MAP INSET 2: 1:50,000

Threatened flora - Caladenia hopperiana

Pinjarra-Williams Rd

Page Rd

Curnow Rd

BODDINGTON

HOTHAM RIVER

MARRADONG BROOK

MURRAY RIVER

WILLIAMS RIVER

WARRENING GULLY

BELL BROOK

Farmers Av

Access Rd

Morts Rd

Robins Rd

Siding Rd

Old Soldiers Rd

Marradong Primary Crusher

Marradong Secondary Crusher

Saddleback Primary Crusher

Moorapulling Rd

George Rd

Lower Hotham Rd

Fletcher Rd

Boundary Rd

Hotham-Williams Rd

Crossman Rd

Days Rd

Albany Hwy

Moramookinning Rd

O'Connell Rd

Crossman Diversion Rd

West Wandering Rd

South Bannister-Wandering Rd

WANDERING BROOK

Stephen Rd

Marradong Rd

Zilko Rd

Mundaya Rd

THIRTY FOUR MILE BROOK

0 5 10 20 KM's

LEGEND

Town | State Highway | Main Road | Minor Road | Track | Major River | Minor River | Lake

Existing Infrastructure:
- Primary Crusher
- Secondary Crusher

MS1237 Approved Envelopes:
- WMDE
- PAA

Additional Buffers:
- Additional Buffers (50m)

NORTH

SOUTH32 Worsley Alumina Pty Ltd

Additional Buffers as a Result of Survey Findings

FIGURE 3-1

Author: dlimm1

Created: February 2025

Plan: WAPL_FVMP_AR25_Fig03_01_AdditionalBuffersSurveyFindings_A3P.mxd

4 Management Actions

There are no changes to the management actions as described in the Flora and Vegetation Management Plan section 6.6 and section 8.

5 Updated Trigger and Threshold Criteria

The Flora and Vegetation Management Plan provides all information in accordance with the '*Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans*' published by the Western Australian (WA) Environment Protection Authority (EPA) (EPA, 2024) and the '*Environmental Management Plan Guidelines*' published by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (DCCEEW, 2024). This includes the inclusion of Trigger and Threshold limits (see table 8-3). The Trigger and Threshold values are based on a known population at a point in time, and therefore are subject to changes as further surveys are conducted, more plants are found. Table 5-1 below will be used to update future years known populations based on surveys conducted in that year, which will also update the Trigger and Threshold Values. As the 2024-5 surveys have been used to update the triggers in the FVEMP there is no update needed in this annual reporting cycle.

Table 5-1 Updated Trigger and Threshold Values for the Environmental Values for MS1237 Condition B12-1(3)

Environmental Value	MS1237 Limit	Known Population	Trigger (%)	Trigger Value*	Threshold (%)	Threshold Value*
Calytrix simplex subsp. simplex	2%		1.5%		2%	
Gastrolobium sp. Prostrate Boddington	8%		6%		8%	
Hibbertia ambita	10%		7.5%		10%	
Halgania corymbosa	2%		1.5%		2%	

6 References

DPAW (2015) *FEM047 Phytophthora Dieback Interpreter's Manual for Lands Managed by the Department.*. Department of Biodiversity, Conservation and Attractions, Perth.

DPAW (2017). *Procedures for the assessment, identification and demarcation of old-growth forest*. Published by Department of Parks and Wildlife March 2017

Mattiske Consulting Pty Ltd (2021) *Assessment of Flora and Vegetation on Worsley Mine Expansion Primary Assessment Area*. Prepared for South32 Worsley Alumina Pty Ltd, September 2021.

Mattiske Consulting Pty Ltd (2024) *Assessment of Flora and Vegetation Values on Hotham Farm*. Prepared for Newmont Boddington Gold Mine, WA, April 2024.

Mattiske Consulting Pty Ltd (2025) *Interim Memorandum of Targeted Threatened and Priority Flora Searches 2024 and Old Growth Assessments 2024*. Unpublished report prepared for South32 Worsley Alumina Pty Ltd, February 2025.

Onshore Environmental (2025). *Targeted Flora Survey, Spring 2024.* Unpublished report prepared for South32 Worsley Alumina, February 2025.

7 Definition and Abbreviations

Term	Description
CEO	Chief Executive Officer of the Department of the Public Service of the State Responsible for the administration of section 48 of the Environmental Protection Act 1986, or the CEO's delegate
DBCA	Department of Biodiversity Conservation and Attractions
DPAW	Department of Parks and Wildlife
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
GIS	Geographic Information System
Ha	Hectares
IDF	Indicative Disturbance Footprint
ISDs	Indicator Species Deaths
m	Metre
MS1237	Ministerial Statement 1237
PAA	Primary Assessment Area
QTR	Quindanning Timber Reserve
WAH	West Australian Herbarium
WMDE	Worsley Mine Development Envelope
Worsley Alumina	South32 Worsley Alumina Pty Ltd