Cygnium

Mardie A

Stage 1 Project Approvals Overview

Mardie Pastoral Co Pty Ltd
Biomass Projects Pty Ltd

August 2026

Prepared for and on behalf of

Mardie Pastoral Co Pty Ltd
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Date	Version	Reviewed / Endorsed by
August 2026	Rev A	Mardie Pastoral Co Pty Ltd

Acknowledgement of Country

Mardie Pastoral Co Pty Ltd and Biomass Projects Pty Ltd acknowledge the Yaburara & Mardudhunera (YM) Traditional Owners of the lands and waters of Mardie Station, and recognises their continuing connection to Country, culture and community.

The Mardie Char project is being developed in partnership with Wirrawandi Aboriginal Corporation and is intended to support long-term cultural access, land management and stewardship outcomes.

Proponent Details

Item	Details
Registered business name	Mardie Pastoral Co Pty Ltd ACN 668 148 749 *Mardie Pastoral Co Pty Ltd is owned by Biomass Projects Pty Ltd (51%) and Wirrawandi Aboriginal Corporation (49%).*
Property	Mardie Station
Tenure	Pastoral lease, sub-leased to Mardie Pastoral Co from Pastoral Management Pty Ltd (Citic Pacific) for 15 years with two five year options, under arrangements approved by the Minister for Lands.
Property Address	North West Coastal Highway, Mardie, WA, 6714
Postal Address	8 Hope Street, Whitegum Valley, WA, 6162
Primary contact	Richard Paterson Founder & CEO Biomass Projects Pty Ltd and Mardie Pastoral Co Pty Ltd Ph 0429 08 44 23 Email richard@biomassprojects.com.au www.biomassprojects.com.au
Purpose of document	Reference document for engagement with regulators regarding Mardie Char Stage 1 (Mardie A project) approvals.

Project Overview

The Mardie Char Project is a pastoral land rehabilitation and declared pest management initiative being undertaken on Mardie Station in the Pilbara region of Western Australia. The project has been developed to address one of Australia's largest infestations of mesquite, a declared pest and Weed of National Significance that has significantly reduced the productive capacity, accessibility and long-term pastoral utility of the station.

The primary objective of the project is to restore mesquite-affected land to a productive pastoral landscape through the progressive removal of mesquite, rehabilitation of affected areas and implementation of long-term pastoral management practices designed to prevent reinfestation. The project seeks to improve grazing productivity, restore access to land and water resources, improve environmental condition and support greater access to culturally significant areas across the station.

Stage 1 of the project, known as Mardie A, is a pilot-scale rehabilitation program designed to demonstrate a practical and economically sustainable methodology for landscape-scale mesquite rehabilitation. The project combines selective parkland-style mesquite clearing, biomass processing, biochar production, soil rehabilitation and adaptive pastoral management into a single, integrated rehabilitation model. All biochar produced during Stage 1 will be returned to Mardie Station as part of rehabilitation and research activities aimed at improving soil condition and supporting long-term land restoration outcomes.

A key element of the proposal is the processing infrastructure required to manage mesquite biomass removed through rehabilitation activities. Mardie Pastoral Co Pty Ltd (MPC) considers that this infrastructure is ancillary to, and necessary for, the rehabilitation program. The processing facility is not proposed as an independent industrial operation but rather as enabling infrastructure that provides a practical means of managing mesquite biomass and supporting large-scale rehabilitation outcomes. Without a viable biomass management pathway, rehabilitation at the scale required across Mardie Station is unlikely to be achievable.

The project will generate significant public benefits beyond Mardie Station. These include rehabilitation of a nationally significant weed infestation; Aboriginal business, employment and economic participation opportunities; research into soil carbon and biochar performance; improved understanding of landscape-scale rehabilitation methodologies; and the demonstration of lower-cost biochar technology with potential applications across Western Australian and Australian agriculture.

The project is underpinned by the emerging carbon dioxide removal (CDR) market, which provides a mechanism for funding large-scale rehabilitation activities that would otherwise be difficult to justify economically. Through the production of biochar from mesquite biomass and the return of that biochar to Mardie Station soils, the project has the potential to generate durable carbon removal outcomes while supporting long-term land restoration objectives. Importantly, **the carbon removal market provides the funding mechanism that enables landscape-scale mesquite rehabilitation to occur, but it does not alter the primary purpose of Stage 1, which is the restoration of mesquite-affected pastoral land and the return of biochar to Mardie soils**.

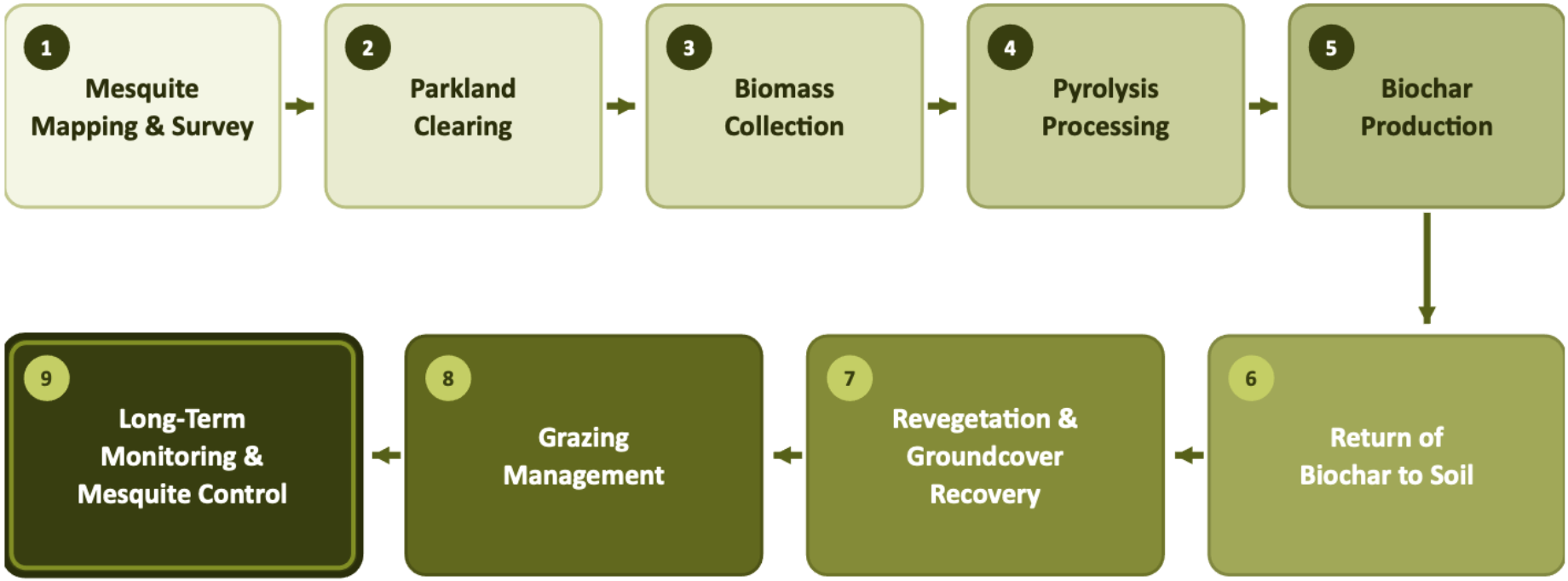
A central element of the rehabilitation strategy is the long-term restoration of Mardie as a productive pastoral enterprise. Rehabilitation will be supported by adaptive grazing management, strategic infrastructure improvements, intensive monitoring of mesquite regrowth and ongoing stewardship of rehabilitated land. The preferred pastoral model is expected to focus on flexible seasonal grazing systems that maintain groundcover, improve resilience to climatic variability and reduce the risk of future mesquite reinfestation.

The project has been structured to deliver meaningful Indigenous participation and long-term stewardship outcomes through Wirrawandi Aboriginal Corporation, representing Traditional Owners, which co-owns Mardie Pastoral Co. The project provides Traditional Owners with direct participation in land management, employment, contracting opportunities, equity ownership and cultural reconnection through the rehabilitation and management of country.

Importantly, **Stage 1 is a limited-scale demonstration project and should not be considered a proposal for a future industrial-scale development.** Should the rehabilitation methodology prove successful, any future commercial-scale facility will be subject to separate planning, environment, native title and land tenure approvals. The purpose of Stage 1 is to demonstrate a rehabilitation model capable of restoring the pastoral productivity, environmental condition and long-term sustainability of Mardie Station while generating broader benefits for Western Australia.

In summary, the Mardie Char Project seeks to transform one of Australia's largest mesquite infestations into a long-term pastoral rehabilitation program that restores productive grazing land, supports Indigenous stewardship, advances agricultural innovation and provides a practical model for large-scale land rehabilitation across Western Australia. By combining rehabilitation activities with biochar production and carbon removal funding mechanisms, the project aims to create a self-sustaining pathway for restoring degraded pastoral land while delivering measurable environmental, social and economic benefits.

Mardie Rehabilitation Pathway



Mardie Char Project – Stage 1 (Mardie A) rehabilitation methodology, Mardie Station, Pilbara WA

Figure ES-1: Mardie Rehabilitation Pathway

Strategic Importance of the Mardie Char Project

The Mardie Char Project addresses one of the largest and most significant mesquite infestations in Australia and provides an opportunity to demonstrate a practical pathway for rehabilitating degraded pastoral land at landscape scale.

Historically, large-scale mesquite rehabilitation has been constrained by cost, logistics and the absence of a viable pathway for managing the biomass generated during clearing. The Mardie Char Project seeks to overcome these challenges by integrating weed management, rehabilitation, adaptive pastoral management and biomass utilisation into a single rehabilitation framework.

The project is expected to deliver benefits that extend beyond Mardie Station, including:

- rehabilitation of one of Australia's largest infestations of a declared pest and Weed of National Significance;
- restoration of productive pastoral land and improved rangeland condition;
- improved access to culturally significant areas for Traditional Owners;
- meaningful Indigenous ownership, employment and contracting opportunities;
- demonstration of innovative rehabilitation methodologies potentially applicable across Western Australia;
- generation of new research into biochar, soil carbon and long-term rehabilitation outcomes;
- development of lower-cost biochar production technologies with potential agricultural applications; and
- creation of a model for funding large-scale rehabilitation projects that have historically been considered economically unviable.

The project provides a pathway to transform a long-standing environmental and pastoral liability into a program of land restoration, Indigenous participation, agricultural innovation and regional economic development.

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Acronyms and abbreviations used

Acronym	Definition
ABN	Australian Business Number
ACH	Aboriginal Cultural Heritage
ACN	Australian Company Number
AEP	Annual Exceedance Probability
APVMA	Australian Pesticides and Veterinary Medicines Authority
ARI	Average Recurrence Interval
AS	Australian Standard (e.g. AS 3959:2018)
BAL	Bushfire Attack Level
BAM Act	*Biosecurity and Agriculture Management Act 2007* (WA)
BC Act	*Biodiversity Conservation Act 2016* (WA)
BCI	BCI Minerals Limited (proponent of the adjacent Mardie Salt Project)
BMP	Bushfire Management Plan (reserve for this use only — see finding N2)
BoM	Bureau of Meteorology
C2 / C3	Declared pest control categories under the BAM Act (C2 eradication; C3 management/containment)
CD	Conservation Dependent
CDR	Carbon Dioxide Removal
CEO	Chief Executive Officer
CITIC	CITIC Pacific Mining
CO	Collapsed (ecological community category)
CR	Critically Endangered
Cth	Commonwealth of Australia
DA	Development Application
DAFWA	Department of Agriculture and Food, Western Australia (former)
DAWE	Department of Agriculture, Water and the Environment (Cth, former)
DBCA	Department of Biodiversity, Conservation and Attractions (WA)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth)
DEED	Department of Energy and Economic Diversification (WA) — confirm expansion
DER	Department of Environment Regulation (WA, former)
DFES	Department of Fire and Emergency Services (WA)
DoE	Department of the Environment (Cth, former)
DPIRD	Department of Primary Industries and Regional Development (WA)
DPLH	Department of Planning, Lands and Heritage (WA)
DWER	Department of Water and Environmental Regulation (WA)
EC	Electrical conductivity
EMP	Environmental Management Plan
EN	Endangered
EP Act	*Environmental Protection Act 1986* (WA)
EPA	Environmental Protection Authority (WA)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EY	Exceedances per year (e.g. 1EY: one exceedance per year on average)
GA	General arrangement (drawing)
GDA2020 / GDA94	Geocentric Datum of Australia 2020 / 1994
GL	Gigalitre (10^9 litres)
GMMP	Groundwater Monitoring and Management Plan
GPS	Global Positioning System
ha	Hectare
HSE	Health, Safety and Environment
IGP	Industry Growth Program (AusIndustry)
ILUA	Indigenous Land Use Agreement
IUCN	International Union for Conservation of Nature
km	Kilometre
LA Act	*Land Administration Act 1997* (WA)
MA	Management action
mS/m	Millisiemens per metre (electrical conductivity; 1 mS/m = 10 µS/cm)

Acronym	Definition
MGA50	Map Grid of Australia, Zone 50
MNES	Matters of National Environmental Significance
MPA	Mardie Pilot Area
MPC	Mardie Pastoral Co Pty Ltd
MS	Ministerial Statement (e.g. MS 1264)
NDVI	Normalised Difference Vegetation Index
National EPA / NEPA	National Environmental Protection Agency (Cth)
P1–P4	Priority 1 to Priority 4 (DBCA Priority species/community codes)
PB	Production bore (borefield identifier, e.g. PB10)
PEC	Priority Ecological Community
PLB	Pastoral Lands Board (WA)
PMMC	Pilbara Mesquite Management Committee
PMST	Protected Matters Search Tool
Pty Ltd	Proprietary Limited
RCM	Rangeland Condition Monitoring
RDAP	Regional Development Assessment Panel
Rev	Revision
RiWI Act	*Rights in Water and Irrigation Act 1914* (WA)
SPP	State Planning Policy (e.g. SPP 3.7)
spp.	Species (plural)
SRE	Short-range endemic (invertebrate fauna)
t/a	Tonnes per annum
TDS	Total dissolved solids
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora List (DBCA database)
VU	Vulnerable
WA	Western Australia / Western Australian
WAC	Wirrawandi Aboriginal Corporation
WAHerb	Western Australian Herbarium (specimen database)
WAOL	Western Australian Organism List (DPIRD)
WAPC	Western Australian Planning Commission
WoNS	Weed of National Significance
YM	Yaburara & Mardudhunera Peoples

1 Introduction

1.1 Project background

The Mardie Char Project is a pastoral land rehabilitation and declared pest management initiative being undertaken by Mardie Pastoral Co Pty Ltd (MPC) on Mardie Station in the Pilbara region of Western Australia.

The project has been developed to address one of Australia's largest infestations of mesquite (*Prosopis* spp.), a declared pest and Weed of National Significance that has significantly reduced the pastoral functionality of the lease. Mesquite infestation has restricted access to grazing land and water resources, reduced pastoral productivity, altered ecological processes, impacted biodiversity values and limited Traditional Owner access across substantial areas of Country.

The processing infrastructure proposed for Mardie A is not an independent industrial undertaking. It forms part of the rehabilitation methodology and provides the only presently identified economically and operationally viable mechanism for undertaking large-scale mesquite removal and land rehabilitation on Mardie Station. All biochar produced during Stage 1 will be returned to Mardie soils as part of the rehabilitation and research program.

1.2 Project purpose

The primary purpose of the Mardie Char Project is to rehabilitate mesquite-affected pastoral land and restore the long-term pastoral utility of Mardie Station. The Initial Pilot Stage has been designed to:

- demonstrate practical mesquite removal methodologies;
- validate rehabilitation techniques under Pilbara conditions;
- establish environmental baseline information;
- demonstrate productive utilisation of removed biomass;
- support long-term declared pest management;
- return biochar to the land as part of soil rehabilitation;
- inform future approvals pathways for later stages of the project.

Stage 1, referred to as Mardie A, is explicitly positioned as a pilot and enabling phase, with a limited footprint and controlled operational parameters. The outcomes of this stage will inform the detailed design, environmental assessment and approvals pathway for the broader Mardie Char Project.

1.3 Site location

Mardie Station is located approximately 100 km south-west of Karratha within the Pilbara region of Western Australia and is held under pastoral lease. The Initial Pilot Stage is proposed within a defined mesquite-affected area of Mardie Station and incorporates both a pilot rehabilitation area and associated ancillary infrastructure footprint. Figures 1, 2 and 3 illustrate the location of Mardie Station, the extent of the core mesquite infestation, and the proposed Stage 1 clearing area respectively.

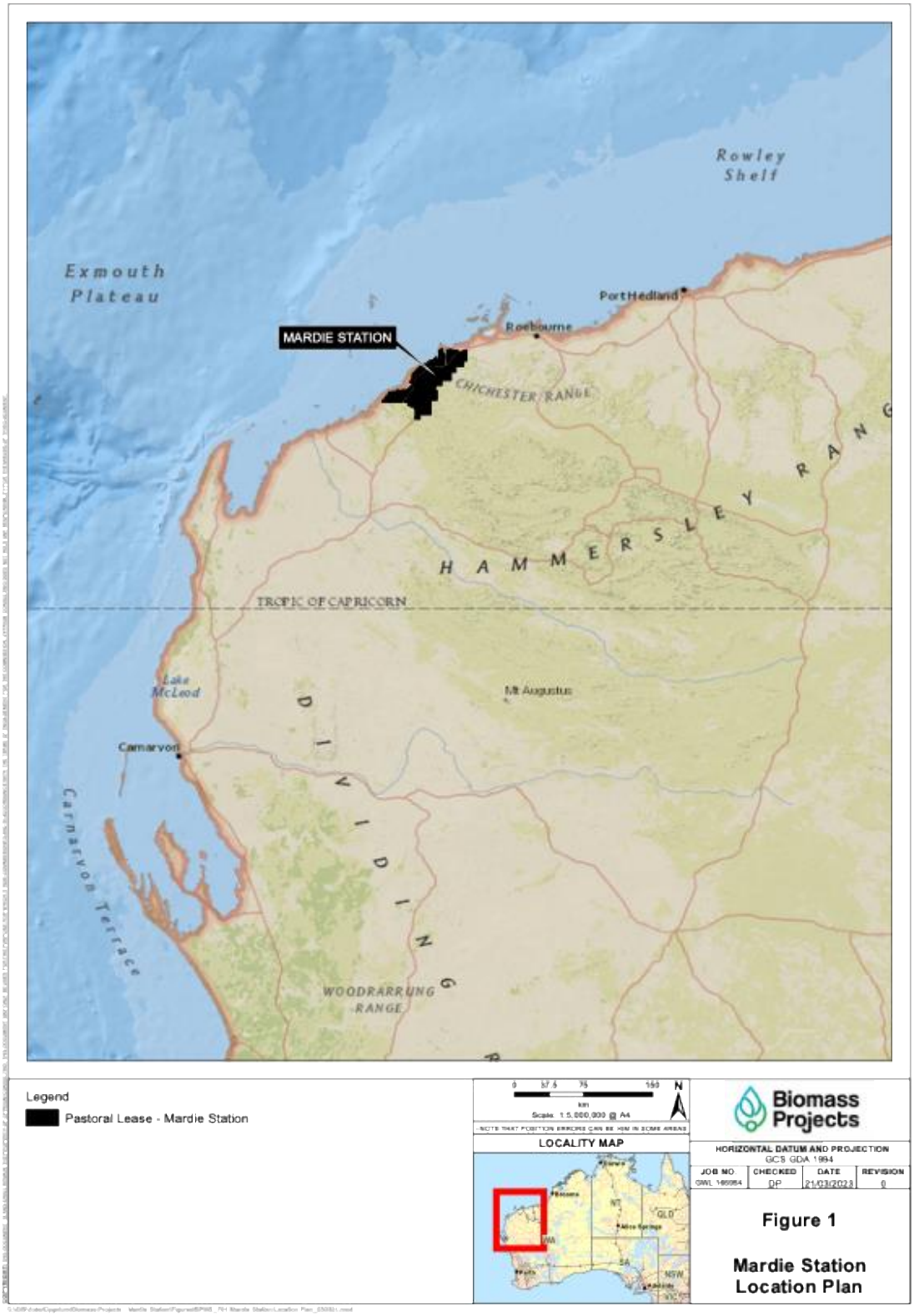


Figure 1. Mardie Station Location Plan

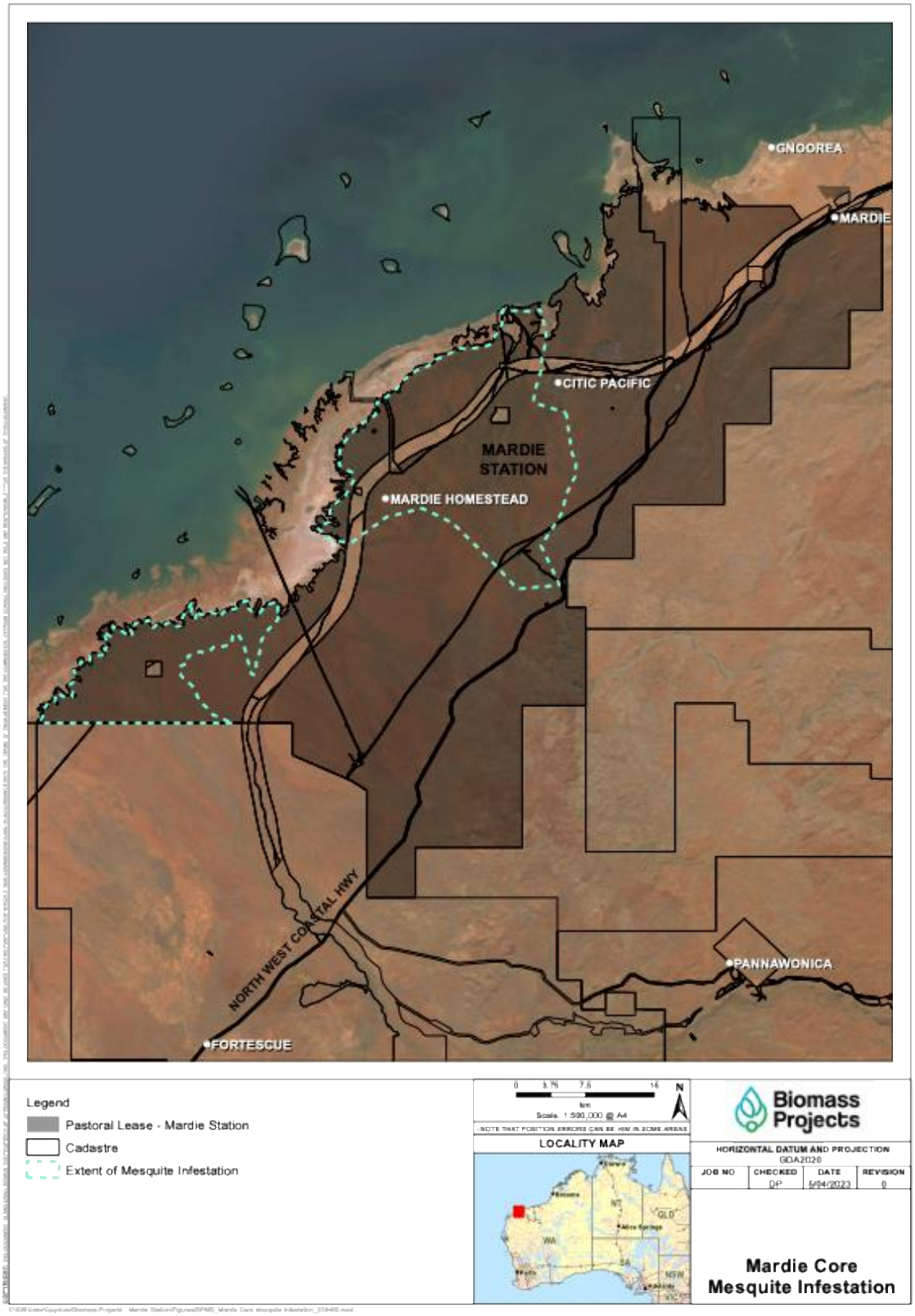


Figure 2. Mardie Station Core Mesquite Infestation Areas

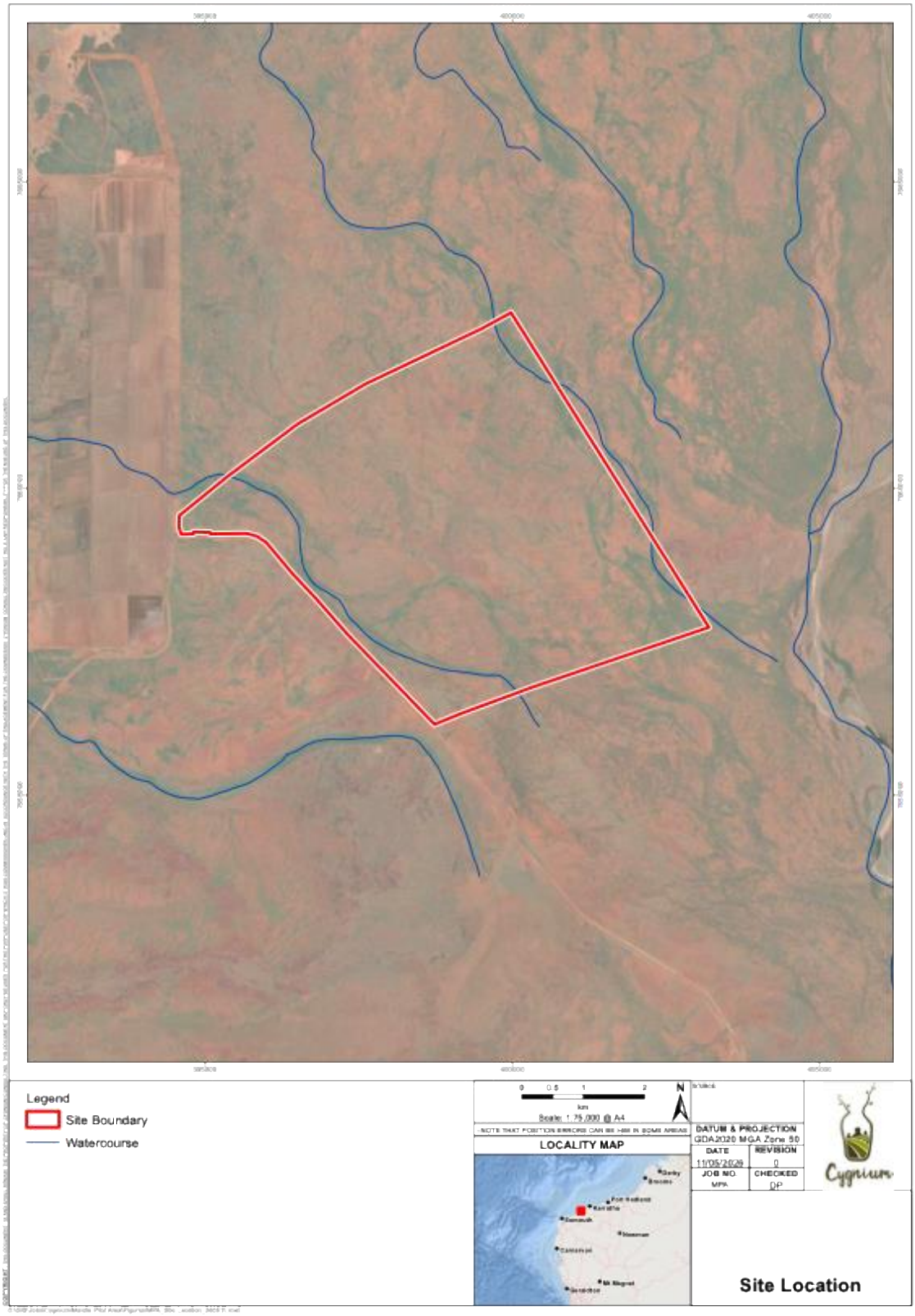


Figure 3. Mardie A Pilot Clearing Area (Project Area)

Note the clearing visible in Figure 3 has been undertaken as part of the BCI Minerals Mardie Salt project, which is not affiliated with this proposal.

1.4 Timelines

Mardie A is intended to be delivered as a staged pilot following receipt of all required approvals. Key phases include approvals pathway confirmation, establishment of the pilot clearing area, construction and commissioning of processing infrastructure, operational trials, biochar return-to-soil trials, progressive rehabilitation and monitoring, and reporting to inform future stages.

1.5 Tenure and proponent arrangements

Mardie Station is managed under a pastoral lease (N050076), held by Pastoral Management Pty Ltd, a subsidiary of CITIC Pacific Mining (CITIC). The station is sub-leased to MPC under arrangements approved by the Minister for Lands. MPC is responsible for the pastoral rehabilitation activities described in this document, including approvals applications, environmental compliance, implementation of rehabilitation activities and stakeholder engagement.

The project is being undertaken in partnership with Wirrawandi Aboriginal Corporation (WAC) through the Mardie Pastoral Co joint venture structure.

1.6 Development pathway

The project has been staged to distinguish the rehabilitation-focused activities proposed under Stage 1 from any future commercial-scale development. Stage 1 is a pastoral rehabilitation and demonstration project. Any future industrial-scale processing facility and additional clearing proposals will require separate assessment and approvals. Table 1 and Figure 4 summarise the staged development pathway.

Table 1. Development Pathway - Mardie Station Rehabilitation

Stage	Purpose	Tenure / Approval Basis	Key Distinction
Stage 1 – Mardie A	Pilot rehabilitation and technology demonstration, including parkland clearing, biochar production and return of biochar to Mardie soils.	Pastoral purposes assessment / confirmation, clearing permit, works approval and other approvals as required.	Current proposal. Limited-scale pilot focused on rehabilitation outcomes.
Stage 2 – Expanded Rehabilitation	Expansion of rehabilitation activities based on Stage 1 outcomes, with continued monitoring and adaptive pastoral management.	Further assessment as required, depending on scale, footprint and environmental triggers.	Builds on Stage 1 lessons and remains focused on rehabilitation.
Future Commercial-Scale Development	Potential future production of products for external markets and integration of Stage 1 equipment into a larger facility.	Separate land tenure, planning, environmental, native title and stakeholder approvals, including ILUA or tenure change if required.	Not part of the Stage 1 proposal. Assessed under its own approvals pathway.

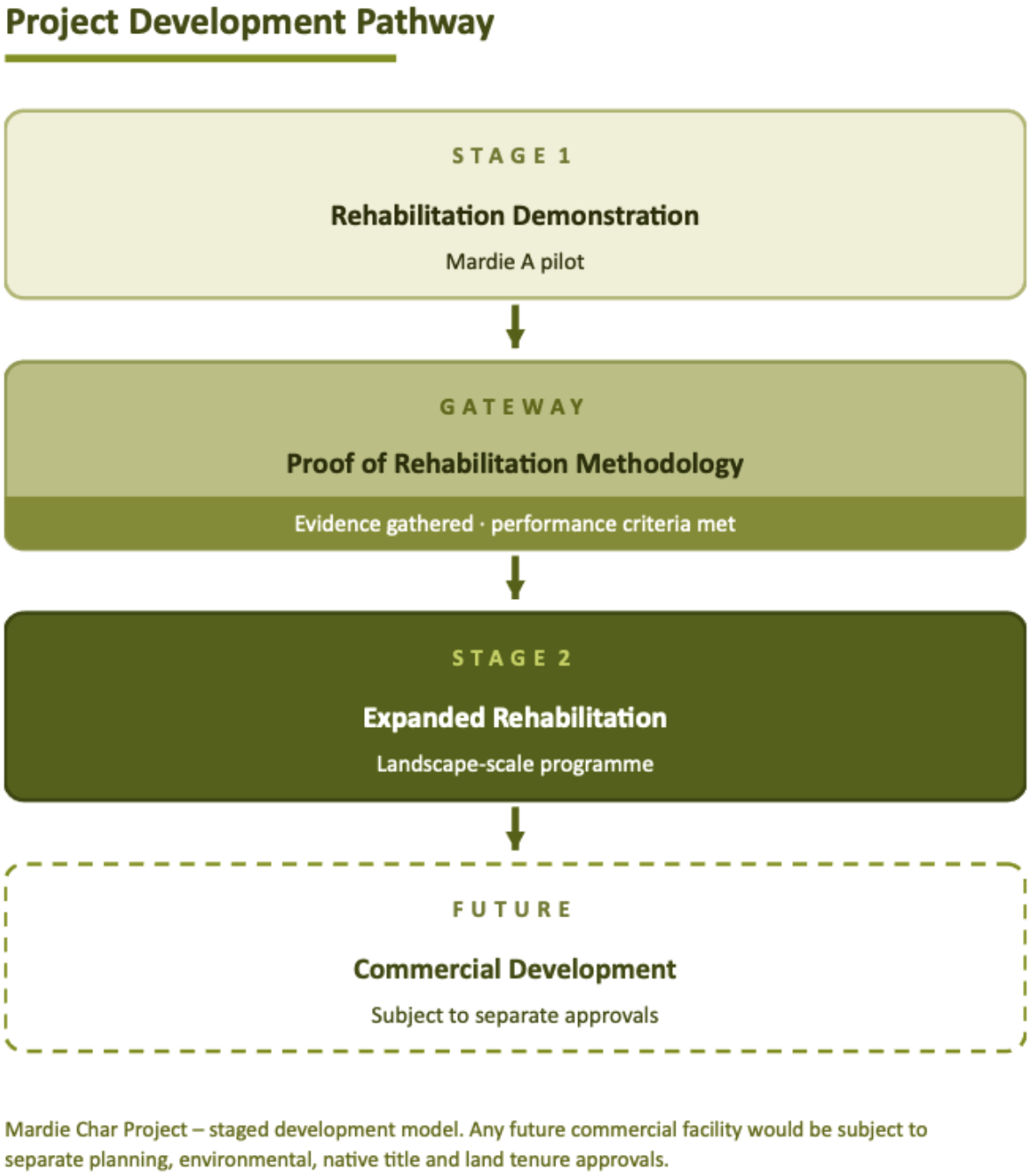


Figure 4. Mardie Char Pilot Project Development Pathway

This document has been prepared to support the approvals requirements of Stage 1 only (Mardie A project).

1.7 Government support and policy alignment

Mardie A has received funding support under the Western Australian Government's Lower Carbon Grants Program (Gorgon Fund), recognising its potential to deliver emissions reduction, carbon removal, land rehabilitation and regional development outcomes.

The full Mardie Char proposal has been reviewed under the Australian Government's AusIndustry Industry Growth Program (IGP), through the Commonwealth Department of Industry, Science and Resources (Reeves, 2024).

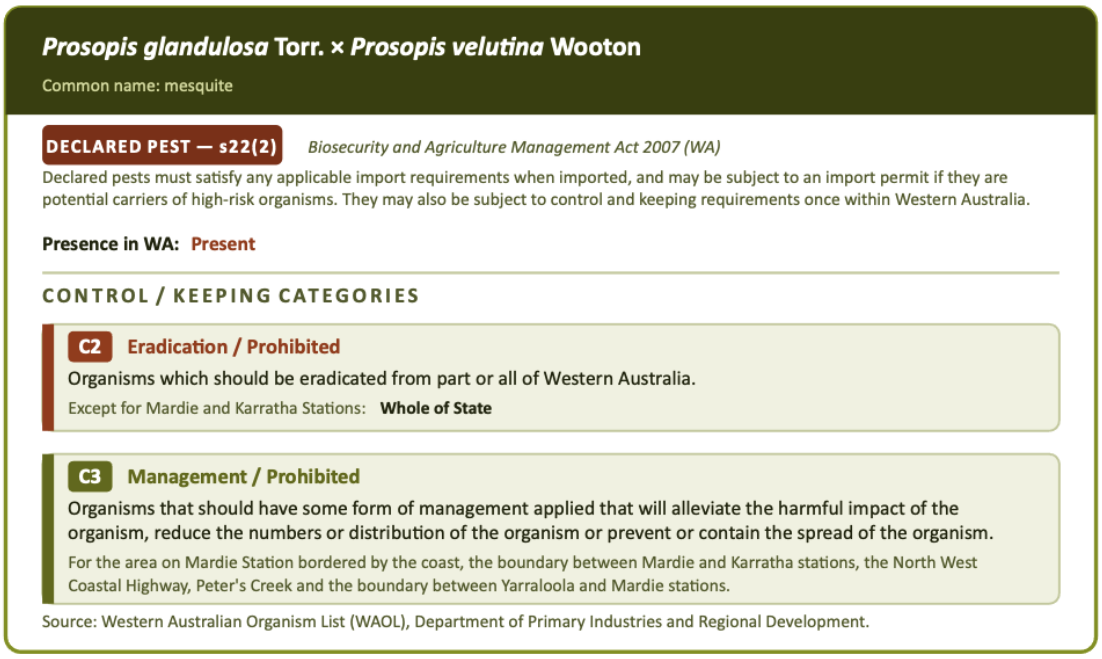
The project aligns with Western Australian climate and decarbonisation objectives; national interest in carbon dioxide removal; Aboriginal economic development priorities; and broader land rehabilitation and biosecurity objectives.

2 Mesquite on Mardie

Mesquite was introduced to parts of Western Australia in the early twentieth century and has since become a highly invasive woody weed across the Pilbara. On Mardie Station, mesquite has spread extensively across floodplains and riparian systems, forming dense and difficult-to-access thickets that have reduced pastoral productivity, restricted access to key areas of Country, altered hydrology and impacted native vegetation and ecological processes.

The infestation now represents one of the most significant land management challenges affecting Mardie Station. Dense infestations have substantially reduced the ability of the lessee to utilise and manage large areas of the station for pastoral purposes, particularly on the high-value alluvial floodplains associated with the Fortescue and Robe River systems.

Mesquite is a declared weed under the *Biosecurity and Agriculture Management Act 2007* (WA) (BAM Act). The current listing summary is provided in Plate 1. For Mardie and the neighbouring Karratha Stations, the requirement is to manage/contain (C3 classification) rather than eradicate (C2 classification) the species.



***Prosopis glandulosa* Torr. × *Prosopis velutina* Wooton**

Common name: mesquite

DECLARED PEST — s22(2) *Biosecurity and Agriculture Management Act 2007 (WA)*

Declared pests must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia.

Presence in WA: Present

CONTROL / KEEPING CATEGORIES

C2 Eradication / Prohibited

Organisms which should be eradicated from part or all of Western Australia.

Except for Mardie and Karratha Stations: **Whole of State**

C3 Management / Prohibited

Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.

For the area on Mardie Station bordered by the coast, the boundary between Mardie and Karratha stations, the North West Coastal Highway, Peter's Creek and the boundary between Yarraloola and Mardie stations.

Source: Western Australian Organism List (WAOL), Department of Primary Industries and Regional Development.

Plate 1. Mesquite status under the Biosecurity and Agriculture Management Act 2007 (WA)

(Source: https://www.dpird.wa.gov.au/online-tools/western-australian-organism-list/)

Due to the scale of the infestation and the cost of control, mesquite has effectively remained unmanaged at landscape scale. The Mardie Char Project has been developed in response to this long-term land management challenge, providing a practical alternative to unmanaged spread, broadacre clearing or open burning.

Plates 2 to 6 (over page) and Figures 5 and 6 provide examples of the mesquite infestation on Mardie and identification information respectively. The extent of the infestation is shown in Figures 7, 8 and 9.



Plate 2. Mesquite tree on Mardie Station



Plate 3. Understorey mesquite



Plate 4. Mesquite thorns evident



Plate 5. Eucalypts on western bank of Fortescue River under competition pressure from mesquite (in foreground)



Plate 6. Fortescue River pool immediately east of Plate 5 image above

Plate 6 illustrates the riparian habitat which the Mardie Char Project (latter stages) will seek to protect and rehabilitate through mesquite control.



Figure 5. PMMC Mesquite identification card [side A]

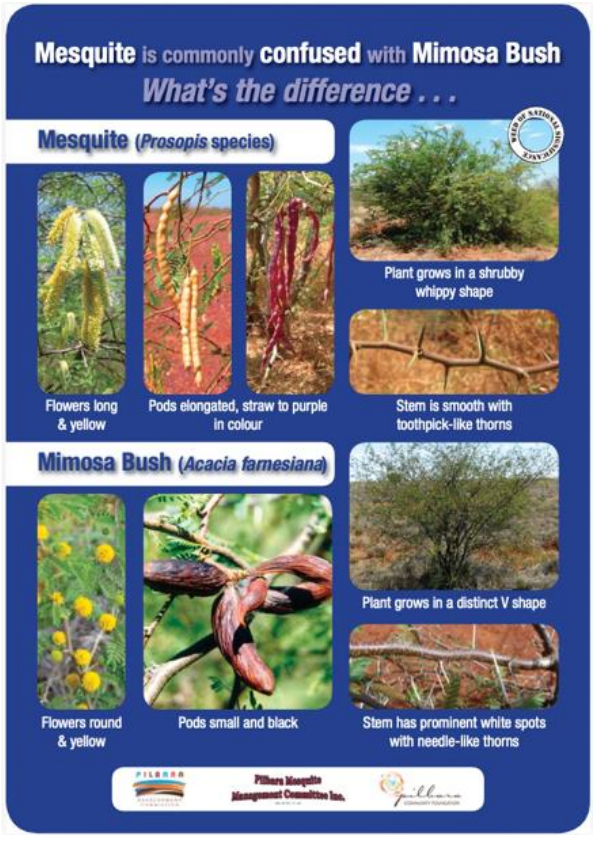


Figure 6. PMMC Mesquite identification card [side B]

(Source: www.pilbaramesquite.com.au)

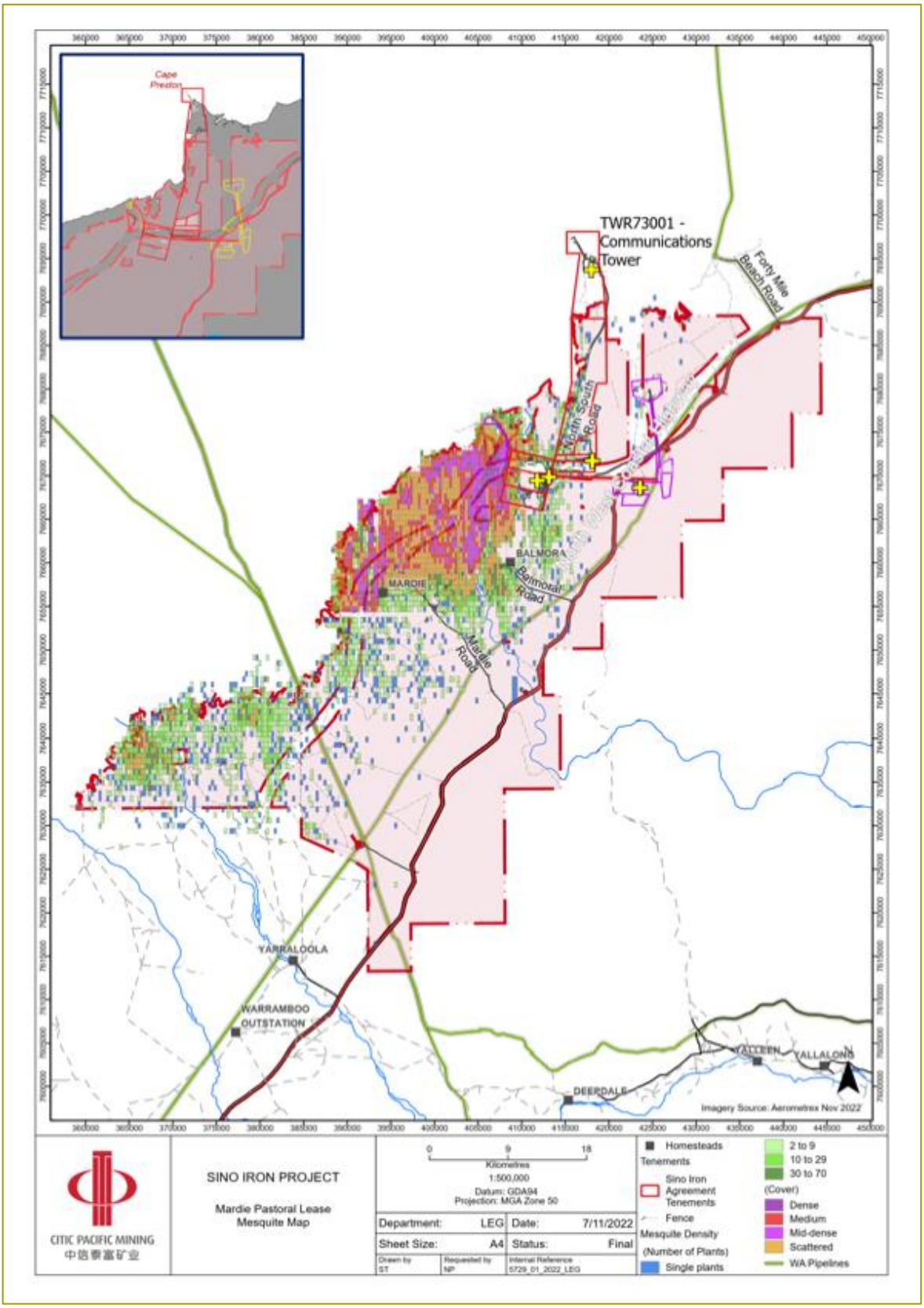


Figure 7. Mesquite density on Mardie Station

(Source: CITIC Pacific Mining, 2022)

Figure 2 (earlier in this document) broadly indicates the current core mesquite infestation areas. Figure 7 provides mesquite density mapping from 2012, provided by CITIC as leaseholder. Figure 8 from Sentinel satellite imagery dated August 16 2026 illustrates the location of the Mardie A pilot rehabilitation area relative to BCI's Mardie Salt project, and the Fortescue River.

Note that the pilot area covers moderately dense mesquite, when compared to the areas nearer to the river, to enable mesquite removal and land rehabilitation techniques to be refined in less sensitive areas prior to future approvals being sought for removal of mesquite nearer to the riparian zone.

Figure 9's vegetation indexation clearly illustrates the density of the mesquite infestation compared to the regional pastoral landscape. Mardie Pastoral Co plans to rehabilitate the mesquite infested areas to a state consistent with neighbouring landscapes.



Figure 8. Sentinel 2 imagery: Mardie A Pilot Area 16 August 2026

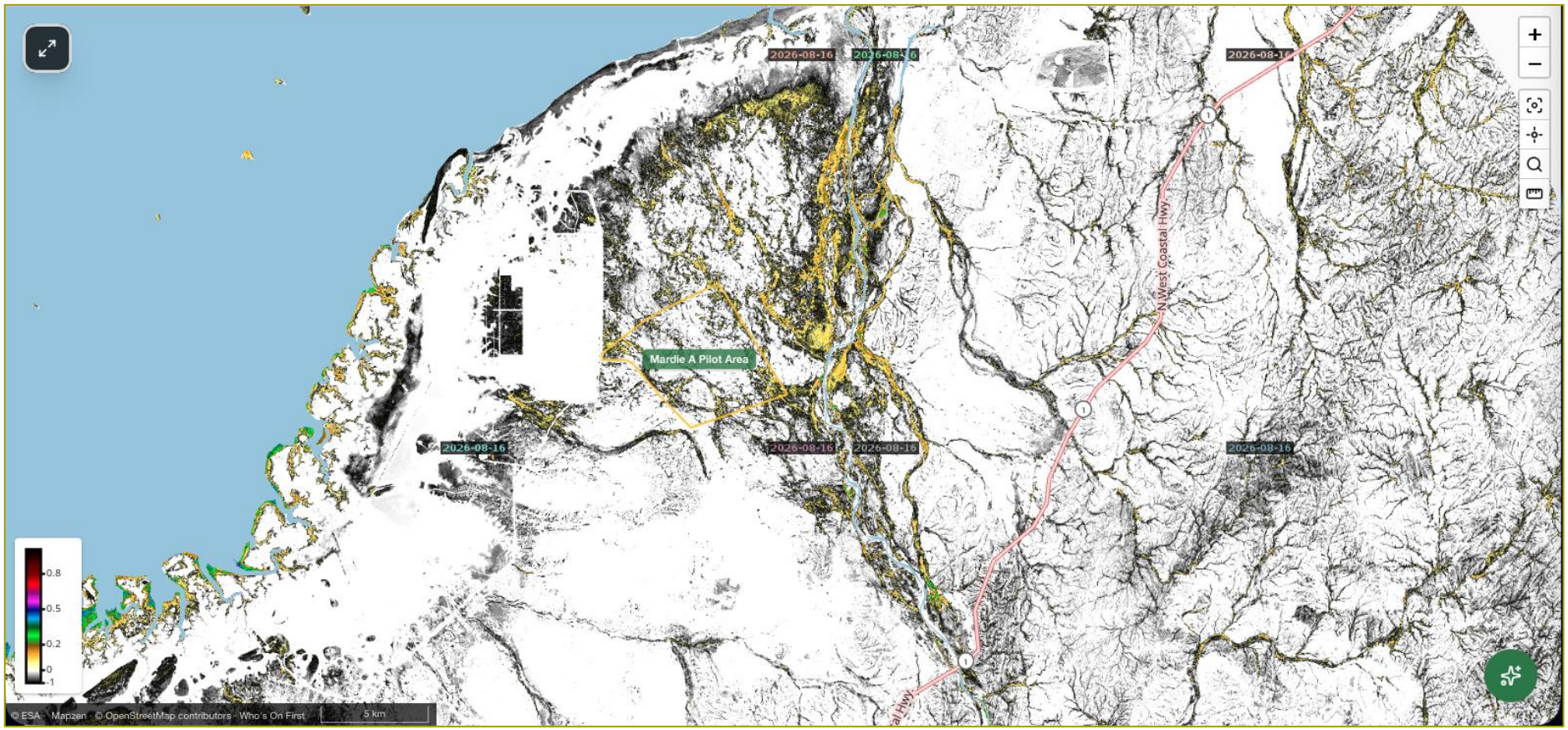


Figure 9. Regional vegetation index representation 16 August 2026

(Source: Both images from Sentinel 2 via www.satamap.com.au)

3 Project description

3.1 Overview of the rehabilitation project approach

Stage 1 (Mardie A) has been designed as an integrated land rehabilitation program focused on the removal of mesquite, restoration of productive pastoral land and long-term management of the property to prevent reinfestation. The project combines invasive weed control, biomass processing, soil rehabilitation, research and adaptive pastoral management into a single rehabilitation methodology.

The rehabilitation process begins with the identification and mapping of mesquite infestations using a combination of satellite imagery, drone surveys and on-ground inspections. These surveys are used to identify mesquite density, drainage lines, culturally significant areas, environmentally sensitive locations and remnant native vegetation that should be retained during clearing activities.

Mesquite removal is undertaken using a parkland clearing methodology. Unlike broadacre clearing techniques that remove all vegetation within a treatment area, the parkland approach is designed to selectively remove mesquite while preserving remnant native trees, existing perennial grasses and other desirable vegetation wherever practical.

Following clearing, harvested biomass is consolidated and transported to the Stage 1 processing facility. The facility utilises pyrolysis technology to convert mesquite biomass into biochar through a thermal process conducted in a low-oxygen environment. This transforms the mesquite into a stable carbon-rich material while avoiding the emissions associated with conventional open burning of cleared vegetation.

Biochar produced during Stage 1 is intended to be returned to rehabilitation areas on Mardie Station. The biochar will be incorporated into the soil as part of a broader program investigating soil improvement, carbon storage, moisture retention, vegetation establishment and long-term pastoral productivity.

Figure 10 illustrates the steps involved in the pastoral land restoration process.



Figure 10. Mardie Rehabilitation Pathway

3.2 Primary land use objective

The primary objective of the Mardie Char Project is the rehabilitation of mesquite-affected pastoral land and restoration of the long-term pastoral utility of Mardie Station. Activities proposed under the project are directed towards removal and suppression of mesquite, restoration of pastoral functionality, improved access to grazing land, rehabilitation of degraded rangelands, improved environmental condition and sustainable long-term pastoral management.

The productive utilisation of removed biomass is ancillary to, and dependent upon, the rehabilitation activity. Removing the mesquite at the scale required is not economically feasible without a productive return from the treated (pyrolysed) biomass.

3.3 Rehabilitation-enabling Infrastructure

The removal and ongoing management of mesquite is the principal objective of the project and the basis upon which all project activities have been developed.

A key challenge associated with large-scale mesquite rehabilitation is the management and sterilisation of the biomass generated through clearing activities. While the physical removal of mesquite is consistent with pastoral land management objectives, the practical challenge is how to manage and utilise the significant volume of biomass generated in a manner that supports long-term rehabilitation outcomes, without releasing substantial carbon volumes into the atmosphere through burning. Alternative approaches such as stockpiling, burial or conventional disposal methods do not provide a demonstrated pathway capable of supporting the scale of rehabilitation proposed for Mardie Station. Without an effective means of managing harvested biomass, landscape-scale rehabilitation of mesquite infestations becomes significantly more difficult.

Consequently, the infrastructure proposed as part of Mardie A has been developed specifically to address this challenge. MPC proposes, in Stage 1, to install pyrolysis facilities to process char for in-situ use in station pastoral rehabilitation. The processing facility is not proposed as a separate industrial land use, nor is it intended to establish a permanent export-oriented manufacturing operation on the pastoral lease. The facility forms an integral component of the rehabilitation and landscape-scale restoration approach.

Figure 11 provides an illustration of the proposed Stage 1 pyrolysis infrastructure which MPC proposes to install. The final location of the pyrolysis infrastructure will be informed by the *Town Planning and Development Act 2005* (WA) Development Approval and the EPA Act Part V Works Permit and Licensing Processes.

Additional infrastructure layouts are provided in Appendix A.

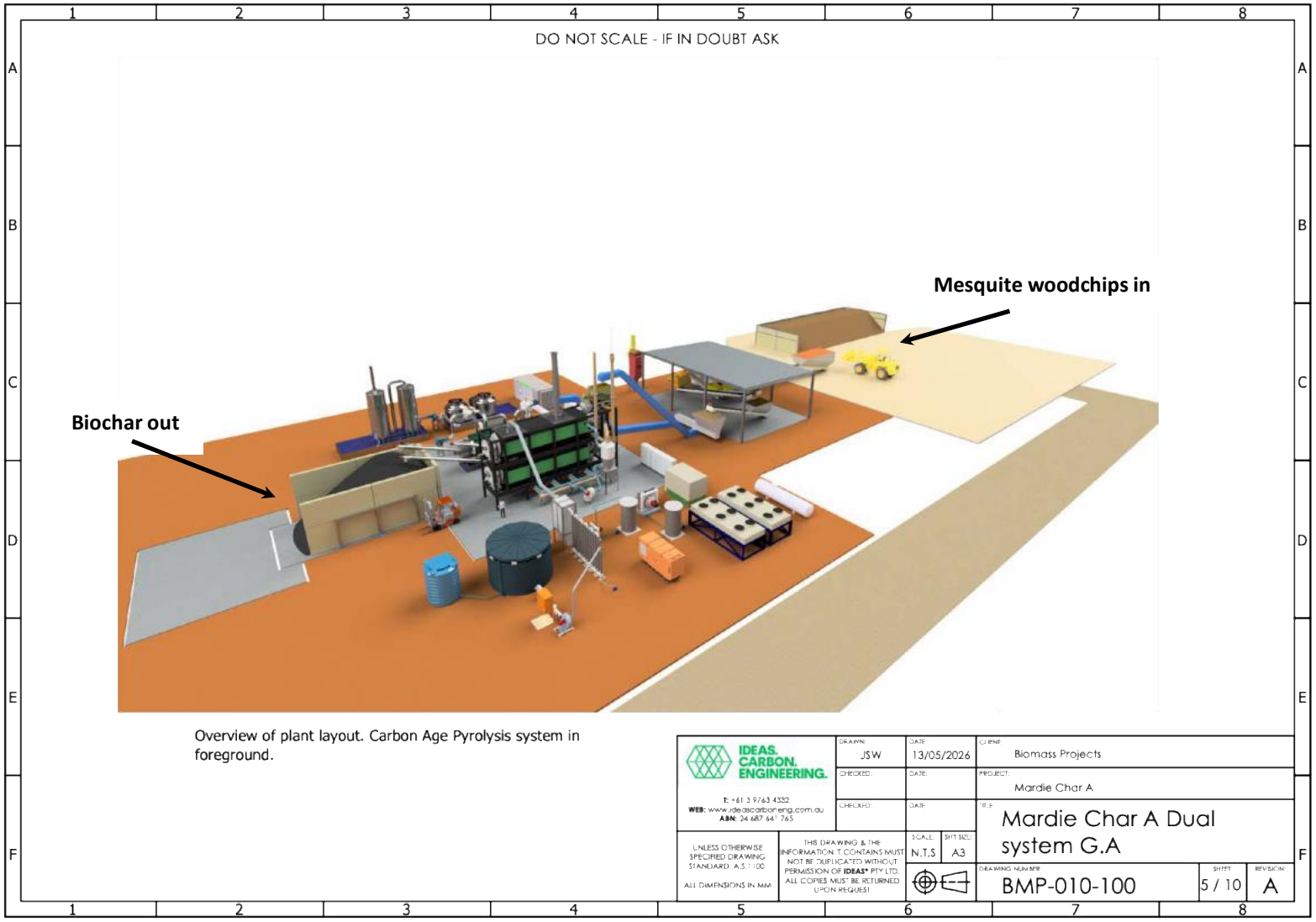


Figure 11. Proposed Mardie A Pyrolysis Plant

Biochar from the Mardie A Stage 1 development will be applied back onto Mardie Station as part of the land rehabilitation program. In addition, partnerships are proposed with research organisations to investigate soil carbon permanence, carbon modelling and broader agricultural applications within Western Australia.

Subject to the successful demonstration of technical and commercial viability, the infrastructure established as part of Stage 1 is expected to be incorporated into a future larger-scale development. Any expanded development will be subject to separate environmental, planning, native title and land tenure approval processes.

3.4 Mardie A inclusions

The Mardie A proposal includes:

- a defined pilot clearing area targeting dense mesquite infestations (see Figure 3);
- establishment of a processing site adjacent to existing station infrastructure;
- feedstock handling and biomass storage areas;
- pyrolysis unit(s) and supporting plant;
- biochar cooling, handling and storage;
- ancillary infrastructure including power, water, access and hardstand;
- internal haulage between clearing and processing locations using existing station tracks where practicable.

Figure 12 provides an indicative illustration of the size and scale of the proposed Mardie A processing facility. Note that the location illustrated is for comparison purposes (to the Mardie Road yards) only, and **is not the final location of the facility.**

The final location of the facility will be determined through the Development Application and Works Permit approvals processes.



Figure 12. Mardie processing facility (dome shelter) indicative scale comparison [NOT FINAL LOCATION]

3.5 Inter-related approvals

Mardie Pastoral Co Pty Ltd has engaged with State and Commonwealth agencies, including DWER, DPLH, DEED, DPIRD and the Pastoral Lands Board (PLB) since (at least) 2022. The approvals strategy for Mardie A is to pursue standard and transparent approvals pathways where possible, with escalation to EP Act Part IV or EPBC Act processes only if triggered by environmental assessment outcomes.

Approvals applications will be staged in accord with project staging. Cumulative impacts will be addressed at the earliest possibly juncture.

Table 2. Approvals summary

Approval Requirement	Legislation	Agency	Status / Proposed Approach
Clearing Permit	Part V, *Environmental Protection Act 1986* (WA)	DWER	Expected to be required for untargeted native vegetation clearing (eg possible native grasses present under mesquite) unless exemption or referral determination applies.
Works Approval and Operating Licence	Part V, *Environmental Protection Act 1986* (WA)	DWER	EP Act Part V Prescribed Premises Category 37: ***Char manufacturing***: *premises on which wood, carbon material or coal is charred to produce a fuel or material of a carbonaceous nature or of enriched carbon content.*
Pastoral Purposes Assessment / Confirmation	*Land Administration Act 1997* (WA)	DPLH / PLB	Mardie A (Stage 1) activities are understood to be consistent with pastoral purposes. Confirmation of this is sought from DPLH / PLB.
Commonwealth Environmental Approval	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)	DCCEEW	Referral to be considered if potential significant impacts to MNES are identified.
Aboriginal Cultural Heritage	*Aboriginal Heritage Act 1972* (WA)	DPLH	Heritage assessment, avoidance and engagement to be undertaken through the applicable processes.
Native Title / ILUA	*Native Title Act 1993* (Cth)	Relevant parties	Future larger-scale development will require separate ILUA and/or tenure arrangements.
Development Approval	*Planning and Development Act 2005* (WA)	City of Karratha; Regional Development Assessment Panel (RDAP	Development approval per City of Karratha and State / RDAP requirements.
Building Permit	*Building Act 2011* (WA) *Building Regulations 2012* (WA)	City of Karratha	As required for shed construction.

The project has been deliberately structured so that Stage 1 can be assessed on its own merits as a rehabilitation pilot and project feasibility assessment before proceeding to latter stages. Approvals for any future commercial-scale facility/s and for expanded clearing will trigger additional planning, environmental, native title and land tenure approval processes.

4 Aboriginal cultural, heritage and economic outcomes

4.1 Native title and cultural access

The project is being developed in partnership with Wirrawandi Aboriginal Corporation (WAC) and is intended to improve cultural access to areas of Mardie Station that have been restricted by dense mesquite infestation, including along the Fortescue River. Rehabilitation will support Traditional Owner access for cultural activities, heritage protection, environmental stewardship and intergenerational transfer of cultural knowledge.

4.2 Indigenous participation, employment and cultural outcomes

The Mardie A Project is intended to deliver long-term cultural, economic and land management outcomes for the Traditional Owners of Mardie Station. The project will support Traditional Owners to play a leading role in rehabilitation and ongoing management of country through planning, monitoring, rehabilitation works, mesquite control programs and pastoral land management activities.

Key elements of the approach adopted include -

- 49% WAC ownership of Mardie Pastoral Co, the entity holding the pastoral sub-lease;
- 10% WAC ownership of the project operating company;
- direct project payments of $1 per tonne of biomass processed, equating to approximately A$550,000 per annum payable to WAC at full pyrolysis facility development (all stages);
- Indigenous employment and contracting targets of 65% across project activities; and
- WAC participation in future land management, rehabilitation and environmental stewardship activities.

4.3 Aboriginal cultural heritage sites

Registered cultural heritage sites in the vicinity of the Mardie A proposal are illustrated in Figure 13. As part-owner (49%) of Mardie Pastoral Co Pty Ltd, Wirrawandi Aboriginal Corporation, representing the Traditional Owners, has an active and ongoing role in ensuring heritage sites are not impacted by the proposal. Heritage clearances will be obtained if and as required, noting that there are no cultural heritage sites within the Mardie A clearing proposal area.

The Wiruwandi Plain cultural heritage site (ACH-00010351) includes the Mardie homestead location. This is shaded in grey in Figures 13, 14 and 15. The one hectare site Mardie Salt Thalu 01 (ACH-0038619) is located between the proposed clearing area and the Wiruwandi Plain, as shown in Figure 15.

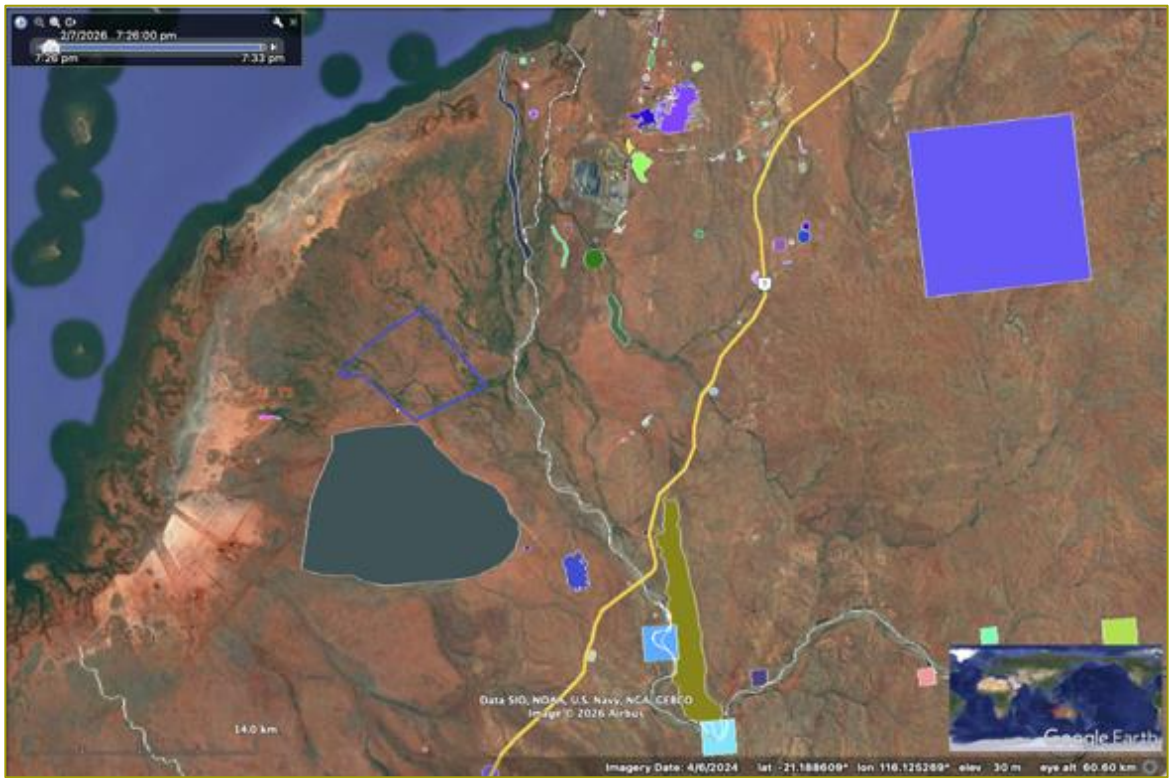


Figure 13. Aboriginal heritage sites near proposal area

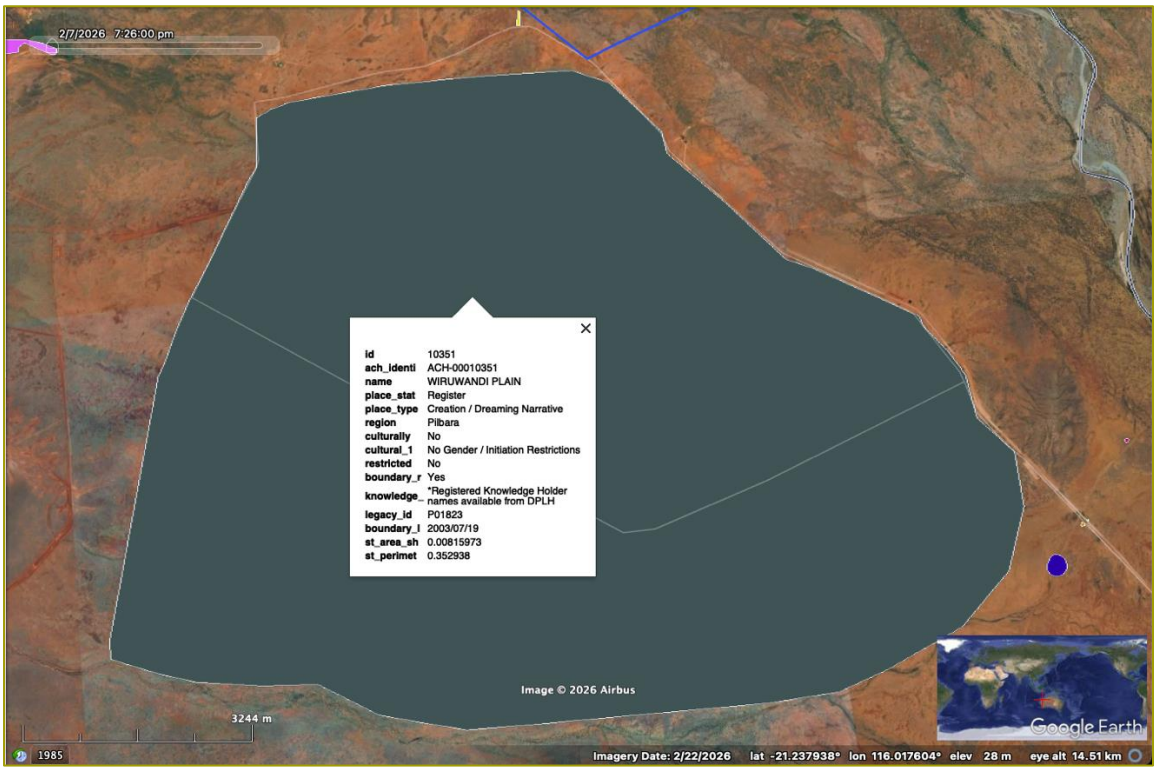


Figure 14. Wiruwandi Plain Cultural Heritage Area (ACH-00010351)

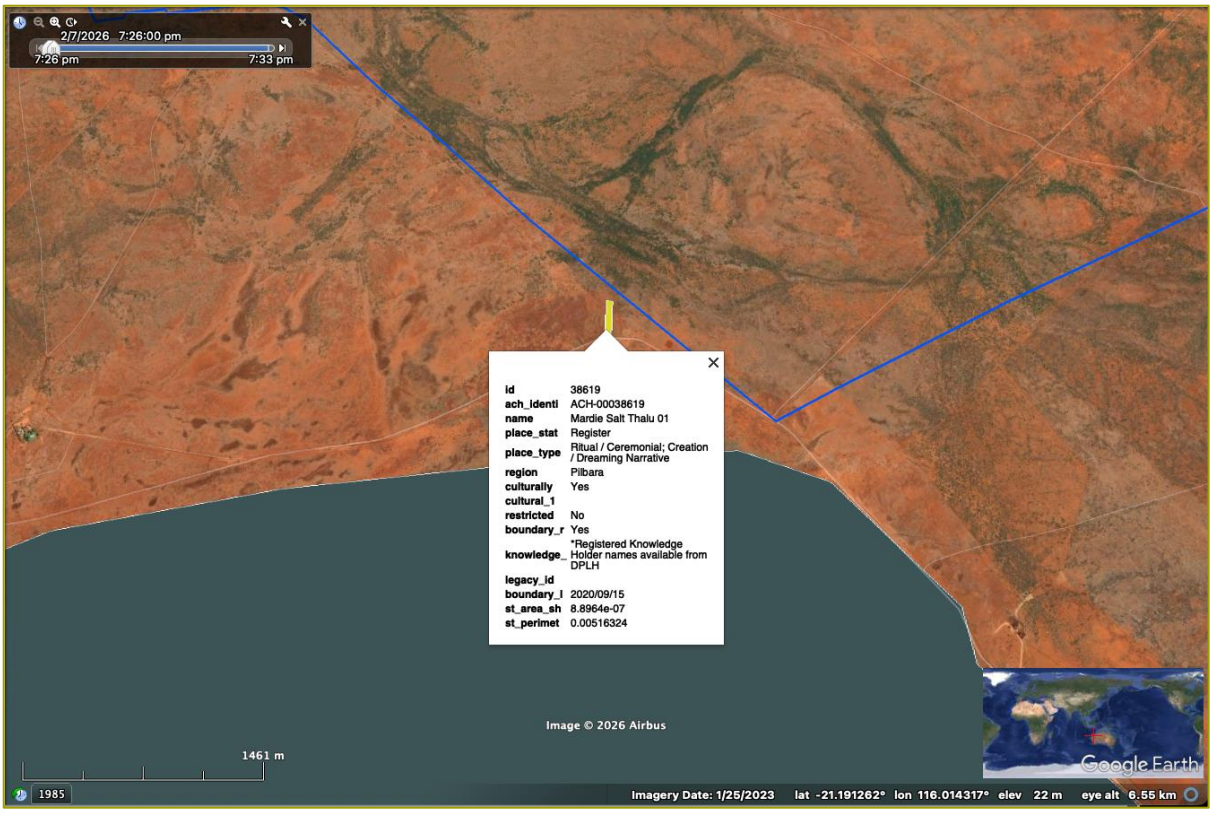


Figure 15. Mardie Salt Thalu 01 Cultural Heritage Area (ACH-00038619)

(Figures 13, 14 and 15 source: DataWA Aboriginal Cultural Heritage Register – DPLH-099 Accessed 13 August 2026)

5 Improved station management and pastoral outcomes

5.1 Pastoral purposes

The primary purpose of Stage 1 is the rehabilitation of mesquite-affected land and the restoration of the long-term pastoral utility of Mardie Station.

The removal of mesquite and ongoing land rehabilitation are fundamental pastoral land management activities directed towards improving the condition, productivity and sustainability of the pastoral lease. Stage 1 has been intentionally designed as a pilot-scale rehabilitation program to demonstrate a practical, environmentally responsible and economically sustainable methodology capable of supporting large-scale mesquite rehabilitation.

A defining feature of Stage 1 is that all biochar and other rehabilitation products generated during the pilot program will be returned to Mardie Station as part of the rehabilitation process and associated research activities.

Mardie Pastoral Co considers that Stage 1 should be assessed according to its primary purpose and intended outcomes. The primary purpose is not the manufacture of commercial products nor the establishment of a permanent industrial development. The primary purpose is rehabilitation.

5.2 Rehabilitation inclusions

Rehabilitation measures will include controlled, selective mesquite removal (parkland clearing) methodologies which retain native perennial vegetation in situ; return of biochar to soil; management of regrowth over time; monitoring of vegetation recovery and soil condition; and adaptive grazing management once recovery thresholds are achieved. The Mardie rehabilitation plan is attached as Appendix B. This plan will be revised and refined with technical specifics throughout the approvals process.

5.3 Supporting infrastructure

On-site infrastructure, as shown in Appendix A, is proposed to support the Mardie A rehabilitation program.

While mesquite removal is clearly directed towards restoring pastoral productivity and land condition, as noted earlier the practical challenge lies in managing the significant volume of biomass generated through landscape-scale rehabilitation activities.

The proposed Mardie A / Stage 1 processing facility is not proposed as a separate industrial land use. Rather, it provides the mechanism through which biomass removed as part of rehabilitation activities can be managed and returned to productive use.

All biochar generated from Stage 1 will be returned to the soil on Mardie Station as part of the rehabilitation and research program.

5.4 Evaluating the use of biochar in landscape-scale soil rehabilitation

A key component of Stage 1 is the application of biochar to rehabilitation areas on Mardie Station as part of a broader program of soil improvement, carbon sequestration and land restoration.

The project will evaluate the role of biochar in improving soil function and supporting long-term rehabilitation outcomes within Pilbara pastoral systems. Trial plots will be established and monitored to assess soil carbon accumulation and persistence, soil moisture retention, nutrient retention and cycling, pasture establishment and productivity, soil biological activity and longer-term rehabilitation outcomes.

Mardie Pastoral Co is in discussion with WA-based research organisations to develop a scientifically robust research program focused on soil carbon permanence and biochar performance in Western Australian soils.

5.5 Pastoral management and long-term rehabilitation monitoring and maintenance

The successful rehabilitation of Mardie Station will require more than the removal of mesquite. The long-term objective is the restoration of a productive, sustainable pastoral enterprise capable of maintaining healthy grassland systems and preventing reinfestation of mesquite across the property.

A significant challenge is the longevity of the mesquite seedbank. Mesquite seed may remain viable within the soil profile for several decades, with viability reported for periods approaching fifty years. Rehabilitation must therefore be considered as a long-term land management program rather than a one-off clearing exercise.

Experience from previously cleared areas on Mardie indicates that reinfestation can be prevented where groundcover is maintained and grazing pressure is appropriately managed. Healthy perennial grass cover is expected to play a critical role in suppressing mesquite establishment.

Rather than operating primarily as a breeder herd enterprise, Mardie Pastoral Co anticipates transitioning towards a seasonal agistment model focused on younger cattle. Stock numbers can be adjusted in response to seasonal conditions, pasture availability and land condition objectives.

Additional pastoral infrastructure may include strategic fencing, watering points, laneways and associated infrastructure designed to improve livestock distribution and facilitate rotational grazing.

5.6 Rehabilitation success criteria

The success of Stage 1 will be assessed by reference to measurable rehabilitation, pastoral management and land condition outcomes. Proposed success criteria are provided in Table 3.

Table 3. Proposed rehabilitation success criteria

Rehabilitation Outcome	Success Criteria	Indicative Measure / Evidence
Mesquite removal and suppression	Mesquite is progressively removed from the approved Stage 1 pilot rehabilitation area and regrowth is actively controlled.	Area cleared; mapped reduction in density; drone/satellite monitoring; field records; treatment logs.
Prevention of reinfestation	Mesquite seedlings and regrowth remain at a level capable of being managed through targeted intervention.	Regular monitoring; early identification of regrowth; chemical or mechanical treatment records.
Groundcover establishment	Perennial grasses and desirable groundcover are re-established to reduce bare ground and suppress mesquite recruitment.	Groundcover percentage; perennial grass cover; photo-point monitoring; RCM-style assessments.
Soil stability and erosion control	Rehabilitated areas show improved soil surface stability and reduced wind and water erosion risk.	Reduced bare ground; stable soil surface; absence of significant rilling, scalding or erosion channels.
Biochar application and soil improvement	Biochar produced during Stage 1 is returned to Mardie soils and incorporated into rehabilitation trial areas.	Application records; trial plot establishment; soil sampling; monitoring of carbon, moisture and nutrients.
Pasture productivity and pastoral utility	Rehabilitated land progressively returns to a condition capable of supporting sustainable pastoral use.	Pasture availability; improved access; capacity to support controlled seasonal grazing once thresholds are met.
Adaptive grazing management	Grazing pressure is managed to maintain groundcover and reduce reinfestation risk.	Grazing plans; stocking records; seasonal/agistment-based management; fencing and water infrastructure.
Cultural access and land stewardship	Rehabilitation improves access to culturally significant areas and supports Traditional Owner participation.	Access improvements; Wirrawandi participation; ranger, monitoring or contractor involvement.
Research and knowledge generation	Stage 1 generates data relevant to biochar performance, soil carbon permanence and rehabilitation outcomes.	Research partnerships; trial design; soil carbon modelling; reports on biochar performance and rehabilitation outcomes.
Regulatory and pastoral compliance	Rehabilitation outcomes are consistent with pastoral lease management obligations and regulator expectations.	Alignment with PLB expectations; permit compliance; annual reporting; adaptive management records.
Future scalability	Stage 1 provides data to inform future rehabilitation stages and approvals pathways.	Stage 1 completion report; lessons learned; refined methodology; updated risk assessment.

Mardie A has been intentionally designed as a pilot project that must demonstrate technical, environmental and rehabilitation success before any future expansion is considered. Success in rehabilitation and pastoral productivity improvements will dictate progression to the next stages of the broader project. Minimum requirements to proceed to subsequent stages are provided in Table 4:

Table 4. Decision gateways: Mardie Char Project

Decision Gate	Demonstration Requirement
Decision Gate 1 – Rehabilitation Success	Demonstrate that mesquite can be removed efficiently while retaining desirable vegetation and supporting landscape recovery.
Decision Gate 2 – Environmental Performance	Demonstrate acceptable environmental outcomes including management of emissions, water, soils, biodiversity and rehabilitation areas.
Decision Gate 3 – Pastoral Outcomes	Demonstrate improvement in pastoral land condition and establishment of long-term management systems capable of reducing reinfestation risk.
Decision Gate 4 – Biochar Research Outcomes	Demonstrate whether biochar application provides measurable benefits for soil condition, carbon storage, vegetation establishment and pastoral productivity.
Decision Gate 5 – Future Development Assessment	Only after successful completion of Stage 1 would consideration be given to any future commercial-scale development.

5.7 Contingency should pilot not meet target outcomes

The purpose of Stage 1 is to test and validate the rehabilitation methodology. Should Stage 1 fail to demonstrate acceptable rehabilitation, environmental, pastoral or commercial outcomes, the project would not automatically progress to any subsequent stage. However, it is noted that should the pilot not prove viable, Mardie Pastoral Co Pty Ltd as sub-lessees will ensure that

- rehabilitated areas continue to be managed in accordance with pastoral lease obligations;
- mesquite regrowth is actively monitored and controlled;
- monitoring and rehabilitation obligations associated with Stage 1 approvals will continue to be met;
- existing infrastructure will be decommissioned, repurposed or managed in accordance with regulatory requirements and approvals; and
- lessons learned will be incorporated into future land management programs.

6 Public interest outcomes

The Mardie A Project will deliver benefits that extend beyond the rehabilitation of Mardie Station, and contribute to broader environmental, agricultural, economic, scientific and social outcomes for Western Australia.

The project will facilitate the rehabilitation of one of Australia's largest and most significant infestations of mesquite. Through progressive removal and restoration of productive grassland systems, it will improve land condition, reduce the risk of further spread into neighbouring pastoral leases and provide a practical demonstration of landscape-scale rehabilitation of invasive woody weeds.

The project will generate new scientific knowledge through collaboration with Western Australian research institutions and government agencies, including research into soil carbon permanence, biochar performance, rehabilitation outcomes and long-term land management.

6.1 Advancement of biochar technology and agricultural innovation

A significant public benefit which from Stage 1 is the opportunity to demonstrate and validate an Australian-developed biochar production technology with the potential to materially reduce the cost of biochar manufacture, relative to conventional production systems.

Reducing the cost of biochar production is important because cost remains one of the principal barriers to widespread adoption of biochar solutions for biomass management within Australian agriculture and industry.

6.2 Benefits for Western Australian agriculture

Western Australia may be uniquely positioned to benefit from advances in biochar technology. Many regions of the State have experienced declining rainfall and increasing climate variability over recent decades. At the same time, large areas of Western Australia's agricultural zone are characterised by sandy soils with low levels of organic carbon, limited water-holding capacity and increasing pressure on agricultural productivity.

These factors create conditions in which improvements in soil carbon, soil structure and water retention may provide substantial agricultural benefits. Biochar has been identified globally as a potential tool for improving soil carbon levels, water holding capacity, nutrient retention, fertiliser efficiency, drought resilience and long-term soil productivity. However, widespread adoption has been limited by the cost of production. Through proposed collaboration with Western Australian research institutions, Mardie A will generate locally relevant data regarding the performance of biochar under Western Australian climatic and soil conditions.

A key objective of the Mardie A pilot is to demonstrate a lower-cost biochar production technology that has the potential to reduce production costs by approximately 60% when compared with conventional systems. If demonstrated successfully, the technology may help establish the commercial foundations for a future Western Australian biochar industry linked to sustainable agriculture, environmental rehabilitation, carbon management, agricultural by-product utilisation and regional manufacturing and processing.

6.3 Circular economy

The technology and knowledge developed and trialled through Stage 1 will have broader application to biomass resources across Australia, including agricultural residues, forestry by-products, other organic streams that currently have limited commercial use pathways.

6.4 Economic outcomes

The Mardie Char Project is expected to deliver a range of direct and indirect economic benefits to Western Australia, particularly regional communities within the Pilbara. The outcomes include -

- increased pastoral productivity through rehabilitation of mesquite-affected land;
- new Indigenous employment and contracting opportunities;
- regional construction and operational employment;
- local procurement of goods and services;
- research partnerships with Western Australian universities and government agencies;
- investment in regional infrastructure and land management capacity;
- development of new skills associated with rehabilitation, environmental monitoring and carbon-based agricultural technologies; and
- a foundation for future biochar production and land rehabilitation industries within Western Australia.

6.5 Carbon removal market and project funding model

The long term outlook for the Mardie Char Project is underpinned by the emerging global market for durable carbon dioxide removal. This market supports projects that remove carbon dioxide from the atmosphere and store it in a durable form, subject to independent certification, monitoring and verification.

In the case of Mardie A, mesquite biomass removed as part of the rehabilitation program will be processed through pyrolysis to produce biochar. Pyrolysis heats biomass in a low-oxygen environment, converting the majority of the carbon contained in the biomass into a stable carbon-rich material. When applied to soil or otherwise stored in accordance with an approved methodology, biochar can support long-term carbon storage while also providing potential soil improvement benefits.

The relevance of the carbon removal market to Mardie A is that it provides the mechanism to fund rehabilitation at a scale that would otherwise be unviable and unachievable. The project is not being advanced because mesquite biomass has a conventional commercial value sufficient to justify removal. Rather, the value arises because the project can convert a declared pest biomass into a durable carbon storage product and thereby generate certified carbon removal outcomes – which in turn pay for the rehabilitation.

Mardie Pastoral Co considers that, without a viable carbon removal revenue pathway, landscape-scale mesquite removal and rehabilitation will not be achievable. Conventional pastoral operations alone do not generate sufficient returns to fund the removal and long-term management of the infestation. The carbon removal market therefore enables a land management outcome that would not otherwise be economically achievable.

Stage 1 will test the operational, environmental and rehabilitation assumptions that underpin this funding model. It will assess whether mesquite can be removed, processed

into biochar, returned to Mardie soils and incorporated into a broader rehabilitation program in a commercially viable way that supports long-term pastoral outcomes.

The purpose remains the restoration of Mardie Station as a productive, sustainable pastoral landscape with improved groundcover, reduced mesquite dominance, enhanced cultural access and long-term management systems capable of preventing reinfestation.

Any claims regarding certified carbon removal, carbon credit generation or carbon market revenue will be managed separately from the statutory assessment of environmental impacts. This approach ensures that the approvals pathway remains focused on land rehabilitation, environmental management and pastoral outcomes, while recognising that carbon removal revenue is the mechanism that makes the rehabilitation program possible.

6.6 Summary of public interest outcomes

The Mardie A project will:

- Commence the rehabilitation of one of Australia's largest mesquite infestations;
- Assess options for the restoration of degraded pastoral land and productive grassland systems;
- Deliver Aboriginal employment, contracting and long-term land management opportunities;
- Improved Traditional Owner access to culturally significant areas;
- Develop WA's biochar research capability;
- Demonstrate lower-cost Australian biochar production technology;
- resilience in agricultural regions;
- Demonstrate opportunities for sustainable biomass utilisation;
- Generate data supporting future carbon storage and soil management policies;
- Potentially establish a future biochar industry within WA; and
- Demonstrate a scalable rehabilitation model applicable to other invasive woody weed infestations across Australia.

7 EP Act Part V Clearing permit

Mardie A is proposed as a discrete Stage 1 pilot within the broader Mardie Char Project and is intended to progress under a Part V approvals pathway in the first instance, noting that the broader and subsequent full-scale project will be subject to separate and more comprehensive assessment as required.

The purpose of the Stage 1 clearing program is to enable a limited pilot rehabilitation area and the associated processing infrastructure required to demonstrate the technical, environmental and operational feasibility of the project under Pilbara conditions. The proposed approach is to seek a transparent and conservative permit pathway rather than relying on broad assumptions about exemption.

A Part V *Environmental Protection Act 1986* (WA) s.51DA referral will be lodged, and if required, a s.51E(8) Purpose Permit will be sought through the Department of Water and Environmental Regulation (DWER).

7.1 Clearing area

The stage 1 clearing area is illustrated in Figure 3. Up to 2,966ha is proposed for single-pass removal of the perennial woody weed. *Appendix C Mardie A Stage 1 Clearing and Material Handling Methodology* provides the proposed approach. The purpose of submitting a clearing referral is to ensure that any concerns regarding potential risks to non-target (ie, native) vegetation and fauna are assessed appropriately.

7.2 Priority species and communities

An initial review of the Department of Biodiversity, Conservation and Attractions (DBCA) Threatened and Priority Ecological Communities (TECs / PECs), Threatened Fauna and Threatened Flora databases indicated no known records on or in the immediate vicinity of the proposed pilot site. Regional records of listed species and TECs or PECs are indicated in Figures 16, 17 and 18.

Conservation categories referenced in Figures 16, 17 and 18 are summarised in Table 5.

Table 5. Summary of Conservation Codes used in Western Australia

Code	Category	Basis	Definition (summarised)
T	Threatened ecological community (TEC)	s. 27(1) *Biodiversity Conservation Act 2016* (BC Act); rediscovered communities under s. 33	An ecological community listed as critically endangered, endangered or vulnerable, assessed against the BC Act listing criteria, Ministerial Guidelines Nos 1 and 4, and the IUCN Red List of Ecosystems Categories and Criteria.
CR	Critically endangered ecological community	s. 27(1)(a) BC Act; criteria at s. 28 and ministerial guidelines	Faces an **extremely high** risk of becoming eligible for listing as a collapsed ecological community in the **immediate future**.
EN	Endangered ecological community	s. 27(1)(b) BC Act; criteria at s. 29 and ministerial guidelines	Faces a **very high** risk of becoming eligible for listing as a collapsed ecological community in the **near future**.
VU	Vulnerable ecological community	s. 27(1)(c) BC Act; criteria at s. 30 and ministerial guidelines	Faces a **high** risk of becoming eligible for listing as a collapsed ecological community in the **medium-term future**.
CO	Collapsed ecological community	s. 31(1) BC Act (Ministerial order); criteria at s. 32	Listed where there is no reasonable doubt that the last occurrence of the community has collapsed, or the community has been so extensively modified throughout its range that no occurrence is likely to recover its species composition and/or structure.
P1	Priority 1: Poorly known ecological communities – very few occurrences, very restricted distribution	DBCA Priority Ecological Communities list (administrative; not a BC Act listing category)	Known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100 ha). Occurrences believed to be under threat due to limited extent or location on lands under immediate threat (e.g. agricultural or pastoral lands, urban areas, active mineral leases) or where current threats exist. May include comparatively well-known communities that do not meet adequacy-of-survey requirements and appear under immediate threat across their range.
P2	Priority 2: Poorly known ecological communities – few occurrences, restricted distribution	DBCA Priority Ecological Communities list	Known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. May include comparatively well-known communities that do not meet adequacy-of-survey requirements and are under known and described threats.
P3	Priority 3: Poorly known ecological communities – inadequately surveyed	DBCA Priority Ecological Communities list	Comparatively well-known from several localities but not meeting adequacy-of-survey requirements, with known threatening processes. Three sub-categories: (i) several to many occurrences, a significant number or area of which are not under threat; (ii) a few widespread occurrences, either large or with significant remaining habitat, much not under imminent threat; (iii) large and/or widespread occurrences under threat of modification across much of their range (e.g. grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change).
P4	Priority 4: Adequately known ecological communities – rare, near threatened, or recently removed from the threatened list	DBCA Priority Ecological Communities list	Adequately known communities requiring regular monitoring. Three sub-categories: (i) rare – few occurrences, adequately surveyed, not currently threatened or in need of special protection, but could be if circumstances change (usually represented on conservation lands); (ii) near threatened – adequately surveyed, not conservation dependent, but close to qualifying for a higher threat category; (iii) communities removed from the threatened list during the past five years.

[Source: Department of Biodiversity, Conservation and Attractions (DBCA), *Conservation Category Definitions for Western Australian Ecological Communities*, updated 9 December 2025. Statutory categories are established under the *Biodiversity Conservation Act 2016* (WA) (BC Act)].

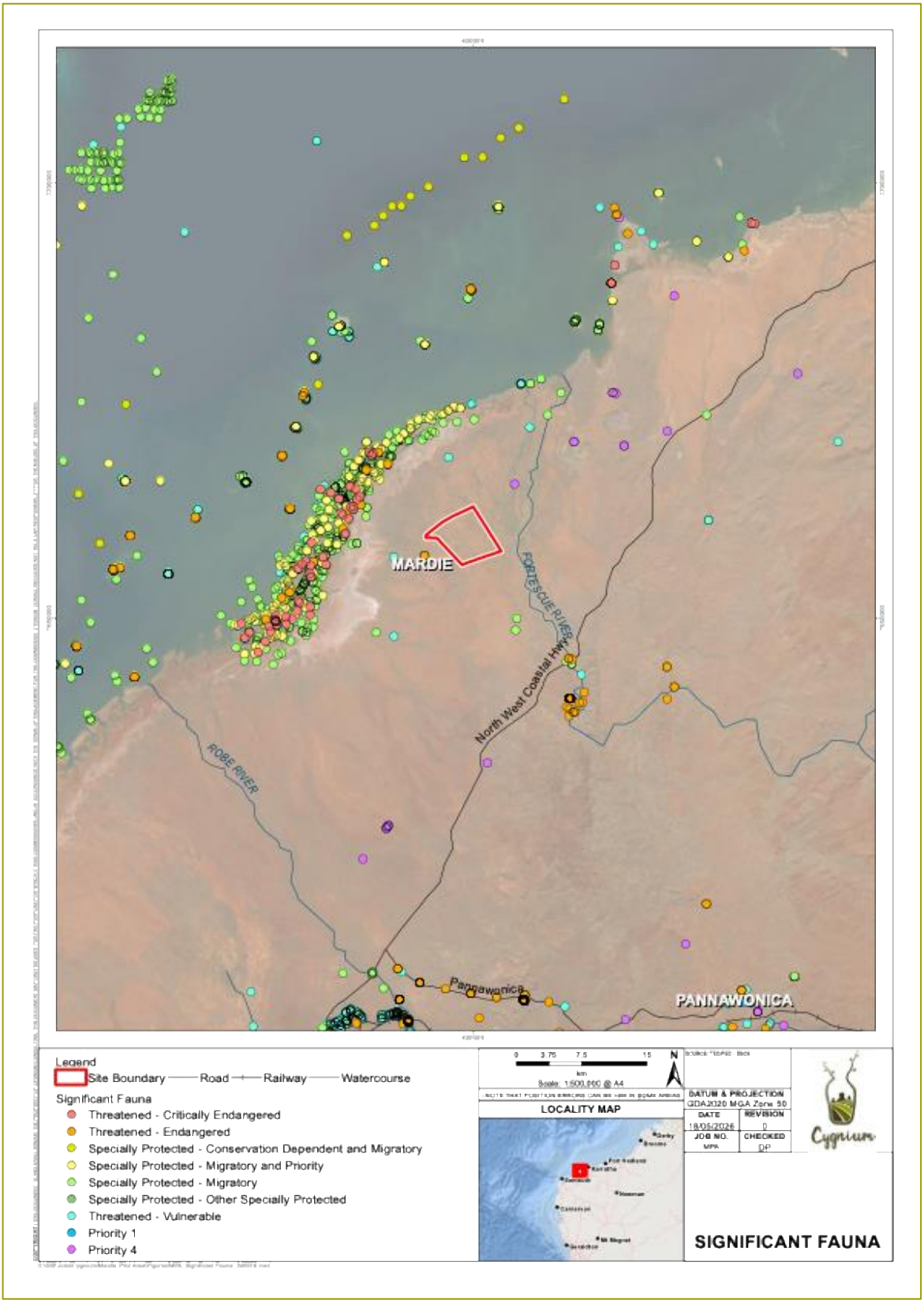


Figure 16. Significant fauna in the vicinity of Mardie A

[Data source: Department of Biodiversity, Conservation and Attractions (2024) Threatened and Priority Database Search for Mardie Station, accessed on 14 February 2024. Prepared by the Species and Communities Program for Ecosystem Solutions Pty Ltd on behalf of Mardie Pastoral Co Pty Ltd and Biomass Projects Pty Ltd.]

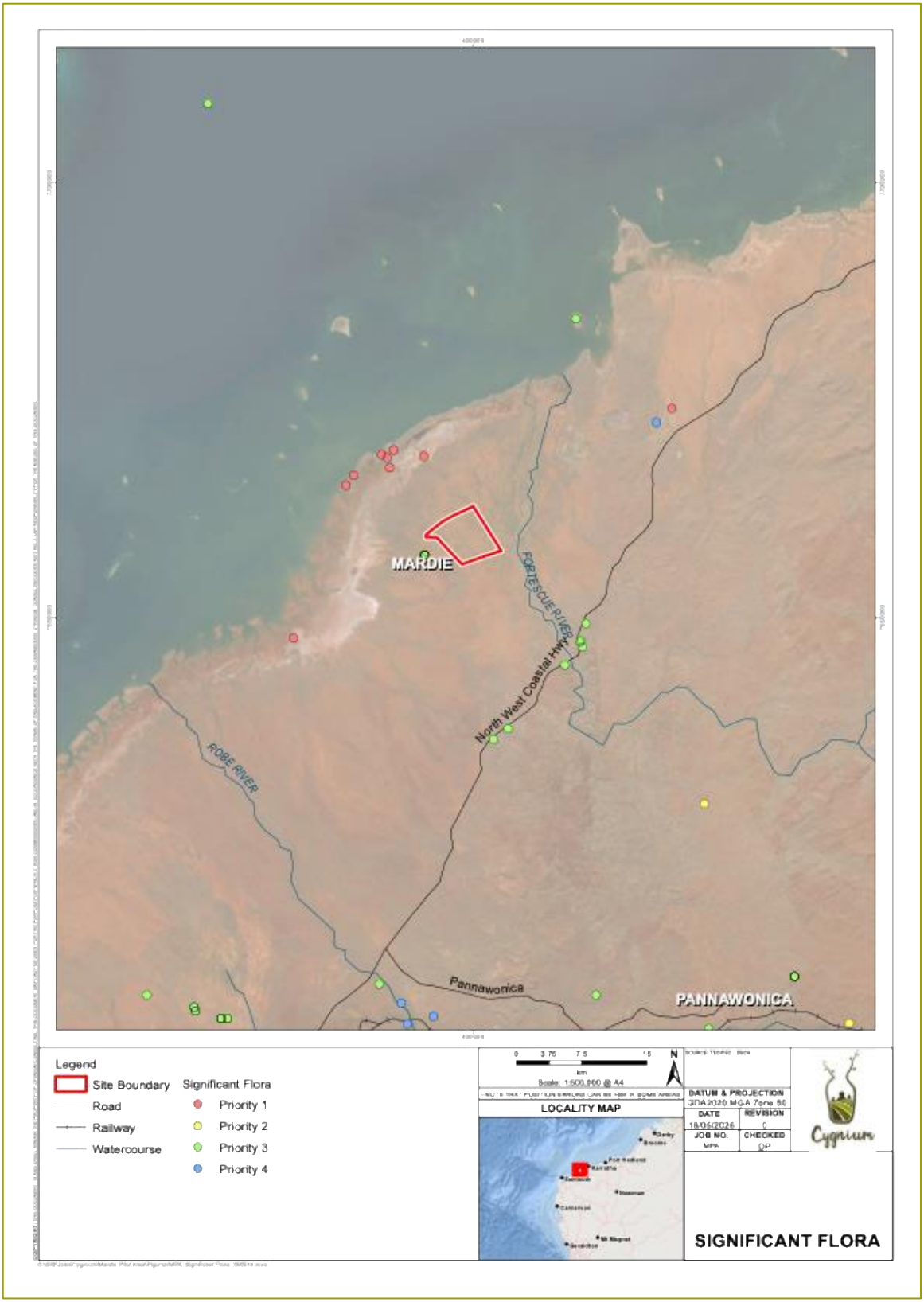


Figure 17. Significant flora in the vicinity of Mardie A

[Data source: Department of Biodiversity, Conservation and Attractions (2024) Threatened and Priority Database Search for Mardie Station, accessed on 14 February 2024. Prepared by the Species and Communities Program for Ecosystem Solutions Pty Ltd on behalf of Mardie Pastoral Co Pty Ltd and Biomass Projects Pty Ltd.]

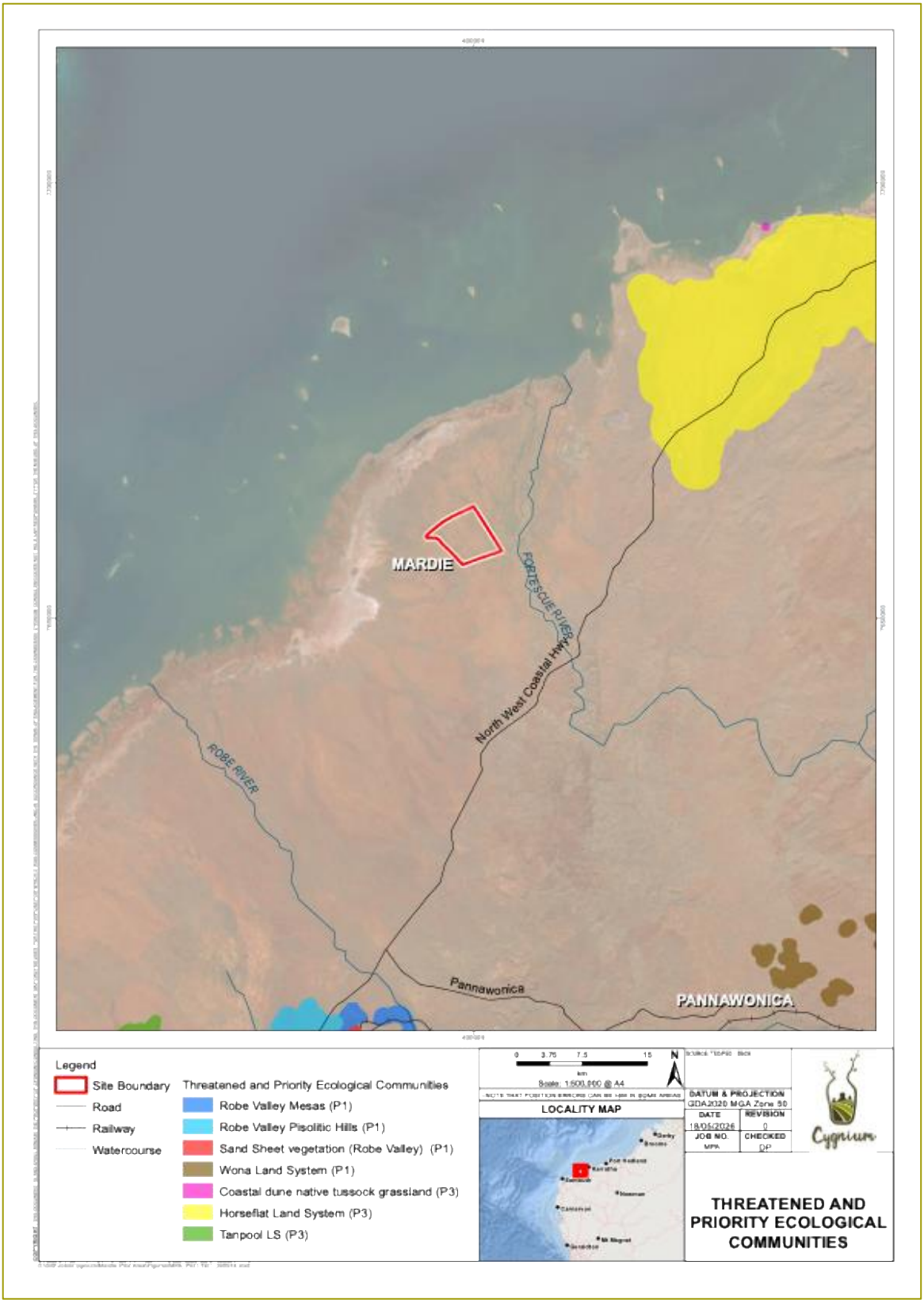


Figure 18. TECs and PECs in the vicinity of Mardie A

[Data source: Department of Biodiversity, Conservation and Attractions (2024) Threatened and Priority Database Search for Mardie Station, accessed on 14 February 2024. Prepared by the Species and Communities Program for Ecosystem Solutions Pty Ltd on behalf of Mardie Pastoral Co Pty Ltd and Biomass Projects Pty Ltd.]

The Mardie A Project rehabilitation site has been selected to avoid direct risk exposure to known TECs, PECs and priority species. MPC and BMP will draw on existing environmental studies in undertaking any required additional surveys and assessments. This includes work undertaken by and for the BCI Minerals Mardie Salt project, and the Pilbara Mesquite Management Committee. Species presence likelihood is summarised in Table 6

Table 6. Summary of assessment of likelihood of presence of BC Act Threatened and Priority Species

Species	BC Act	Assessment of likelihood of occurrence at pilot site
Night parrot (*Pezoporus occidentalis*)	CR	Unlikely. *Triodia* (spinifex) habitat is limited in the proposal area. Targeted acoustic survey of 21 nearby sites (December 2017 – March 2018; ~ 330 recording nights) detected no calls. The Phoenix Environmental fauna survey report prepared for BCI Minerals concluded it is 'reasonable to assume the species is not present' (Phoenix 2020b, pp. 55-56; EPA Report 1704, p. 62). The pilot area itself is unsurveyed as access is very limited due to the presence of dense thorny mesquite.
Eastern curlew (*Numenius madagascariensis*)	CR	Unlikely within pilot area (no intertidal habitat).
Curlew sandpiper (*Calidris ferruginea*)	CR	Unlikely, as above. Possible transient use of ephemeral wetlands after rainfall.
Australian painted snipe (*Rostratula australis*)	EN	Possible (low). Transient use of vegetated clay areas following significant rainfall. Rehabilitation of vegetation to reduce mesquite dominance should assist in returning habitat suitability for listed bird species.
Northern quoll (*Dasyurus hallucatus*)	EN	Possible, however denning habitat (rocky terrain) is absent from the alluvial plain. Foraging along riparian corridors is possible within 1km of denning habitat, however neither are present in the pilot proposal area. The nearest denning-prospective habitat identified in available fauna surveys is 10-13 km SSE and all reliable DBCA records exceed 18km away.
Red goshawk (*Erythrotriorchis radiatus*)	EN	Unlikely. Very sparse Pilbara records of this species, noting that the project area would provide marginal habitat at best.
Grey falcon (*Falco hypoleucos*)	VU	Likely (foraging). Wide-ranging over the pastoral plain; possible breeding in mature riparian trees along the Fortescue River (not in the pilot area). Mardie's tussock and hummock grassland plains and drainage lines are typical foraging habitat. Species recorded twice during the 2019-2021 Mardie Optimisation Area surveys (once over cleared land/woodland-over-shrubland and once over tussock grassland, and considered likely to be nesting on a communications tower close to Mardie Homestead (Phoenix 2021b, pp. ii, 70–71). Georeferencing of Phoenix 2021b Figure 5-3 (p. 48) places one record at or immediately adjacent to the Mardie pilot area's western boundary (positional uncertainty ±100 m). The DBCA extract holds one regional record (2018, ~40km to the NE).
Australian fairy tern (*Sternula nereis nereis*)	VU	Unlikely within pilot area. The species is a coastal/island breeder, therefore breeding within the buffer applied in the PMST is likely but not in the pilot area.
Pilbara olive python (*Liasis olivaceus barroni*)	VU	Possible occurrence, but not recorded by Phoenix Environmental (2020b) in nocturnal surveys at nearby Mardie Pool (~4km west of the pilot area). The Pilbara olive python prefers permanent pools and rocky/riparian habitat. There is potential for occurrence along major drainage lines which are not present in the pilot area, but are known in other areas of Mardie Station.

Species	BC Act	Assessment of likelihood of occurrence at pilot site
Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form)	VU	Likely occasional / transient nocturnal foraging. There are no roost habitat (caves/mines) within pilot area. Confirmed present (foraging) on Mardie Station. Recorded acoustically at Mardie Pool and at a flowing creek line ~10 km south of the pilot area (Phoenix 2020b, pp. 54). The DBCA fauna extract contains 24 records, the nearest being ~4km west (2018, acoustic, SM04-02) and 11km (2018), plus records from 2015 approximately 24 km away. *Triodia* (spinifex/hummock) grassland and shrubland-over-spinifex provide foraging habitat.
Ghost bat (*Macroderma gigas*)	VU	Possible foraging may occur. There is no suitable roost habitat (caves, rocky outcrops) in or adjacent to the Mardie A pilot area. Foraging overflight is conceivable but the pilot does not exhibit significant habitat for ghost bats.
Greater bilby (*Macrotis lagotis*)	VU	Possible (low likelihood). Not identified in EPBC PMST matters (see section 10).
Red knot (*Calidris canutus*)	EN	Unlikely to occur in project area. Species is an intertidal specialist. Presence is possible on the buffer coastline only.

Further species discussion is provided in Section 10 in relation to the EPBC-listed MNES, which largely correspond with WA BC Act species listings.

Appendix D provides an annotated bibliography of relevant local surveys and other environmental assessment reports which have informed the clearing risk analysis for the Mardie A pilot area planning. The analysis is presented holistically, taking into account other environmental risk and management matters such as fire.

8 Geophysical attributes and risks

The Mardie A pilot area occurs within alluvial and floodplain landscapes that have historically supported productive pastoral grasslands and now support dense mesquite growth.

The risk assessment in this section draws on available documentation including -

- Clearing and Material Handling Methodology (August 2026) attached in Appendix C;
- BCI Minerals Mesquite Management Plan (Rev 4, 2023);
- surface water assessments undertaken by RPS for BCI Minerals (2020);
- flood studies undertaken by Advisian for BCI Minerals (2021);
- hydrogeological assessments completed by AQ2 for BCI Minerals (2020–2023);
- BCI Mineral's *Groundwater Monitoring and Management Plan Rev P* (2025);
- Phoenix flora/vegetation surveys;
- DBCA data extracts (2024); and
- Pastoral Lands Board Good Pastoral Land Management Guidelines (2020).

8.1 Soils and landforms

Table 7 provides a summary description of the soils and landforms present in and around the Mardie A pilot area.

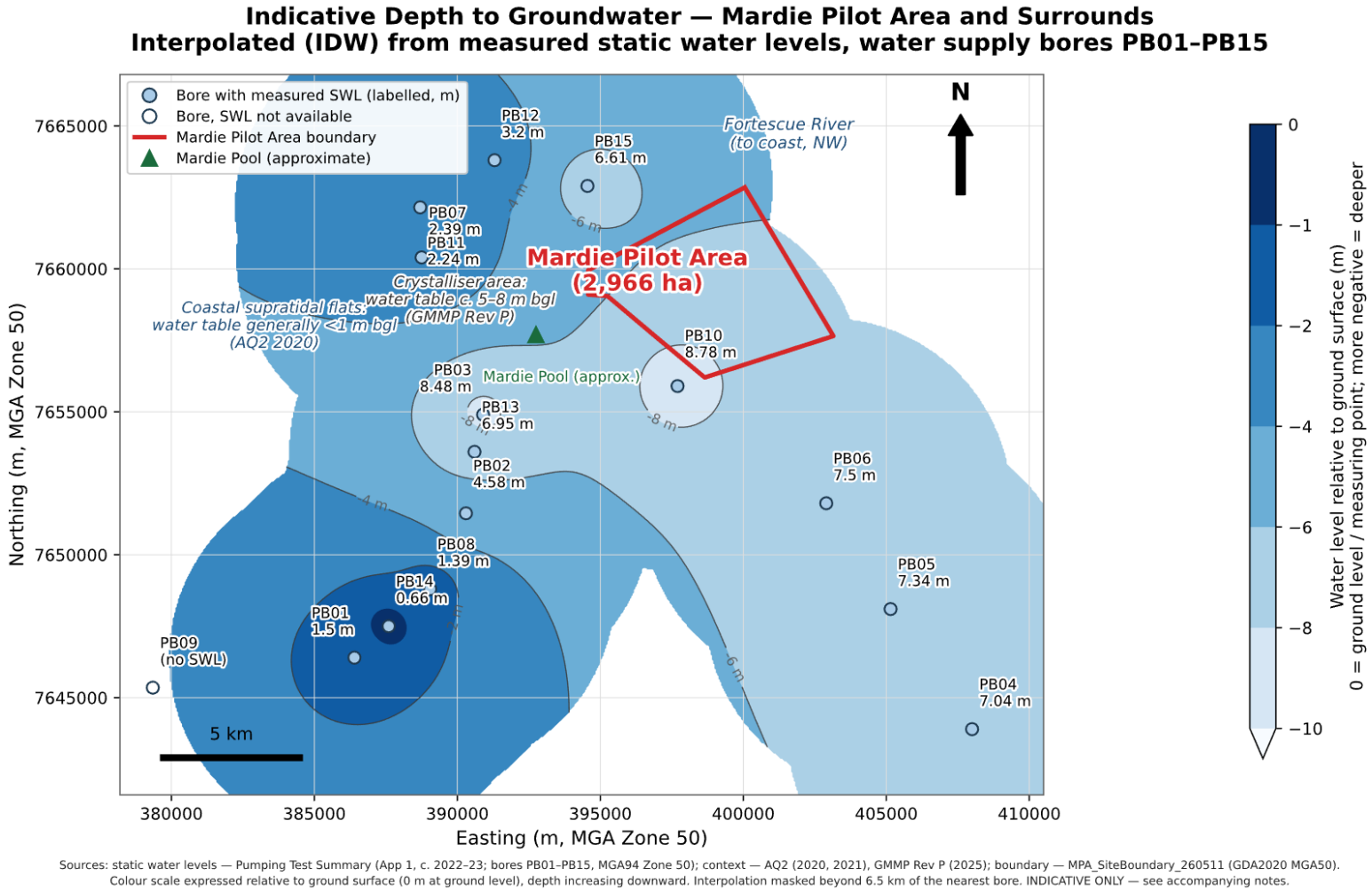
Table 7. Soils and landforms description

Aspect	Description	Detail and sources
Land systems and landforms	Yamerina system flood plains and deltaic deposits (tussock grasslands and woodlands, buffel-invaded) dominate the western/central plains; Horseflat system weakly gilgaied alluvial clay plains (Roebourne Plains grass *Eragrostis xerophila* tussock grassland, a potential P3 PEC) cross the corridor; sandy plains and low dunes with *Triodia* hummock grassland; minor drainage floors. Rocklea basalt hills lie >10km km south-east of the proposed pilot area	Pilot site soils are dominated by red-brown sandy loams and loamy sands on plains and floodplains; alluvial red clay loams and cracking/gilgaied clays on the Horseflat plains; orange-brown sands on rises and dunes; silty/sandy clay alluvium on drainage floors. *Sources: Phoenix 2020a/Appendix 4 (site descriptions); Supplementary Report Part 2 (land systems, p. 154); TPFL/WAHerb habitat notes.*
Erosion susceptibility	Wind erosion risk is high on fine sandy plains and dunes when groundcover is removed (including from dry season winds and cyclonic gusts). Sheet and rill water erosion is possible on floodplains under intense cyclonic rainfall. Gullying can occur in disturbed drainage lines.	Gilgai clay plains are trafficking-sensitive when wet (compaction, rutting, structural decline) and set hard when dry. Cryptogamic/biological soil crusts on interfluves resist wind erosion and are lost under blade disturbance. Grazing- and mesquite-degraded condition means groundcover is already patchy in the pilot area.
Soil degradation processes relevant to mesquite clearing	Stick-raking extracts rooting systems and disturbs the top 10-30cm of soil. Mesquite seed-bearing soil requires separate handling under the Mesquite Management Plan. Machinery traffic compaction risk if multiple passes occur.	Mesquite bares the soil beneath dense canopies and outcompetes native grasses. Staged removal with grass recovery, along with the return of biochar is expected to improve infiltration, soil carbon and land condition consistent with the Good Pastoral Land Management Guidelines (PLB 2020).

8.2 Groundwater

The Fortescue River alluvial aquifer, receiving an average annual recharge ~ 11 GL,underlies the plains north and north-east of the Mardie A Pilot Area, with a fresh lobe (<1,000 mg/L TDS) grading saline coastward. Salinity ranges from fresh–brackish (~196 mS/m) in Fortescue alluvium bores, to hypersaline (up to 23,700 mS/m) toward the coast. Mardie Pool, located approximately 4km west of the Mardie A Pilot Area, is sustained year round by a freshwater lens and base groundwater inflow at EC 37-96 mS/m.

Drawn from available 2019-2023 groundwater monitoring reports prepared for BCI Minerals, and illustrated in Figure 19, groundwater data from across Mardie indicate a water table around 7-8 metres below ground level in the Pilot Area:



Sources: static water levels — Pumping Test Summary (App 1, c. 2022–23; bores PB01–PB15, MGA94 Zone 50); context — AQ2 (2020, 2021), GMMP Rev P (2025); boundary — MPA_SiteBoundary_260511 (GDA2020 MGA50).
Colour scale expressed relative to ground surface (0 m at ground level), depth increasing downward. Interpolation masked beyond 6.5 km of the nearest bore. INDICATIVE ONLY — see accompanying notes.

Figure 19. Indicative depth to groundwater around Mardie A Pilot Area

Bore PB10, within the Mardie A Pilot Area, recorded a static water level of 8.78m in the fresh–brackish Fortescue alluvium (EC 220 mS/m), and PB15 at the MPA north-west corner recorded 6.61m (EC 196 mS/m). Both were measured during constant-rate test pumping of the water supply borefield in 2022-23 (Mardie Minerals Pty Ltd, 2023). More recent data were not available at the time of preparation of this document.

Figure 20 illustrates groundwater salinity range in the vicinity of the Pilot Area.

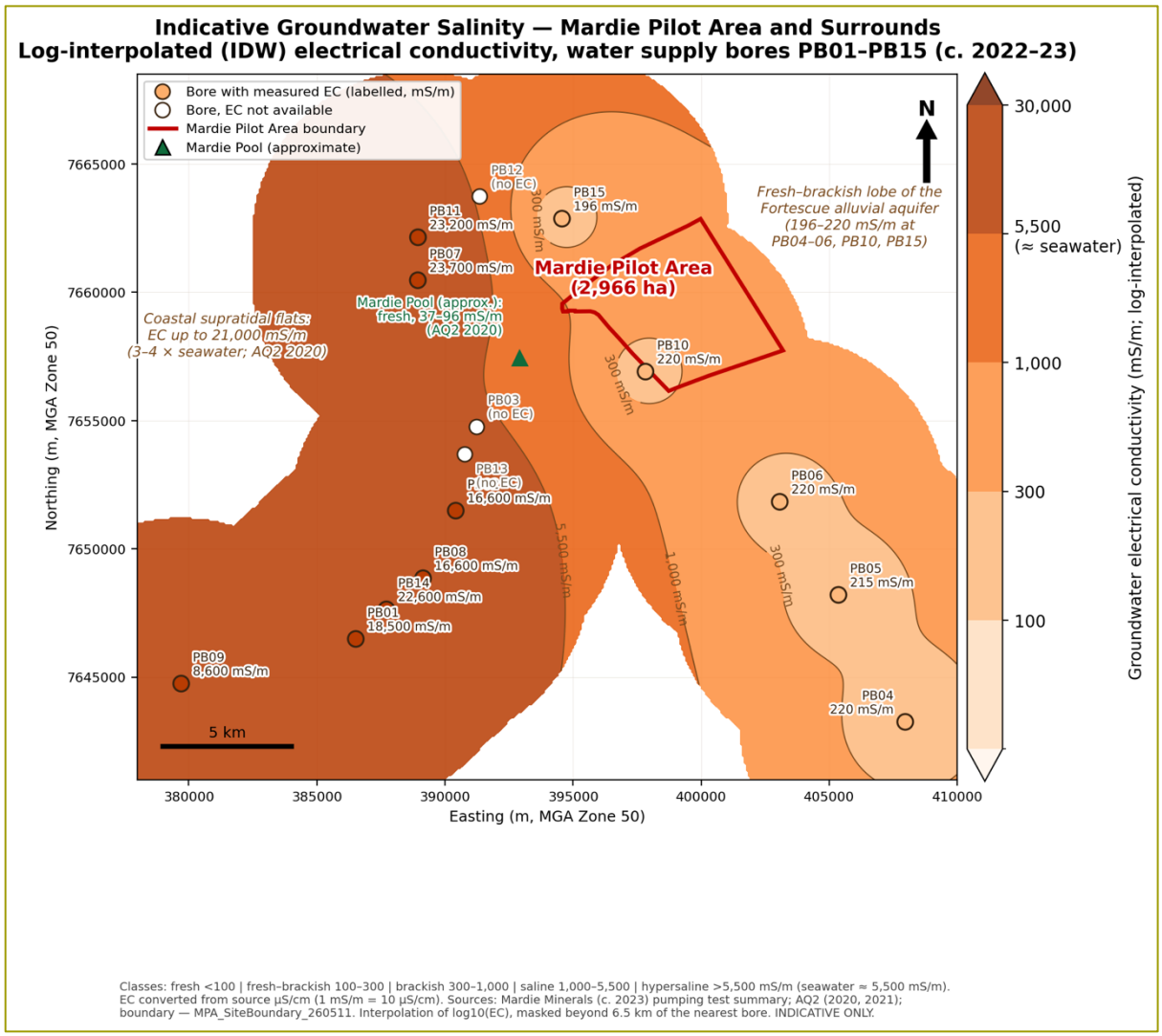


Figure 20. Indicative Mardie Groundwater Salinity 2022-2023

A water table at 7 to 8 metres across most of the Mardie A Pilot Area presents no shallow-groundwater constraint on surface clearing works, and machinery activities will not intersect groundwater. Clearing of the mesquite involves no groundwater abstraction and no excavation below the water table. Because mesquite is a deep-rooted perennial, removal at scale typically reduces transpiration losses, modestly increasing soil moisture and recharge and enabling a neutral-to-beneficial water balance effect.

With the Mardie mesquite infestation transpiring an estimated 10GL+ per year over the full extent of the Station, the removal of the perennial weed has the potential to return

groundwater levels to pre-weed depth. This could result in the increase or return of groundwater expression in Mardie and Fortescue pools respectively.

Mardie Pastoral Co will seek access to telemetered water level data from the BCI Minerals Groundwater Monitoring and Management Plan bore network (140 bores, operational since September 2024) to inform operations and any necessary response activities.

8.3 Rainfall, surface water and flooding

9.3.1 Rainfall records

Bureau of Meteorology (BOM) average monthly annual rainfall and temperatures for Mardie BOM Site 005008 are presented in Table 8 and graphed in Figure 21. As illustrated, the majority of rainfall is associated with cyclonic and/or wet season events

Table 8. BOM Average Rainfall and Temperature - Mardie 005008

Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean rainfall (mm)	38.2	61.9	48.3	19.5	38.0	36.8	13.3	7.3	1.4	0.8	1.5	9.1	**275.7**
Mean maximum temperature (°C)	37.8	37.5	37.6	35.9	31.6	28.2	27.8	29.6	32.4	35.1	36.3	37.6	**34.0**
Mean minimum temperature (°C)	25.2	25.4	24.4	21.3	17.0	14.0	12.0	12.6	14.6	17.7	20.3	23.2	**19.0**

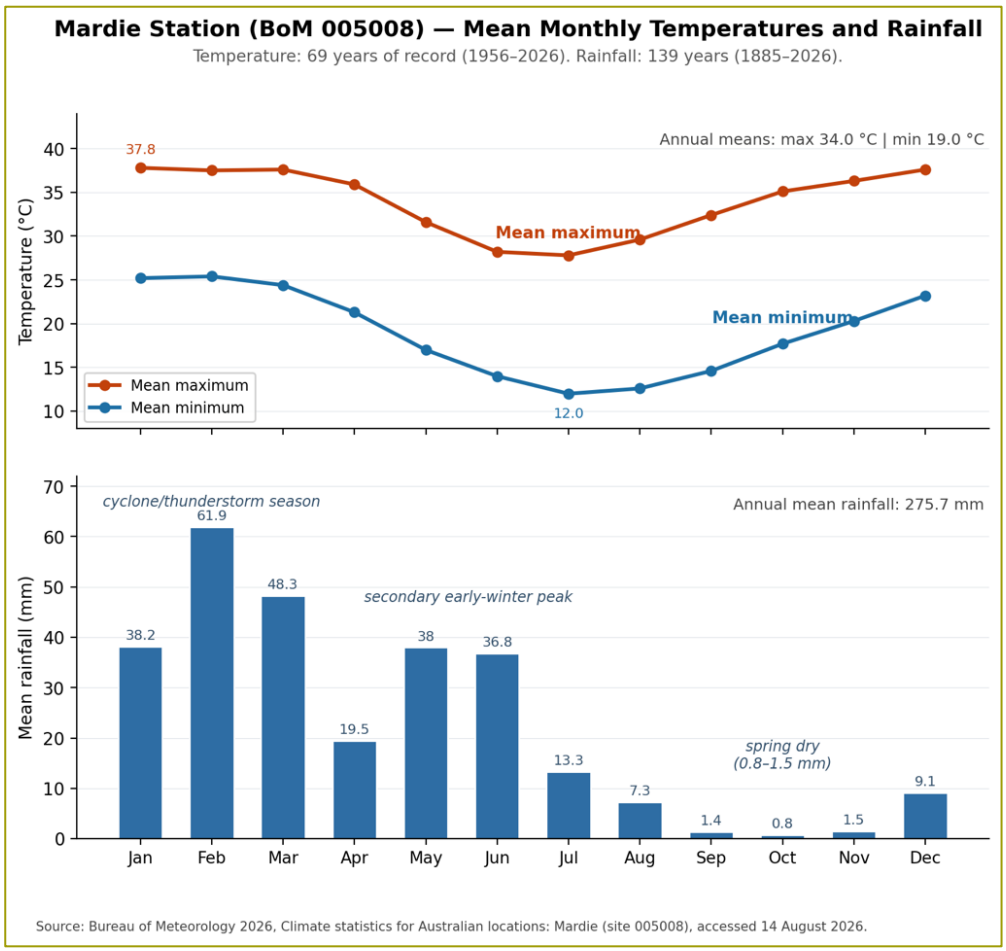


Figure 21. Mardie BOM Station 005008 Climate Statistics

9.3.2 Surface water and drainage

On-site ephemeral drainage lines and their riparian vegetation; downstream Mardie Creek and Mardie Pool catchments to the west; and the Fortescue River permanent pools to the north-east are potential receptors of changed water quality on and around the Mardie A Pilot Area.

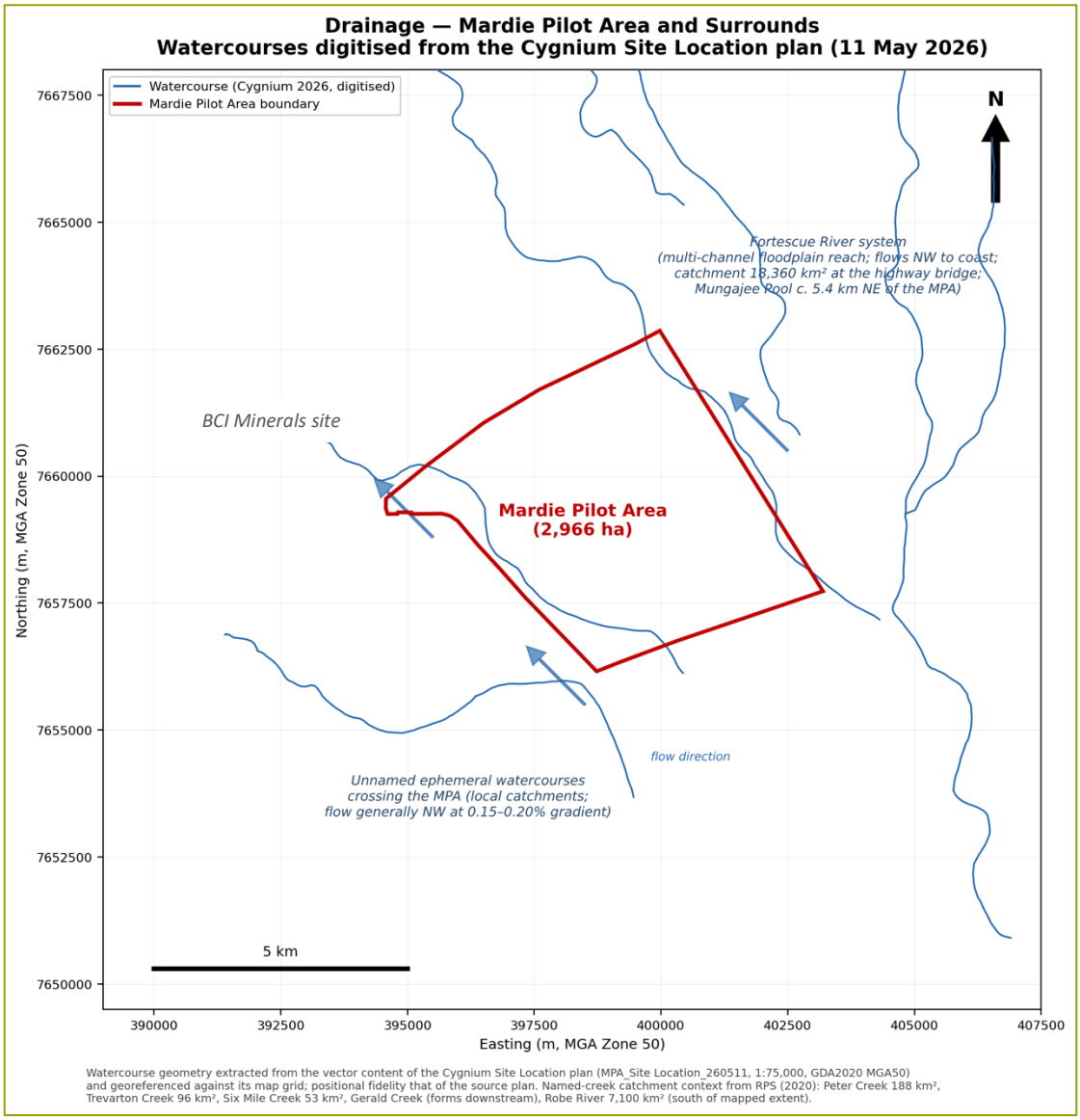


Figure 22. Drainage lines – Mardie A Pilot Area

Water quality risks include sediment pulses from cleared surfaces, organic debris and fines from windrows mobilised by flood flows. There is a minor risk of spills (eg hydrocarbons) from station machinery involved in mesquite clearing activities.

This is in addition to the floating behaviour of Mesquite pods in a flood situation. Flood flows are a recognised dispersal pathway for mesquite, so debris and seed-bearing soil left in flow paths presents both a water quality and a biosecurity risk. This risk is inherent with or without the Mardie A project.

9.3.3 Flood risk

Regional modelling undertaken for BCI Minerals shows Fortescue River breakout flows dominate the northern district in rare events (peak depths >1.5 m on salt-pan country in the 1% Annual Exceedance Probability (AEP), reducing to ~0.2 m at 10% AEP, while local creek catchments dominate frequent events (~1 exceedance per year (EY) with peak flooding depths of ~200–300 mm in low-lying areas (Advisian 2021a Part 2 figures; Advisian 2021b memo; RPS 2020a/b).

The Mardie A pilot area is situated within this occasionally flood-affected landscape, crossed by minor watercourses conveying local runoff south-west and north toward the Fortescue system.

8.4 Geophysical attributes risk assessment

Eleven risks are considered below, across soil, groundwater and surface water / flooding, as presented in Table 9. This is supported by management actions identified in Table 9.

Risk ratings applied are derived from an assessment of *likelihood* (Rare, Unlikely, Possible, Likely, Almost certain) and *consequence* (Slight, Minor, Moderate, Major, Severe).

It is noted that the consequence does not change with management; only the likelihood changes.

Table 9. Geophysical attributes risk assessment

ID	Domain / aspect	Potential event and consequence pathway	Inherent risk	Management Actions (refer to Table 13 for MA descriptions)	Residual risk	Risk owner
S1	Soils — wind erosion	Removal of mesquite canopy and disturbance of groundcover and soil crusts across staged clearing fronts exposes fine sandy plain and dune soils to wind erosion; topsoil and seedbank loss, dust generation, sand drift onto retained vegetation.	Likely x Moderate = High	MA1–MA5, MA8, MA19: selective clearing retaining groundcover and roots; cap on open (cleared/unstabilised) area per front; retain groundcover strips across prevailing wind directions; progressive rehabilitation with biochar/fines return and seeding; weather-aware operations with dust suppression.	Possible x Moderate = Medium	Site supervisor / rehabilitation team
S2	Soils — water erosion (sheet, rill, gully)	Cyclonic rainfall on freshly cleared or trafficked ground generates sheet and rill erosion on floodplain soils and gully initiation where machinery tracks or drainage-line margins concentrate flow; scalding of stripped texture-contrast soils.	Likely x Moderate = High	MA1–MA3, MA6–MA8, MA19: dry-season scheduling with pre-wet-season stabilisation; drainage-aware work fronts; no blade clearing on drainage-line margins (excavator-only in buffers); erosion and sediment controls at work fronts and crossings; contour-oriented groundcover retention; progressive rehabilitation.	Possible x Moderate = Medium	Site supervisor
S3	Soils — compaction and structural decline	Machinery traffic on wet gilgai clay plains (Horseflat) and repeated passes on haul routes compact soils, reduce infiltration and damage gilgai microrelief; hardstand and wood yard construction removes soil profile function locally.	Likely x Minor = Medium	MA2, MA7, MA9: wet-weather shutdown triggers and clay-plan machinery exclusion when wet; single-pass clearing and defined haul routes minimising traffic footprint; wood yard sited on pre-disturbed/low-value ground; ripping and rehabilitation of temporary hardstands and redundant tracks at completion.	Unlikely x Minor = Low	Site supervisor
S4	Soils — contaminated (seed-bearing) topsoil	Topsoil containing mesquite seed handled or spread beyond infested ground re-establishes infestation and degrades rehabilitation areas; seed persists in soil for decades.	Likely x Moderate = High	MA10–MA12: contaminated topsoil identified and managed per the Mesquite Management Plan (segregated handling; not exported from infested ground); screened fines returned only to areas already within the mapped infestation; machinery hygiene (washdown/certification) before leaving fronts; germination surveillance and follow-up control (MA13).	Possible x Moderate = Medium	Operations / rehabilitation team
G1	Groundwater — quality (herbicide and hydrocarbon)	Herbicide used in follow-up/selective control, or fuel and oil from refuelling and plant maintenance, leaches through permeable sands to a locally shallow water table; degradation of stock water or alluvial aquifer quality.	Possible x Moderate = Medium	MA14–MA16: bunded refuelling ≥100 m from drainage lines and away from shallow-water-table ground; spill kits on all plant and incident reporting; herbicide selection, rates and buffers per label and APVMA permits, applied by certified operators; no soil-residual herbicides on permeable sands near drainage lines.	Unlikely x Moderate = Low	Site supervisor / contractor
G2	Groundwater — water balance and levels	Broadscale removal of a deep-rooted perennial weed alters local evapotranspiration: expected modest	Possible x Minor = Medium	MA17: clearing scope excludes groundwater abstraction and sub-water-table excavation; any future water supply borefield or deep excavation to be preceded by hydrogeological assessment as	Unlikely x Minor = Low	Environment / approvals team

ID	Domain / aspect	Potential event and consequence pathway	Inherent risk	Management Actions (refer to Table 13 for MA descriptions)	Residual risk	Risk owner
		rise in soil moisture and recharge (beneficial).		required by DWER (RiWI Act) licensing (5C), with siting away from the Mardie Pool capture zone; monitor for unexpected waterlogging / salinisation in low-lying cleared ground after wet seasons.		
G3	Groundwater — interface with salt project regime	Works within or near the 54ha overlap with the BCI Minerals development envelope disturb BCI monitoring bores	Possible x Moderate = Medium	MA18: obtain bore network locations from BCI Minerals before works; exclusion buffers and demarcation around all monitoring bores; interface agreement covering access, timing and data notification; no works within the overlap without written coordination.	Unlikely x Moderate = Low	Environment / approvals team
W1	Surface water — sediment export	Rainfall on cleared fronts, tracks and crossings delivers sediment pulses to ephemeral drainage lines and downstream receptors (Mardie Creek/Pool catchments west; Fortescue pools).	Possible x Moderate = Medium	MA3, MA6–MA8: riparian buffers with excavator-only selective removal; sediment controls (banks, sumps, brush bunds) at fronts and crossings; stable, designated crossings only; staged clearing with pre-wet-season stabilisation; post-event inspection and repair.	Unlikely x Moderate = Low	Site supervisor
W2	Flooding — flow obstruction and afflux	Windrows, biomass stockpiles, wood yard pads or spoil placed in flow paths obstruct or divert flood flows (local catchment events and Fortescue breakout flows), causing localised afflux, scour, debris damming and redirection of flows onto retained vegetation or neighbouring land.	Possible x Moderate = Medium	MA6, MA9, MA20: no windrows, stockpiles or spoil within drainage lines or mapped flow paths; wood yard and long-term stockpiles sited above design flood levels informed by the RPS/Advisian flood mapping; maintain natural flow paths; pre-cyclone-season pull-back or processing of windrows in flood-prone ground.	Unlikely x Moderate = Low	Site manager
W3	Flooding — debris and seed mobilisation	Flood flows mobilise cleared mesquite debris and floating pods from windrows, spreading propagules along drainage lines and depositing debris against fences, crossings and downstream vegetation — converting a clearing benefit into a downstream infestation and water quality impact.	Likely x Moderate = High	MA11–MA13, MA20: chip and remove biomass promptly — do not carry seed-bearing windrows through a wet season; schedule clearing of heavy seed-load stands outside peak pod drop; windrow siting out of flow paths; post-event debris recovery; downstream surveillance transects and follow-up control along drainage lines.	Possible / Minor — Medium	Operations / rehabilitation team
W4	Flooding — works and access in flood events	Cyclone-season works strand plant on floodplains, damage saturated soils, destroy erosion controls and expose personnel; crossings fail under flow.	Possible x Moderate = Medium	MA2, MA19: dry-season scheduling of bulk clearing; cyclone preparedness and demobilisation triggers; crossing closures during flow; work fronts sequenced to firm ground; re-establishment inspections after events.	Unlikely x Moderate = Low	Site manager

Table 10. Proposed management measures to minimise soil degradation, groundwater and surface water risks

ID	Management measure	Phase / timing
MA1	Selective parkland clearing. Remove mesquite only; retain native trees, remnant vegetation, desirable grasses and groundcover wherever practical; single-pass operation; smaller plant (excavator) near retained vegetation.	During clearing
MA2	Dry-season scheduling of bulk clearing and haulage; wet-weather shutdown triggers; machinery excluded from gilgai clay plains when wet; cyclone preparedness and demobilisation procedures.	Programming / during works
MA3	Stage clearing fronts so stabilisation/rehabilitation efforts keep pace with clearing.	During clearing
MA4	Retain roots and groundcover in situ where practical (stick-rake set-up balanced against MA13 regrowth control); retain groundcover strips oriented across prevailing winds and on contour.	During clearing
MA5	Weather-aware operations: no clearing or chipping in high-wind conditions; speed limits on defined haul routes.	During works
MA6	Riparian/drainage buffers: no blade clearing within buffers; excavator-only selective mesquite removal; no windrows, stockpiles or spoil in drainage lines or mapped flow paths; maintain natural flow paths.	Planning / during clearing
MA7	Designated, stabilised drainage crossings only; crossings closed during flow events; post-event inspection and repair of crossings and controls.	During works
MA8	Erosion and sediment controls at work fronts, tracks and crossings (banks, sumps, brush bunds from cleared non-seed-bearing material); pre-wet-season stabilisation inspections.	During works / seasonal
MA9	Site the wood yard, long-term stockpiles and hardstands on pre-disturbed or low-value ground above design flood levels (informed by RPS/Advisian flood mapping); rip and rehabilitate temporary hardstands and redundant tracks at completion.	Design / completion
MA10	Contaminated (mesquite seed-bearing) topsoil identified, segregated and managed within infested ground; not exported to clean areas; screened fines returned only to areas already within the mapped infestation.	During clearing / handling
MA11	Machinery and vehicle hygiene when leaving mesquite infested areas.	All phases
MA12	Prompt biomass processing: chip and remove windrows without carrying seed-bearing material through a wet season; schedule clearing of heavy seed-load stands outside peak pod drop where practicable.	Programming
MA13	Committed follow-up mesquite control: surveillance from first post-rain germination flush; targeted chemical/manual treatment of regrowth and germinants; annual density mapping against the pre-clearing baseline; adaptive grazing management for groundcover recovery.	Post-clearing (ongoing)
MA14	Bunded refuelling and maintenance areas ≥100 m from drainage lines and shallow-water-table ground; spill kits on all plant; hydrocarbon incident reporting and corrective action.	During works
MA15	Herbicide controls: selection, rates, buffers and weather constraints per label/APVMA permits; certified operators; no soil-residual products on permeable sands adjacent to drainage lines; application records.	Follow-up control
MA16	Water quality surveillance: opportunistic post-event inspection of drainage lines leaving cleared fronts (turbidity, debris); corrective action where sediment plumes or debris accumulations are observed.	Post-event
MA17	No groundwater abstraction or excavation below the water table within the clearing scope; any future borefield or deep excavation preceded by hydrogeological and stygofauna assessment and DWER 5C licensing, sited clear of the Mardie Pool capture zone.	Design gate
MA18	Interface protocol with Mardie Minerals: obtain BCI monitoring bore locations; demarcate and buffer all bores; written coordination before any works in the 54ha overlap or near the haul road corridor; notification of works that could influence monitoring data.	Ongoing

ID	Management measure	Phase / timing
MA19	Progressive rehabilitation: biochar and screened fines returned to cleared areas with GPS-recorded application; seeding/groundcover re-establishment targets tied to Stage 1 success criteria; monitoring plots and photo-points.	Progressive
MA20	Pre-cyclone-season readiness: process or pull back windrows in flood-prone ground; secure stockpiles; inspect and clear flow paths; post-event debris recovery along drainage lines.	Seasonal

8.5 Geophysical attributes impacts – conclusion

With the listed measures implemented, no residual risk exceeds Medium, and the residual profile is dominated by Low ratings.

Inherently higher risks arise not from the clearing objective but from execution detail. Open-area hygiene, discipling in handling mesquite, the pace of post-clearing site stabilisation, seed-bearing soil and biomass handling, and seasonal timing, will all impact on project rehabilitation outcomes.

Groundwater risks are inherently modest because the scope involves no abstraction or sub-water-table excavation, and the dominant water-balance effect of removing a deep-rooted invasive weed is neutral to beneficial.

Surface water and flooding risks reduce to two rules applied without exception: keep material and works out of flow paths, and do not carry seed-bearing biomass or destabilise ground through wet conditions.

Managed this way, the Mardie A pilot area clearing is expected to deliver a net improvement in soil stability, groundcover and land condition relative to continued mesquite expansion.

9 Overall assessment against Clearing Principles

9.1 Section overview

The assessment outlined in this section tests the proposed Mardie A Stage 1 single-pass selective mesquite clearing of the 2,966 ha Mardie Pilot Area (MPA) against the ten clearing principles in Schedule 5 of the *Environmental Protection Act 1986* (WA), in the manner described in *A Guide to the Assessment of Applications to Clear Native Vegetation* (DER, December 2014).

Each principle carries a presumption against clearing where the relevant environmental value is present; the findings below state whether the proposed clearing is, on current information, likely to be at variance with each principle. The assessment assumes the clearing is executed in accordance with the Mardie A Stage 1 Clearing and Material Handling Methodology (Appendix C). The proposed method involves selective parkland clearing targeting mesquite, with retention of native trees, groundcover and drainage vegetation. Evidence is drawn from the habitat assessments earlier in this document, and the source survey documents cited herein.

Mesquite itself is not native vegetation and its removal is not "clearing" for EP Act purposes.

The EP Act Part V assessment relates to the potential for native vegetation to be unavoidably taken or damaged in the course of mechanically removing mesquite from mixed stands. This may include understorey grasses, co-occurring native shrubs, and native vegetation within tracks, windrow areas and hardstands. It is that incidental native vegetation take which this assessment addresses.

9.2 EP Act Part V Clearing Principles - Assessment summary

Table 11. Assessment against clearing principles

No.	Clearing principle (Schedule 5, EP Act)	Assessment for the Mardie A Pilot	Finding
(a)	Native vegetation should not be cleared if it comprises a high level of biological diversity.	The Mardie pilot area comprises degraded Pilbara coastal-plain vegetation in Good to Poor condition where mapped (grazing, buffel grass and mesquite invasion), dominated by widespread hummock and tussock grassland types and mesquite shrubland; 224–253 taxa were recorded in comparable adjoining survey areas with no Threatened flora. The selective parkland methodology removes the invasive component (mesquite) while retaining native trees, groundcover and drainage vegetation, and is expected to increase native diversity over time. However, ~ 95% of the Mardie A Pilot Area is unsurveyed, and clay-plan tussock grasslands potentially representative of the Roebourne Plains PEC (P3) occur on the corridor crossing the site.	**Not likely to be at variance.**
(b)	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	Fauna habitats present (spinifex and tussock grasslands, drainage lines) are extensive regionally and degraded locally; no rocky-hill (northern quoll), permanent-water or coastal habitat occurs in the Pilot Area. Pilbara leaf-nosed bat (*Rhinonicteris aurantia*, VU) likely forages over the site and grey falcon (*Falco hypoleucos*, VU) was previously recorded near the western boundary. Both are wide-ranging, and mesquite removal with retention of native trees, groundcover and riparian vegetation preserves the habitat elements they use. The likelihood of night parrot (*Pezoporus occidentalis*) presence is assessed low but the interior of the Mardie A Pilot Area is unsurveyed due to access restrictions (caused by dense mesquite); pre-clearing spinifex-maturity screes will be undertaken as exterior mesquite removal permits access. Retained habitat function is expected to improve as mesquite thickets are replaced by restored grassland.	***May be at variance*. Resolvable by pre-clearing visual survey and single pass clearing methodology to protect significant fauna habitat, noting that native vegetation will be protected from clearing wherever possible.**
(c)	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora (Threatened flora under the BC Act).	No BC Act Threatened flora records exist within the DBCA extract search area (~ 60 km), and none was recorded in any adjoining survey. The nearest EPBC-listed flora (*Minuria*, formerly *Minuria tridens*) is recorded ~6 km away in coastal island-edge habitat not present in the Mardie A Pilot Area. Priority flora remain a residual consideration, with *Owenia acidula* (P3) records in the south-west corner. However, Priority flora are not "rare flora" for the purposes of this principle.	**Not likely to be at variance**

No.	Clearing principle (Schedule 5, EP Act)	Assessment for the Mardie A Pilot	Finding
(d)	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	No TEC occurrence is mapped anywhere within the DBCA ecological communities extract search area. The nearest listed communities of any kind are PECs (non-statutory), with the closest DBCA-mapped occurrence being the Horseflat Land System PEC >20 km ENE of the site. Phoenix field mapping identified PEC-representative clay-plan tussock grassland (PgvExCt) on the corridor crossing the southwest of the Mardie A Pilot area. A PEC is not a TEC, so the principle is not engaged, though the PEC value is addressed under principles (a) and (h) controls via pre-clearance mapping and low-disturbance treatment of clay plains.	**Not likely to be at variance**
(e)	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	The Roebourne subregion retains the majority of its pre-European vegetation extent. The Pilbara is not an extensively cleared landscape, and the vegetation types present in the Mardie A Pilot Area remain extensively represented regionally. The proposal removes an invasive weed from largely uncleared rangeland rather than removing remnant vegetation from a cleared landscape.	**Not likely to be at variance**
(f)	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	Minor ephemeral watercourses and drainage lines cross the Mardie A Pilot Area, potentially carrying riparian vegetation (eg *Eucalypt* spp). The clearing methodology commits to retaining sensitive drainage features, excavator-only selective mesquite removal within riparian buffers, no windrows or stockpiles in flow paths, and hardened crossings. Some clearing of mesquite growing along or near watercourses is inherent to the rehabilitation purpose. Mesquite preferentially invades drainage lines, so the principle is engaged, however the vegetation being removed is the invasive component and native riparian structure is retained.	**Not likely to be at variance**
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Unmitigated broadacre clearing of 2,966 ha in a cyclonic rainfall environment would risk wind and water erosion. The single-pass selective methodology retains groundcover and roots where possible, stages work fronts, schedules bulk clearing outside the cyclone season, applies progressive stabilisation (biochar and fines return, groundcover recovery) and manages the mesquite seedbank through committed follow-up control. The stated objective is the reverse of degradation — restoration of pastoral land condition consistent with the *Good Pastoral Land Management Guidelines* — and with the committed controls, appreciable degradation is not the likely outcome.	**Not likely to be at variance**
(h)	Native vegetation should not be cleared if the	No conservation estate adjoins the Mardie A pilot area. The nearest sensitive receptors are Mardie Pool (~4 km to the west of the proposal area, protected under Ministerial Statement 1264 conditions applying to the BCI salt project), the	**Not likely to be at variance**

No.	Clearing principle (Schedule 5, EP Act)	Assessment for the Mardie A Pilot	Finding
	clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	Robe River Delta Mangrove Management Area and coastal habitats (6–10 km west), and Fortescue River pools ~5 km to the north-east. Impact pathways (sediment, hydrology, weed spread) are indirect and controlled through drainage buffers, sediment controls and hygiene; no appreciable impact on any conservation area is expected.	
(i)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	Receptors are the ephemeral drainage network, downstream Fortescue pools supporting the Fortescue grunter (*Leiopotherapon aheneus*, P4), and Mardie Pool to the west. Clearing itself involves no discharge. Risks are sediment export during rainfall and potential hydrocarbon/herbicide spills, both subject to standard controls including staged clearing, spill management, label-compliant herbicide use. Groundwater quality effects from surface mesquite clearing are expected to be neutral to positive. No water-table-intersecting excavation is proposed in the clearing scope.	**Not likely to be at variance**
(j)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	The Mardie A Pilot Area lies on flood-affected plains (Fortescue breakout flows dominate rare events regionally; local catchments dominate frequent events). Selective clearing retains groundcover and does not construct flow obstructions; windrows and stockpiles are excluded from flow paths and natural drainage is maintained. Vegetation roughness changes from removing scattered-to-dense mesquite are minor at catchment scale and partially offset by groundcover retention and recovery. No appreciable change to flood incidence or intensity is expected.	**Not likely to be at variance**

9.3 Clearing principles assessment conclusion

The Mardie A pilot proposal is not likely to be at variance with principles (a), (c), (d), (e), (g), (h), (i) and (j).

Principle (b), significant fauna habitat, may be at variance only because the majority of the 95% of the pilot area is unsurveyed. It is noted that pre-clearing surveys are inherently difficult from a safety and access perspective due to the density and physical parameters (ie thorns) present in the mesquite infestation. This has been observed by BCI Minerals, and also in preliminary biodiversity reconnaissance assessment work undertaken by Ecosystem Solutions Pty Ltd for MPC and BMP in 2024.

This uncertainty is resolvable by pre-clearing flora and fauna habitat walk-over, night parrot spinifex-maturity screen and PEC clay-plan mapping, with retention zones adjusted accordingly.

The clearing is directed at removing a Weed of National Significance from the largest core infestation in Australia, with a net land-condition and biodiversity benefit consistent with the Pastoral Lands Board Good Pastoral Land Management Guidelines is the target outcome.

10 EPBC *Matters of National Environmental Significance* and impact assessment

Mardie A has been designed as a limited-scale pilot to minimise the likelihood of significant impacts on Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

10.1 Purpose and scope

This section summarises MNES identified within 20 km of the Mardie A Stage 1 pilot site, and provides a preliminary, desktop-level assessment of the likelihood of occurrence of each matter within the pilot area. Conservation status under the *Biodiversity Conservation Act 2016* (WA) (BC Act) is provided for each matter to support parallel consideration under Western Australian legislation, including clearing permit assessment under the *Environmental Protection Act 1986* (WA).

This assessment is based on a Protected Matters Search Tool (PMST) report generated from the Department of Climate Change, Energy, the Environment and Water (DCCEEW) database on 12 August 2026. The search feature area comprises the Mardie A Stage 1 pilot area on Mardie Station, with a 20 km buffer applied, as shown in Figure 23. WA conservation categories are taken from the *Biodiversity Conservation (Listing of Native Species) (Fauna) Order 2024*, as amended by the 2025 revisions to the Threatened Fauna List, and Florabase for flora.

The pilot area is located on the alluvial plains of Mardie Station, approximately 5 km inland of the mangrove-fringed coastline. The 20 km buffer (white circle on Figure 23) extends across the surrounding pastoral plain and into State coastal waters, intertidal flats, tidal creeks and nearshore islands, including Great Sandy Island and North Sandy Island Nature Reserves. A substantial proportion of the matters returned by the search are marine, intertidal or island-associated species that occur only in these buffer environments and have no credible pathway of interaction with terrestrial rehabilitation activities at the pilot site.

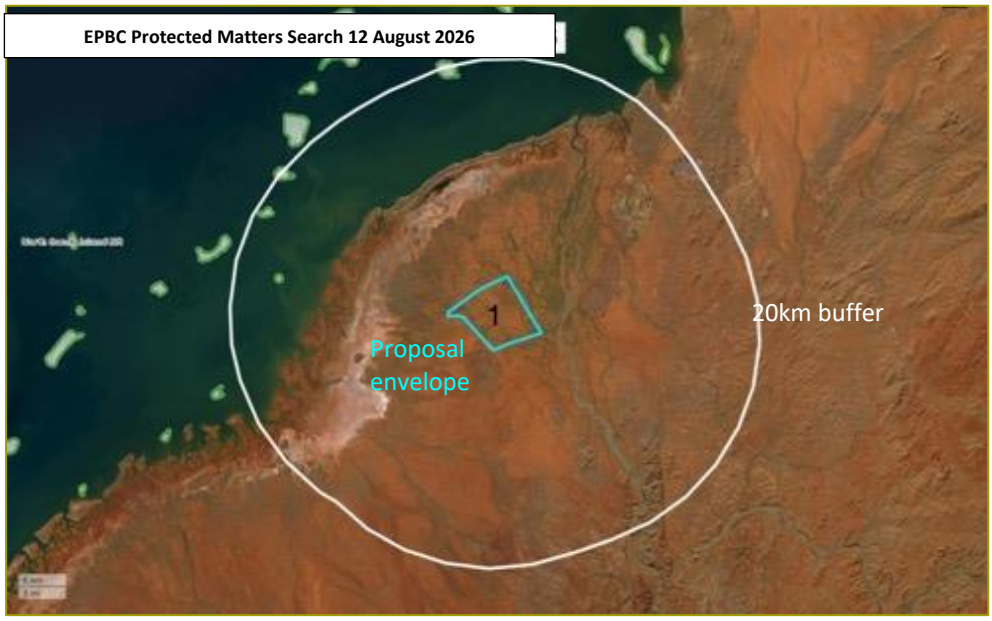


Figure 23. EPBC Protected Matters search area: Mardie A pilot area plus 20km buffer

10.2 Summary of search results

The PMST identified **no** World Heritage properties, National Heritage places, Ramsar wetlands, threatened ecological communities, Commonwealth land or Commonwealth marine areas within the search area.

The identified MNES are summarised in Table 12:

Table 12. Summary of MNES potentially present within 20km of proposal area

Matter type	Count	Comment
Listed Threatened Species	41	Predominantly marine and shorebird species associated with the coastal and marine buffer; 14 Listed Threatened Species identified against the pilot (feature) area – see Table 12.
Listed Migratory Species	52	Largely overlapping the threatened species list; migratory shorebirds, seabirds, cetaceans, sharks and rays
Listed Threatened Ecological Communities	0	None identified
Habitat Critical to the Survival of Marine Turtles	3	*Hawksbill, flatback and green turtle nesting habitat – buffer (coastal/island) only*
Listed Marine Species / Whales and Other Cetaceans	83 / 15	*Marine waters of the buffer only*
Biologically Important Areas	6	*Marine turtle foraging/reproduction, wedge-tailed shearwater breeding, humpback whale migration*
State and Territory Reserves	2	*Great Sandy Island Nature Reserve (terrestrial and marine components), buffer only*
EPBC Act Referrals within search area	13	Including the adjacent Mardie Salt Project (EPBC 2018/8236 and 2022/9169) and regional iron ore and gas developments

10.3 Approach to assessing Likelihood of Occurrence

Likelihood of occurrence at the pilot site has been assigned using the PMST modelled presence category, the habitat requirements of each species and the habitats actually present within and adjacent to the pilot area (mesquite-invaded alluvial plain, ephemeral drainage lines and claypans, spinifex sandplain margins), using the following categories:

- **Recorded**: verified records exist within the pilot area
- **Likely**: suitable habitat present and the species is expected to use the site at least seasonally
- **Possible**: marginal or intermittently suitable habitat; occurrence cannot be discounted
- **Unlikely**: habitat absent or highly marginal; occurrence not reasonably expected.

10.4 MNES returned against the pilot (feature) area

Fourteen threatened species were returned against the pilot area itself in the PMST report (Appendix E), as summarised in Table 13. Of these, the MNES of principal interest in relation to the Stage 1 clearing and rehabilitation activities are the northern quoll (*Dasyurus hallucatus*), ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*), grey falcon (*Falco hypoleucos*) and Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form).

The migratory shorebirds returned against the feature area are overwhelmingly associated with the intertidal flats of the buffer. Their occurrence within the pilot area would be limited to transient use of seasonal (ephemeral) wetlands following significant rainfall.

Table 13 provides an assessment of the likelihood of occurrence of EPBC-listed species in the proposal area, presented in order of listing priority.

Table 13. Listed MNES potentially occurring in Mardie A pilot area

Species	EPBC Act[1]	WA BC Act	PMST assessment	Assessment of likelihood of occurrence at pilot site
Night parrot (*Pezoporus occidentalis*)	CR	CR	May occur	Unlikely. *Triodia* (spinifex) habitat is limited in the proposal area. Targeted acoustic survey of 21 nearby sites (December 2017 – March 2018; ~ 330 recording nights) detected no calls. The Phoenix Environmental fauna survey report prepared for BCI Minerals concluded it is 'reasonable to assume the species is not present' (Phoenix 2020b, pp. 55-56; EPA Report 1704, p. 62). The pilot area itself is unsurveyed as access is very limited due to the presence of dense thorny mesquite.
Eastern curlew (*Numenius madagascariensis*)	CR	CR	Likely to occur	Unlikely within pilot area (no intertidal habitat). Likely on tidal flats within 20km buffer applied in PMST.
Curlew sandpiper (*Calidris ferruginea*)	CR	CR	May occur	Unlikely, as above. Possible transient use of ephemeral wetlands after rainfall.
Australian painted snipe (*Rostratula australis*)	EN	EN	May occur	Possible (low). Transient use of vegetated clay areas following significant rainfall. Rehabilitation of vegetation to reduce mesquite dominance should assist in returning habitat suitability for listed bird species.

[1] CR: Critically endangered; EN: Endangered; VU: Vulnerable; CD: Conservation Dependent

Species	EPBC Act[1]	WA BC Act	PMST assessment	Assessment of likelihood of occurrence at pilot site
Northern quoll (*Dasyurus hallucatus*)	EN	EN	Likely to occur	Possible, however denning habitat (rocky terrain) is absent from the alluvial plain. Foraging along riparian corridors is possible within 1km of denning habitat, however neither are present in the pilot proposal area. The nearest denning-prospective habitat identified in available fauna surveys is 10-13 km SSE and all reliable DBCA records exceed 18km away.
Red goshawk (*Erythrotriorchis radiatus*)	EN	EN	May occur	Unlikely. Very sparse Pilbara records of this species, noting that the project area would provide marginal habitat at best.
Grey falcon (*Falco hypoleucos*)	VU	VU	Likely to occur	Likely (foraging). Wide-ranging over the pastoral plain; possible breeding in mature riparian trees along the Fortescue River (not in the pilot area). Mardie's tussock and hummock grassland plains and drainage lines are typical foraging habitat. Species recorded twice during the 2019-2021 Mardie Optimisation Area surveys (once over cleared land/woodland-over-shrubland and once over tussock grassland, and considered likely to be nesting on a communications tower close to Mardie Homestead (Phoenix 2021b, pp. ii, 70–71). Georeferencing of Phoenix 2021b Figure 5-3 (p. 48) places one record at or immediately adjacent to the Mardie pilot area's western boundary (positional uncertainty ±100 m). The DBCA extract holds only one regional record (2018, ~40km to the NE).
Australian fairy tern (*Sternula nereis nereis*)	VU	VU	Breeding likely	Unlikely within pilot area. The species is a coastal/island breeder, therefore breeding within the buffer applied in the PMST is likely but not in the pilot area.
Pilbara olive python (*Liasis olivaceus barroni*)	VU	VU	Likely to occur	Possible occurrence, but not recorded by Phoenix Environmental (2020b) in nocturnal surveys at nearby Mardie Pool (~4km west of the pilot area). The Pilbara olive python prefers permanent pools and rocky/riparian habitat. There is potential for occurrence along major drainage lines which are not present in the pilot area, but are known in other areas of Mardie Station.
Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form)	VU	VU	May occur	Likely occasional / transient nocturnal foraging. There are no roost habitat (caves/mines) within pilot area. Confirmed present (foraging) on Mardie Station. Recorded acoustically at Mardie Pool and at a flowing creek line ~10 km south of the pilot area (Phoenix 2020b, pp. 54). The DBCA fauna extract contains 24 records, the nearest being ~4km west (2018, acoustic, SM04-02) and 11km (2018), plus records from 2015 approximately 24 km away. *Triodia* (spinifex/hummock) grassland and shrubland-over-spinifex provide foraging habitat.
Ghost bat (*Macroderma gigas*)	VU	VU	Likely to occur	Possible foraging may occur. There is no suitable roost habitat (caves, rocky outcrops) in or adjacent to the Mardie A pilot area. Foraging overflight is conceivable but the pilot does not exhibit significant habitat for ghost bats.
Red knot (*Calidris canutus*)	VU	EN	May occur	Unlikely to occur in project area. Species is an intertidal specialist. Presence is possible on the buffer coastline only.
Sharp-tailed sandpiper (*Calidris acuminata*)	VU	Migratory	May occur	Possible (low). Potential transient use of ephemeral wetlands after rainfall.
Largetooth sawfish (*Pristis pristis*)	EN	Migratory	May occur	No suitable habitat (estuarine/riverine) habitat within pilot area. Potential presence is confined to tidal creeks within buffer area.

10.5 PMST-identified species confined to the coastal and marine buffer

The remaining 27 threatened species returned by the PMST search are marine, coastal or island-associated and were identified as potentially occurring within the 20 km buffer only. None is expected to occur within the pilot area, and no direct or indirect impact pathway from Stage 1 terrestrial rehabilitation activities is anticipated. These species are listed in Table 14:

Table 14. EPBC-listed species confined to coastal areas in PMST 20km buffer

Species	EPBC Act	WA BC Act	PMST presence (buffer)
Short-nosed sea snake (*Aipysurus apraefrontalis*)	CR	CR	Likely to occur
Leaf-scaled sea snake (*Aipysurus foliosquama*)	CR	CR	Likely to occur
Bar-tailed godwit (northern Siberian) (*Limosa lapponica menzbieri*)	EN	EN	Likely to occur
Common greenshank (*Tringa nebularia*)	EN	Migratory	Likely to occur
Loggerhead turtle (*Caretta caretta*)	EN	EN	Breeding likely
Leatherback turtle (*Dermochelys coriacea*)	EN	VU	Breeding likely
Blue whale (*Balaenoptera musculus*)	EN	VU	Likely to occur
Southern right whale (*Eubalaena australis*)	EN	VU	May occur
Southern giant-petrel (*Macronectes giganteus*)	EN	Migratory	May occur
Red-tailed tropicbird (Indian Ocean) (*Phaethon rubricauda westralis*)	EN	Not listed	May occur
White-tailed tropicbird (Christmas Island) (*Phaethon lepturus fulvus*)	EN	Not listed	May occur
Green turtle (*Chelonia mydas*)	VU	VU	Breeding likely
Hawksbill turtle (*Eretmochelys imbricata*)	VU	VU	Breeding likely
Flatback turtle (*Natator depressus*)	VU	VU	Breeding likely
Green sawfish (*Pristis zijsron*)	VU	VU	Breeding likely
Dwarf sawfish (*Pristis clavata*)	VU	Migratory	Likely to occur
White shark (*Carcharodon carcharias*)	VU	VU	May occur
Grey nurse shark (west coast population) (*Carcharias taurus*)	VU	VU	Likely to occur
Whale shark (*Rhincodon typus*)	VU	Migratory	May occur
Australian snubfin dolphin (*Orcaella heinsohni*)	VU	Migratory	Likely to occur
Australian humpback dolphin (*Sousa sahulensis*)	VU	Migratory	Likely to occur
Greater sand plover (*Charadrius leschenaultii*)	VU	VU	Likely to occur
Asian dowitcher (*Limnodromus semipalmatus*)	VU	Migratory	May occur
Little tern (*Sternula albifrons*)	VU	Migratory	May occur
Indian yellow-nosed albatross (*Thalassarche carteri*)	VU	VU	May occur
Scalloped hammerhead (*Sphyrna lewini*)	CD	Not listed	Likely to occur
Minnie daisy (*Minuria tridens*)	VU	Priority 1	Likely to occur (terrestrial, buffer only)

The minnie daisy (*Minuria tridens*) is the only EPBC-listed threatened flora species identified as potentially occurring. It was returned in the PMST search against the buffer only.

10.6 Migratory Species

Fifty-two listed migratory species were identified by the PMST, the majority of which are also threatened species addressed in Tables 12 and 13. The migratory-only species, that is, not otherwise listed as threatened, which were identified in relation to the project area are:

- osprey (*Pandion haliaetus*),
- common sandpiper (*Actitis hypoleucos*),
- fork-tailed swift (*Apus pacificus*),
- barn swallow (*Hirundo rustica*),
- oriental pratincole (*Glareola maldivarum*),
- oriental plover (*Charadrius veredus*),
- pectoral sandpiper (*Calidris melanotos*),
- grey wagtail (*Motacilla cinerea*),
- yellow wagtail (*Motacilla flava*) and
- estuarine crocodile (*Crocodylus porosus*).

All are listed as Migratory under both the EPBC Act and the BC Act. Occurrence of these species within the pilot area is expected to be limited to aerial, transient or post-rainfall wetland use. The potential for estuarine crocodile presence is confined to tidal waters within the buffer.

Migratory-only species returned against the marine buffer comprise seabirds and marine species including cetaceans. There are no direct impact pathways from the Stage 1 terrestrial works upon these species.

10.7 Other Matters Protected by the EPBC Act

- **Habitat critical to the survival of marine turtles:** nesting habitat for the hawksbill (October–February), flatback (all year, peak June–August) and green turtle (October–March) is mapped within the buffer (coastal beaches and islands) only.
- **Biologically Important Areas:** marine turtle foraging and reproduction, humpback whale migration (buffer), and wedge-tailed shearwater breeding (returned against the feature area on account of modelled island colonies within the search geometry; no breeding habitat exists at the inland pilot site).
- **State reserves:** Great Sandy Island Nature Reserve (terrestrial and marine components) lies within the buffer, approximately 15 km north-west of the pilot area. North Sandy Island Nature Reserve is also shown on Figure I.1. No works are proposed within or adjacent to any reserve.
- **EPBC Act referrals:** 13 referrals fall within the search area, including the adjacent Mardie Salt / Optimised Mardie Project (EPBC 2018/8236; 2022/9169; 2024/10094), the Sino Iron and Cape Preston iron ore projects, and the Gorgon gas development. These confirm an established assessment history and a well-characterised regional environment.

10.8 Assessment against the EPBC Significant Impact Guidelines 1.1

In August 2026, the National Environmental Protection Agency (NEPA) released *Agriculture and the EPBC Act Guide to the Environment Protection and Biodiversity Conservation Act 1999*. This document is considered in this analysis, in line with the EPBC Significant Impact Guidelines.

10.8.1 The Action

For the purposes of any potential referral to NEPA, *the action* is the Mardie A Stage 1 project. Considered at its broadest scope (under the requirements of the *Significant Impact Guidelines 1.1*, step 2), the action includes the clearing fronts, access and haul routes, wood yard, processing infrastructure and rehabilitation activities, and their indirect and downstream effects.

10.8.2 Pathway under the Agriculture and the EPBC Act Guide (2026)

The NEPA released updated guidance on existing agricultural activities and their treatment under the EPBC Act, in August 2026.

Is the action exempt from an EPBC approval requirement (ie, is it an EPBC Act s.43B continuing use)?
No. Although pastoral grazing on Mardie Station is a lawful continuing use predating 16 July 2000, the s.43B exemption, as amended by the 1 December 2025 EPBC Act reforms, does not apply to an area of land that has not been cleared for 15 years or more. The Mardie A pilot area is predominantly uncleared rangeland. Mechanical clearing of mixed mesquite–native vegetation across it cannot be characterised as a continuation of grazing, and establishing biomass processing infrastructure to manage the weed is a new activity. The exemption cannot be relied upon for this action.

Risk classification (Agriculture and the EPBC Act Guide, Table 1)
The action spans the Agriculture and the EPBC Act Guide's categories. *Weed management targeted at declared weeds in line with state and territory requirements* is classed as low risk. The core purpose of the Mardie A proposal is the removal of a Declared Pest and WoNS, consistent with the BAM Act containment declaration.

However, the mechanical method will take native vegetation within a largely never-cleared area that could provide habitat for listed species, which Table 1 of the Guide classes as high risk ("any clearing of vegetation that has not been cleared in the past... and could potentially provide habitat for listed species").

10.8.3 EPBC Act Significant impact self-assessment

Table 15 applies the EPBC significant impact criteria and takes the precautionary approach, given that around 95% of the Mardie A Pilot Area has not yet been surveyed.

It is noted that **the ability to survey the area for biodiversity attributes is severely limited by the physical density, and thorns present, in the mesquite infestation**. The infestation is largely impenetrable on foot or by vehicle. Staged pre-clearing habitat and species presence assessments are proposed on the basis of accessibility.

Beneficial impacts such as mesquite removal and pastoral landscape and habitat restoration are not offset against adverse impacts for referral purposes, though they are relevant to any subsequent assessment.

Table 15. EPBC Significant Impact Assessment Summary

Matter	EPBC status	Assessment against the significant impact criteria	Conclusion
Pilbara leaf-nosed bat (*Rhinonicteris aurantia*)	VU	Likely nocturnal forager over the Mardie A Pilot Area. No roost habitat (caves) in or near the site. Selective clearing retains *Triodia* groundcover and riparian trees; foraging resource largely retained and expected to improve with grassland restoration. The Mardie A Pilot Area is not habitat critical to survival and supports no roosting population.	Significant impact unlikely
Grey falcon (*Falco hypoleucos*)	VU	Recorded at the Mardie A Pilot Area western boundary; likely nests on infrastructure near Mardie Homestead ~ 10 km away. Wide-ranging forager over open plains; mesquite removal restores the open grassland structure it hunts over. No nesting habitat affected.	Significant impact unlikely
Northern quoll (*Dasyurus hallucatus*)	EN	No rocky denning habitat in the Pilot Area. All reliable records 10–20 km away. At most, rare transient dispersal. Daylight-only clearing and fauna spotter controls address the residual interaction risk.	Significant impact unlikely
Night parrot (*Pezoporus occidentalis*)	EN	No detections from ~330 regional acoustic recording nights and no DBCA records, although the Mardie Pilot Area interior has not been surveyed due to access limitations caused by dense mesquite. Pre-clearing spinifex-maturity screening has been committed, with exclusion if structurally suitable old-growth hummocks are found. Applying the precautionary principle, pre-clearing screening will be undertaken.	Unlikely, conditional on pre-clearing screening for suitable spinifex habitat
Pilbara olive python (*Liasis olivaceus barroni*)	VU	No permanent water or rocky habitat in the pilot area. Possible dispersal along drainage lines. Riparian buffers and spotter protocols apply.	Significant impact unlikely
***Minuria* (formerly *Minuria tridens*)**	VU *(listing under review)*	All known populations exceed 6 km away in coastal island-edge habitat which is not present in the Mardie A Pilot Area.	Significant impact unlikely
Greater bilby (*Macrotis lagotis*)	VU	No records in any Mardie survey or the DBCA extract; habitat of the general type present. Pre-clearing sign search committed.	Significant impact unlikely
Ghost bat (*Macroderma gigas*); black-flanked rock-wallaby (*Petrogale lateralis*)	VU; EN	No roost or rocky habitat in or near the Mardie A Pilot Area.	No significant impact
Migratory species — oriental plover (*Charadrius veredus*), oriental pratincole (*Glareola maldivarum*), little curlew (*Numenius minutus*), fork-tailed swift (*Apus pacificus*)	Migratory	Occasional, seasonal use of open plains and claypans by small numbers; aerial overflight (fork-tailed swift). The Mardie A Pilot Area is not important habitat for any migratory species, given that the nationally important shorebird habitat lies on the coast >7km to the west of the site). No ecologically significant population of any of these species is known or likely to use the site.	No significant impact

10.8.4 Indirect and facilitated impacts

Downstream sediment pathways to Fortescue River pools and Mardie Creek are controlled by riparian buffers and sediment management. Weed and mesquite propagule spread via machinery is an indirect impact capable of harming listed-species habitat regionally. Vehicle hygiene management is the operative control.

10.9 MNES Impacts Conclusion

On current information, and provided that the committed pre-clearance controls are implemented, the action is unlikely to have a significant impact on any MNES.

11 Works approval and licensing

In addition to clearing approval, Mardie A's mesquite pyrolysis facility will require regulatory consideration under Part V Division 3 of the EP Act because the Stage 1 processing facility is a prescribed premises. The works approval and licensing requirements discussed in this section relate solely to ancillary infrastructure required to support the pastoral rehabilitation program described in this document.

Mardie A will not commence construction of any prescribed premises component until the required Part V Division 3 approvals have been obtained from DWER. The detailed scope of regulated activities will be finalised through the works approval design package and DWER pre-application discussions.

12 Other approvals

12.1 Development approval under *Town Planning and Development Act 2005* (WA)

A Development Application (DA) will be prepared and submitted to the City of Karratha and the Regional Development Assessment Panel (RDAP).

The DA will demonstrate that the Mardie A proposal can be accommodated in the pastoral setting, consistent with the *Lands Administration Act 2007* (WA). Traffic, fire risk, dust, noise, stormwater, emissions, environmental management and future staging proposals will be incorporated into the DA. This is a priority for Mardie Pastoral Co and Biomass Projects.

12.2 Fire hazard management and Bushfire Attack Level (BAL) assessment

A detailed bushfire risk inspection, including a 150m buffer, will be undertaken by specialist bushfire planning consultants to map the vegetation and topography in accordance with AS3959-2018. The proposed Mardie A development, including processing facility locations, will be assessed for compliance against State Planning Policy 3.7 and the associated Planning for Bushfire Guidelines. A Bushfire Management Plan a will be prepared to demonstrate compliance.

The Bushfire Management Plan will include mapping of all vegetation within 150m of the site, deemed a bushfire hazard under AS3959-2018, and the BMP will show compliance with four Bushfire Protection Criteria outlined in Planning for Bushfire Guidelines (November 2024). A Bushfire Emergency Plan will be prepared in accordance with WAPC Bushfire Emergency Plan Manual.

The bushfire risk assessment will inform the final location determined for site processing facilities.

12.3 Building approval

Building approval/s will be obtained as required under the *Building Act 2011* (WA).

13 General project risk assessment

Table 16 provides a summary of Mardie A project risks, and the MPC/BMP approach to risk management.

Table 16. General project risk and management

Risk Area	Potential Risk	Management Approach	Residual Risk
Pastoral purposes characterisation	Infrastructure is viewed as independent industrial use rather than enabling rehabilitation infrastructure.	Maintain clear framing that biomass processing is ancillary and necessary to rehabilitation; return Stage 1 biochar to Mardie soils; separate future industrial approvals.	Low to Medium
Native vegetation clearing	Impacts to native vegetation within or adjacent to pilot areas.	Detailed vegetation mapping, avoidance where practicable, conservative clearing permit pathway and staged footprint refinement.	Low to Medium
Mesquite reinfestation	Seedbank germination and regrowth following clearing.	Early monitoring, drone surveillance, targeted herbicide/mechanical control, groundcover establishment and adaptive grazing management.	Medium
Erosion and soil disturbance	Wind or water erosion following clearing or hardstand establishment.	Contour-aware clearing, erosion and sediment controls, surface stabilisation, biochar incorporation and revegetation.	Low to Medium
Surface water impacts	Drainage obstruction, sediment movement or erosion during rainfall events.	Maintain flow paths, avoid drainage features where practicable, design crossings and hardstands to avoid runoff concentration.	Low
Facility fire hazard	Fire risk associated with biomass stockpiles, process heat, electrical equipment and hot works.	Fire Hazard Management Plan, separation distances, hot-work controls, firefighting access, water supply and induction.	Low to Medium
Air emissions and dust	Dust and process emissions from biomass handling and processing.	Works approval process, dust controls, emissions inventory, air pollution control systems and operational procedures.	Low to Medium
Cultural heritage	Disturbance to heritage sites or culturally significant areas.	Heritage assessment, engagement with Traditional Owners, no-go areas and site-specific controls.	Low
Regulatory sequencing	Construction or operation commencing before required approvals.	Approvals register, staged hold points and no construction of prescribed premises components before required approvals.	Low

14 Proposed Environmental Management Plan

Table 17 consolidates every management action, commitment and control identified in this document into a single *Environmental Management Plan*. Each action carries a unique EMP number and is cross-referenced to its source in the report. Actions are grouped by theme; timing, responsibility and the monitoring/evidence basis are stated for each so the table can function as the audit framework for compliance reporting.

Table 17. Mardie A Stage 1 Environmental Management Plan: Consolidated Management Actions

ID	Aspect and objective	Management action	Timing / phase	Responsibility	Monitoring and evidence	Report cross-reference
A. Approvals, compliance and governance						
EMP-01	Approvals sequencing — no unauthorised works	Maintain an approvals register with staged hold points. No native vegetation clearing before the Part V Division 2 clearing permit / s.51DA referral outcome, and no construction of any prescribed premises component before Part V Division 3 approvals are obtained from DWER.	Pre-works; ongoing	Environment team	Approvals register current; hold-point sign-offs on file	ss.7, 11; Table 16 (regulatory sequencing)
EMP-02	Works approval and licensing	Finalise the scope of regulated activities (Category 37 char manufacturing) through the works approval design package and DWER pre-application discussions; obtain works approval then licence before commissioning and operation.	Design / pre-construction	Environment team	DWER correspondence; issued works approval and licence	s.11
EMP-03	Development approval	Prepare and submit a Development Application to the City of Karratha and the Regional Development Assessment Panel incorporating traffic, fire risk, dust, noise, stormwater, emissions, environmental management and future staging.	Pre-construction	Mardie Pastoral Company	DA lodgement and determination records	s.12.1
EMP-04	Building approval	Obtain building approval(s) as required under the *Building Act 2011* (WA) for processing facility structures.	Pre-construction	Mardie Pastoral Company	Building permits on file	s.12.3
EMP-05	EPBC self-assessment and referral trigger	Retain the documented EPBC significant impact self-assessment. Refer the action under the EPBC Act if pre-clearance surveys or operations identify a likely significant impact on any MNES; apply the precautionary approach while ~ 95% of the pilot area remains unsurveyed.	Pre-clearing; reviewed each stage	Environment / approvals team	Self-assessment record retained; survey results reviewed against Table 14 conclusions	ss.10.8–10.9; Table 15
EMP-06	Decision gateways and contingency	Progress beyond Stage 1 only on demonstrated satisfaction of Decision Gates 1–5 (rehabilitation success, environmental performance, pastoral outcomes, biochar research outcomes, future development assessment). If the pilot does not meet target outcomes, implement the s.5.7 contingency: continue managing rehabilitated areas under pastoral lease obligations.	End of Stage 1	MPC / BMP boards	Stage 1 completion report; gate decisions minuted	ss.5.6–5.7; Tables 3–4
EMP-07	Annual review and corrective action	Undertake annual review of environmental performance against this EMP and the rehabilitation success criteria; document corrective actions and adaptive management responses.	Annual	Environment team	Annual report; corrective action register	s.14; Table 3; Appendix B
B. Biodiversity — pre-clearance assessment and fauna protection						
EMP-08	Staged pre-clearing habitat assessment	Undertake staged pre-clearing flora and fauna habitat walk-overs on an accessibility basis as exterior mesquite removal opens access; adjust retention zones according to findings.	Progressive, ahead of each clearing front	Site supervisor	Walk-over records; retention zone mapping updates	ss.9.3, 10.8
EMP-09	Night parrot screening	Complete the pre-clearing spinifex-maturity screen for night parrot (*Pezoporus occidentalis*); exclude from clearing any structurally suitable old-growth *Triodia* hummock areas identified, and deploy targeted acoustic monitoring where warranted.	Pre-clearing, each front	Site supervisor	Screening records; exclusion mapping; any ARU deployment data	s. 9.3; Table 15
EMP-10	PEC clay-plan mapping	Map potential Roebourne Plains gilgai clay-plan PEC vegetation ahead of clearing; adjust clearing envelope and retention zones to avoid PEC occurrences.	Pre-clearing, each front	Environment team	PEC mapping; retention zone	s. 9.3; s. 9.2

ID	Aspect and objective	Management action	Timing / phase	Responsibility	Monitoring and evidence	Report cross-reference
					adjustments documented	
EMP-11	Greater bilby sign search	Undertake pre-clearing sign searches for greater bilby (*Macrotis lagotis*) in suitable habitat; establish exclusion buffers around any active sign.	Pre-clearing, each front	Environment team	Sign-search records	Table 15
EMP-12	Daylight-only clearing and fauna spotters	Restrict clearing operations to daylight hours; engage fauna spotters during active clearing to detect and relocate fauna, addressing residual interaction risk for northern quoll (*Dasyurus hallucatus*) and other transient species.	During clearing	Site supervisor	Daily records; fauna encounter log	Table 15
EMP-13	Pilbara olive python protocols	Apply riparian/drainage-line buffers and spotter protocols for Pilbara olive python (*Liasis olivaceus barroni*) potentially dispersing along drainage lines.	During clearing	Site supervisor	Buffer compliance checks; encounter log	Table 15; MA6
EMP-14	Selective parkland clearing	Remove mesquite only. Retain native trees, remnant vegetation, desirable grasses and groundcover wherever practical — including *Triodia* groundcover and riparian trees that sustain foraging habitat for Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) and hunting habitat for grey falcon (*Falco hypoleucos*).	During clearing	Site supervisor	Post-clearing retention audits against clearing plan	MA1; Table 15; Appendix C
EMP-15	Biodiversity monitoring	Implement the biodiversity monitoring program: ecological/flora surveys every 2–3 years, fauna monitoring annually to every 2–3 years, with results feeding adaptive management.	Per Appendix B schedule	Environment team	Survey reports; monitoring database	s.14; Appendix B
C. Aboriginal cultural heritage						
EMP-16	Heritage avoidance and WAC oversight	Maintain avoidance protocols and no-go areas for registered heritage sites (including Wiruwandi Plain ACH-00010351 and Mardie Salt Thalu 01 ACH-0038619, both outside the clearing area); Wirrawandi Aboriginal Corporation, as 49% owner, retains an active and ongoing role in ensuring heritage sites are not impacted.	All phases	Mardie Pastoral Company	Site inductions; no-go area mapping; WAC consultation records	ss.4.2–4.3; Table 16; Figures 13–15
EMP-17	Heritage clearances and unexpected finds	Obtain heritage clearances if and as required before ground disturbance; apply a stop-work and notification protocol for any unexpected heritage finds during clearing or construction.	Pre-works; during works	Site supervisor	Clearance records; incident/stop-work log	s.4.3; Appendix C
D. Soils, erosion and land stability						
EMP-18	Seasonal scheduling and wet-weather controls	Schedule bulk clearing and haulage in the dry season; apply wet-weather shutdown triggers; exclude machinery from gilgai clay plains when wet; maintain cyclone preparedness and demobilisation triggers.	Programming / during works	Site supervisor	Works program; shutdown/trigger records	MA2; risks S2–S3, W4
EMP-19	Staged clearing fronts	Stage clearing fronts so that stabilisation and rehabilitation keep pace with clearing; limit the open cleared area awaiting stabilisation at any time (open-area hygiene).	During clearing	Site supervisor	Front-by-front tracking of cleared vs stabilised area	MA3; s.8.5
EMP-20	Groundcover and root retention	Retain roots and groundcover in situ where practical (balanced against regrowth control needs); retain groundcover strips oriented against the prevailing erosive wind.	During clearing	Site supervisor	Retention audits; photopoints	MA4; risk S1
EMP-21	Erosion and sediment controls	Install and maintain erosion and sediment controls at work fronts, tracks and crossings (banks, sumps, brush bunds from cleared non-seed-bearing material); complete pre-wet-season stabilisation of disturbed ground.	During works; pre-wet-season	Site supervisor	Control inspections; pre-wet-season checklist	MA8; risks S1–S2, W1

ID	Aspect and objective	Management action	Timing / phase	Responsibility	Monitoring and evidence	Report cross-reference
EMP-22	Infrastructure siting	Site the wood yard, long-term stockpiles and hardstands on pre-disturbed or low-value ground above design flood levels, informed by the RPS/Advisian flood mapping (undertaken for BCI Minerals).	Design	Engineering team	Siting review against flood mapping	MA9; risk W2
E. Mesquite biosecurity and regrowth control (BAM Act C3 containment)						
EMP-23	Seed-bearing topsoil management	Identify, segregate and manage contaminated (mesquite seed-bearing) topsoil within infested ground; do not export it to clean areas; screen material destined for the processing plant.	During clearing / processing	Operations team	Topsoil handling records; screening records	MA10; risk S4
EMP-24	Machinery and vehicle hygiene	Apply machinery and vehicle hygiene (clean-down) when leaving mesquite-infested areas.	All phases	All personnel	Clean-down records	MA11
EMP-25	Prompt biomass processing	Chip and remove windrows without carrying seed-bearing material through a wet season; schedule clearing of heavy seed-load stands outside peak pod drop.	Programming	Operations team	Windrow age tracking; processing throughput records	MA12; risk W3
EMP-26	Follow-up regrowth control	Committed follow-up mesquite control: surveillance from the first post-rain germination flush; targeted chemical and manual treatment of regrowth and seedlings; early monitoring supported by drone surveillance.	Post-clearing (ongoing)	Rehabilitation team	Treatment logs; drone/satellite imagery; regrowth density mapping	MA13; Table 16; Table 3
EMP-27	Downstream surveillance	Establish downstream surveillance transects along drainage lines leaving cleared ground; recover flood-mobilised debris and treat any propagule establishment (preventing conversion of a clearing benefit into a downstream infestation).	Post-event; seasonal	Rehabilitation team	Transect inspection records; treatment logs	Risk W3; MA20
F. Groundwater and surface water						
EMP-28	Riparian and drainage buffers	No blade clearing within riparian/drainage buffers; excavator-only selective mesquite removal within buffers; no windrows, stockpiles or spoil in drainage lines or mapped flow paths.	Planning / during works	Site supervisor	Buffer compliance inspections	MA6; risks W1–W2
EMP-29	Drainage crossings	Use designated, stabilised drainage crossings only; close crossings during flow events; inspect and repair crossings and controls after events.	During works	Site supervisor	Crossing register; post-event inspection records	MA7; risk W4
EMP-30	Hydrocarbon management	Bunded refuelling and maintenance areas at least 100 m from drainage lines and shallow-water-table ground; spill kits on all plant; hydrocarbon incident reporting and corrective action.	During works	Site supervisor	Spill kit checks; incident register	MA14; risk G1
EMP-31	Herbicide controls	Herbicide selection, rates, buffers and weather constraints per label and APVMA permits; certified operators only; no soil-residual products on permeable sands adjacent to drainage lines; maintain application records.	Follow-up control	Operations team	Application records; operator certifications	MA15; risk G1
EMP-32	Water quality surveillance	Opportunistic post-event inspection of drainage lines leaving cleared fronts (turbidity, debris); corrective action where sediment plumes or debris accumulations are observed.	Post-event	Environment team	Inspection records; corrective actions	MA16; risk W1
EMP-33	Groundwater protection	No groundwater abstraction or excavation below the water table within the clearing scope. Any future borefield or deep excavation to be preceded by hydrogeological and stygofauna assessment and DWER 5C licensing, sited clear of the Mardie Pool capture zone.	Design gate	Environment team	Design review records; any 5C licence	MA17; risk G2
EMP-34	Waterlogging and salinisation monitoring	Monitor low-lying cleared ground for unexpected waterlogging or salinisation after wet seasons, reflecting the altered evapotranspiration balance following deep-rooted weed removal.	Post-wet-season, annual	Environment team	Hydrological monitoring records (Appendix B)	Risk G2; Appendix B

ID	Aspect and objective	Management action	Timing / phase	Responsibility	Monitoring and evidence	Report cross-reference
EMP-35	BCI Minerals interface protocol	Obtain BCI monitoring bore locations before works; demarcate and buffer all bores; written coordination before any works within the 54ha overlap with the Mardie Salt development envelope or near the haul road corridor; notify BCI of works that could influence monitoring data.	Ongoing	Environment team	Interface agreement; coordination correspondence	MA18; risk G3
EMP-36	Pre-cyclone-season readiness	Before each cyclone season: process or pull back windrows in flood-prone ground; secure stockpiles; inspect and clear flow paths; recover debris along drainage lines after events.	Seasonal	Site manager	Pre-season checklist; post-event records	MA20; risks W2–W4
G. Bushfire and facility fire management						
EMP-37	Bushfire risk assessment	Specialist bushfire consultants to undertake a detailed bushfire risk inspection including a 150 m buffer, mapping vegetation and topography in accordance with AS 3959:2018, and assess the development against State Planning Policy 3.7 and the Planning for Bushfire Guidelines (November 2024); results to inform final siting of processing facilities.	Design / DA stage	Environment team	BAL assessment report	s. 12.2
EMP-38	Bushfire Management Plan and Emergency Plan	Prepare a Bushfire Management Plan (mapping all vegetation within 150 m; demonstrating compliance with the four Bushfire Protection Criteria) and a Bushfire Emergency Plan in accordance with the WAPC Bushfire Emergency Plan Manual.	Pre-construction	Environment team	Approved plans; annual review	s. 12.2
EMP-39	Facility fire hazard management	Implement the Fire Hazard Management Plan for the processing facility: separation distances between biomass stockpiles and process heat sources, hot-work controls, firefighting access, water supply and personnel induction.	Operations	Site manager	Plan implementation audits; hot-work permits	Table 16; Appendix C; s. 14
H. Air quality and dust						
EMP-40	Dust management	Weather-aware operations: no clearing or chipping in high-wind conditions.	During works	Site supervisor	Daily weather records	MA5; risk S1; s. 14
EMP-41	Process emissions	Develop the emissions inventory and air pollution control systems for the pyrolysis facility through the works approval process; operate per approved operational procedures.	Works approval / operations	Engineering team	Works approval conditions; emissions monitoring per licence	Table 16; s. 11
I. Rehabilitation, monitoring and reporting						
EMP-42	Progressive rehabilitation	Return biochar and screened fines to cleared areas with GPS-recorded application; seeding and groundcover re-establishment targets tied to Stage 1 success criteria; monitoring plots and photo-points established.	Progressive	Environment team	GPS application records; plot data; photopoints	MA19; Table 3
EMP-43	Success criteria monitoring	Monitor rehabilitation against the Table 3 success criteria (mesquite removal and suppression, reinfestation prevention, groundcover establishment, soil stability, biochar/soil improvement, pasture productivity, adaptive grazing, cultural access, research outputs, compliance, scalability).	Ongoing	Environment team	Criteria dashboard; RCM-style assessments	s. 5.6; Table 3
EMP-44	Monitoring schedule	Implement the Appendix B monitoring schedule: remote sensing (annual), photo-points (annual), ecological/flora surveys (2–3 yearly), fauna monitoring (annual to 2–3 yearly), soil monitoring (3-yearly), hydrological monitoring (annual), pastoral condition monitoring (annual), and independent review at least 5-yearly.	Per schedule	Environment team	Monitoring records; independent review reports	Appendix B
EMP-45	Biochar application	Establish biochar application trial plots with soil sampling and monitoring of carbon, moisture and nutrients; report on biochar performance, soil carbon permanence and rehabilitation outcomes through research partnerships.	Progressive	Biomass Projects	Trial design; soil sampling data; research reports	s. 14; Table 3

ID	Aspect and objective	Management action	Timing / phase	Responsibility	Monitoring and evidence	Report cross-reference
	trials and soil monitoring					
EMP-46	Adaptive grazing management	Prepare and implement adaptive grazing management planning: transition towards a seasonal agistment model with younger cattle; adjust stock numbers to seasonal conditions, pasture availability and land condition; strategic fencing and watering infrastructure to support rotational grazing.	Post-rehabilitation	Mardie Pastoral Company station management	Grazing plans; stocking records	s. 5.5; s. 14; Table 3
EMP-47	Annual rehabilitation reporting	Prepare an annual rehabilitation report documenting monitoring results, adaptive management responses and progress against completion criteria; implement seedbank management and nursery propagation measures per the Rehabilitation Strategy.	Annual	Environment / team	Annual report issued; adaptive management register	Appendix B; s. 14
EMP-48	Completion sign-off	Assess rehabilitated areas against the Appendix B completion criteria, with multi-party sign-off (MPC, BMP, WAC and regulators as applicable) on completion of Stage 1.	End of Stage 1	Mardie Pastoral Company	Completion criteria assessment; sign-off records	Appendix B; Table 4
EMP-49	Records and evidence	Maintain the records and evidence regime across all EMP actions: treatment logs, application records, GPS records, inspection checklists, monitoring data, incident registers and approvals correspondence, retained and auditable for the life of the project.	All phases	Environment team	Document control system; audit results	Appendix C; Table 3; s. 14

***Notes**: MA numbers refer to Table 10 (Proposed management measures to minimise soil degradation, groundwater and surface water risks); risk codes S1–S4, G1–G3 and W1–W4 refer to Table 9; Table 15 is the EPBC Significant Impact Assessment Summary; Table 16 is the general project risk table. Responsibilities are indicative and should be confirmed against the project organisational structure before issue.*

This EMP is designed to be updated through the annual review and corrective action process (EMP-07) and will be superseded or supplemented by condition-specific management plans required by the clearing permit, works approval, licence and Development Approval as those instruments are granted.

15 Conclusion

Mardie Pastoral Co considers that the Mardie A Project is fundamentally a pastoral land rehabilitation and declared pest management initiative directed at restoring the pastoral utility, environmental condition and long-term sustainability of Mardie Station.

The project has been designed as a staged rehabilitation program supported by ancillary infrastructure required to enable the productive utilisation of removed mesquite biomass and the return of biochar to Mardie soils. Stage 1 is a limited pilot intended to demonstrate the rehabilitation methodology and inform future decision-making, not to establish a permanent industrial facility on pastoral land.

Mardie Pastoral Co will continue to work collaboratively with DPLH, the Pastoral Lands Board, DWER, DPIRD, Traditional Owners and other stakeholders to ensure that the project proceeds in a manner consistent with sustainable pastoral land management, responsible environmental stewardship and long-term rehabilitation outcomes.

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Appendices

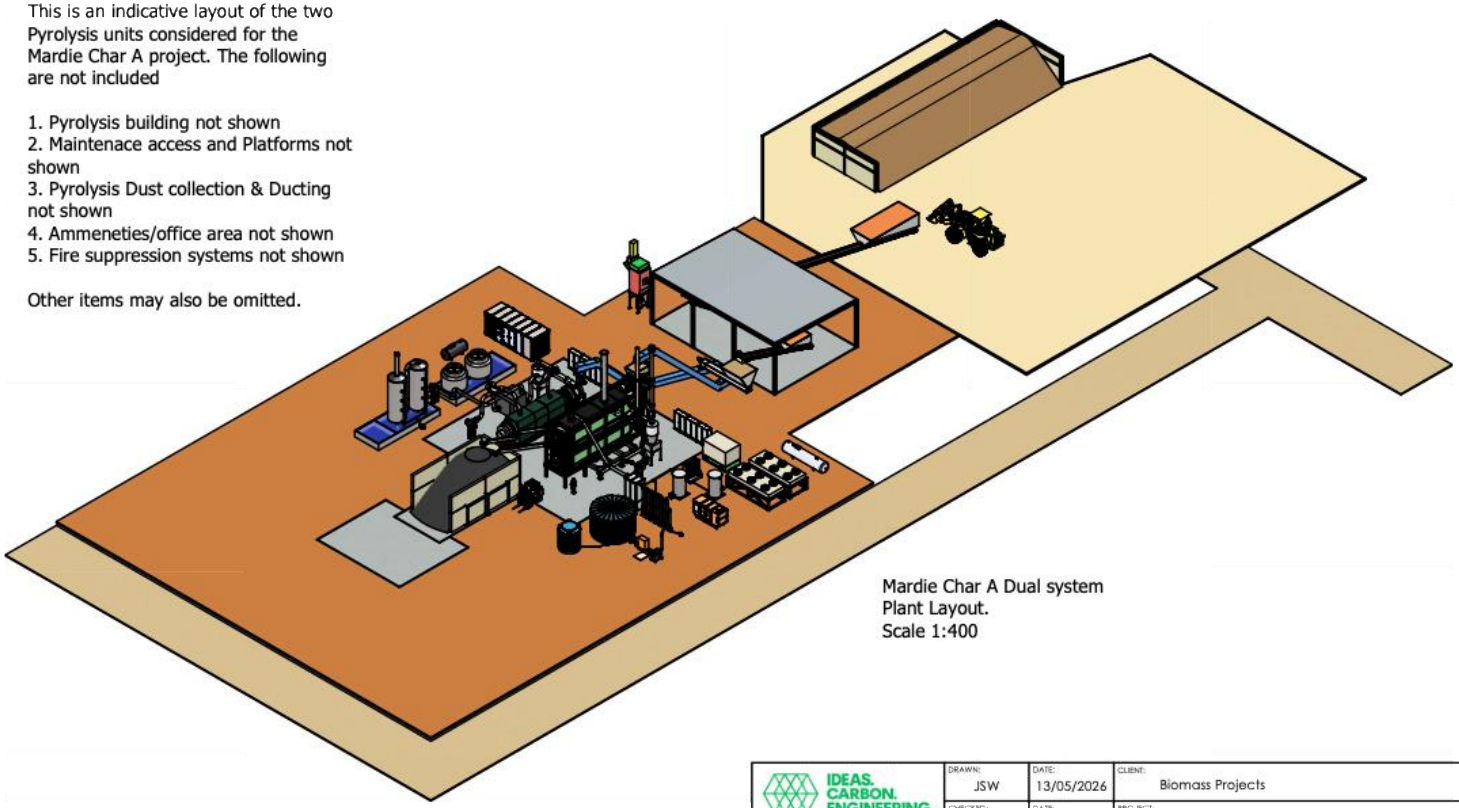
Appendix A Mardie A Facility Layout / General Arrangement

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NOTE
This is an indicative layout of the two Pyrolysis units considered for the Mardie Char A project. The following are not included

1. Pyrolysis building not shown
2. Maintenace access and Platforms not shown
3. Pyrolysis Dust collection & Ducting not shown
4. Ammeneties/office area not shown
5. Fire suppression systems not shown

Other items may also be omitted.



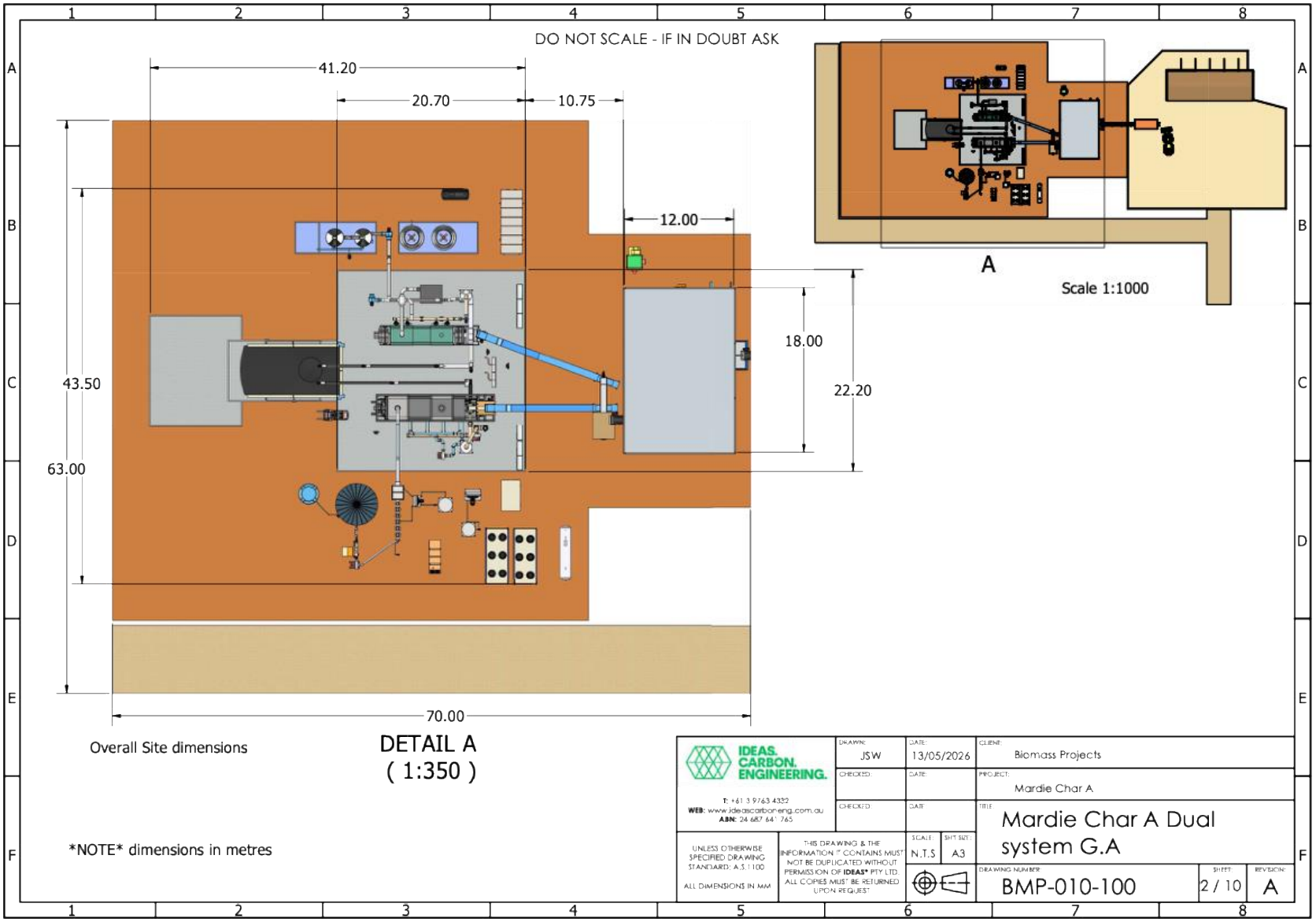
Mardie Char A Dual system
Plant Layout.
Scale 1:400

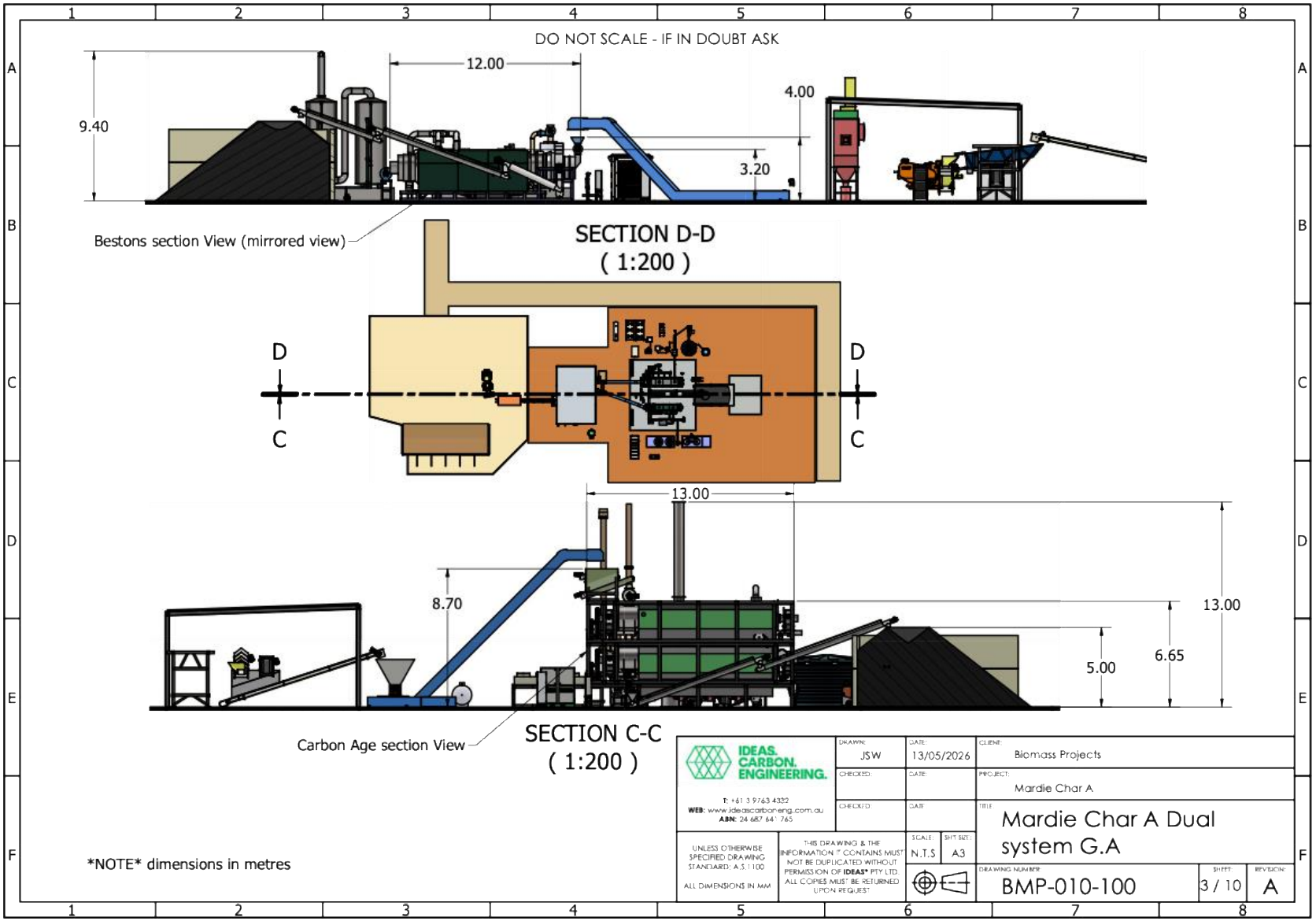
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Bestons section View (mirrored view)
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Carbon Age section View
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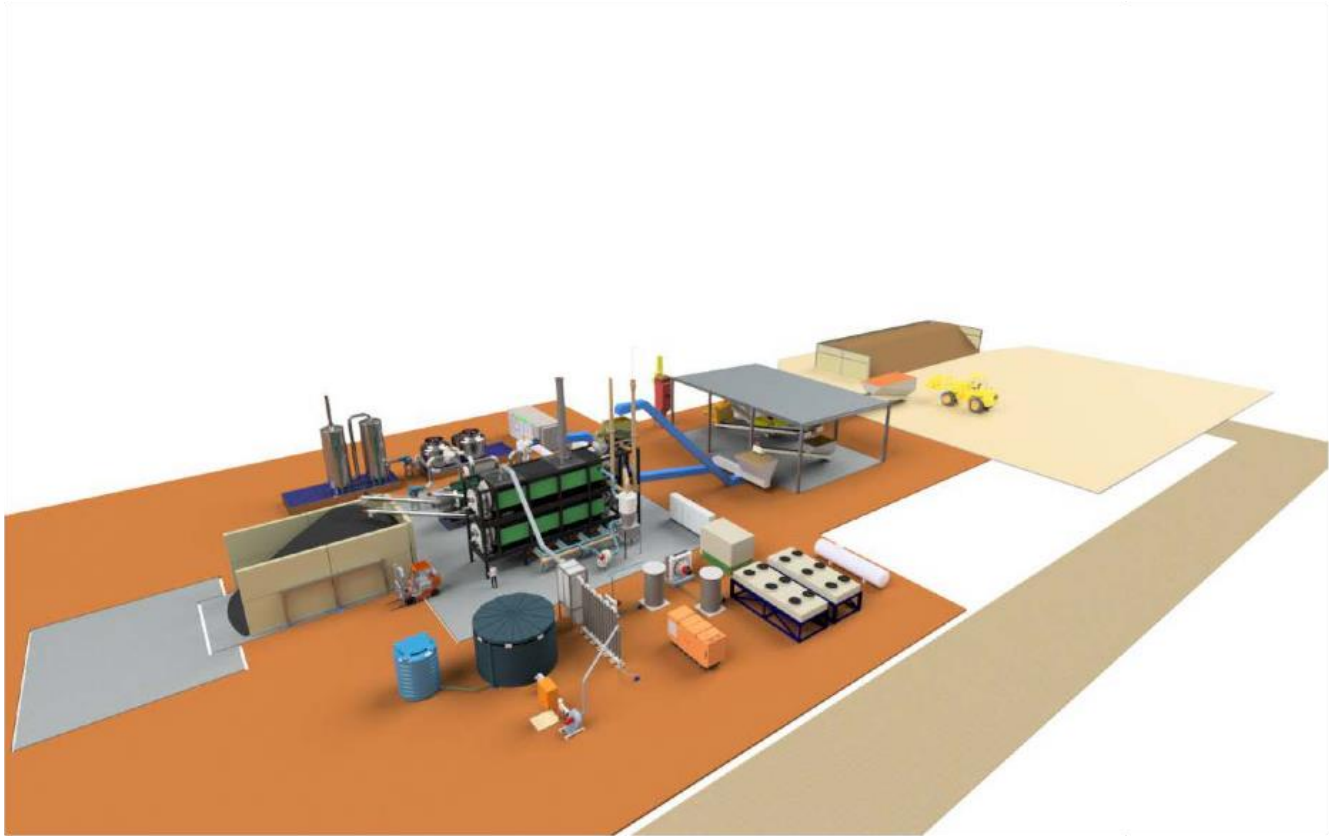
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Dual Pyrolysis system infeed view

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Overview of plant layout. Carbon Age Pyrolysis system in foreground.

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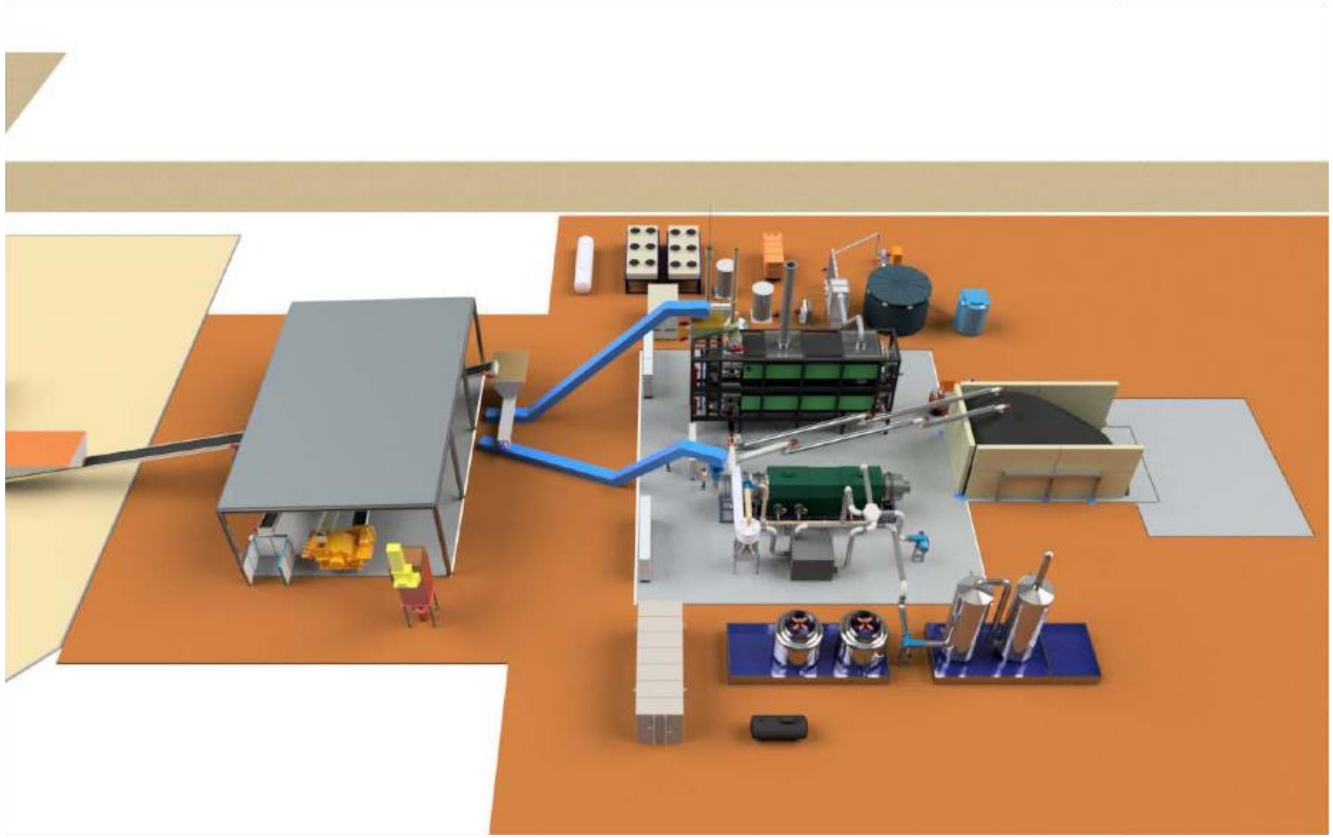
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Overview of plant layout. Bestons Pyrolysis system in foreground.

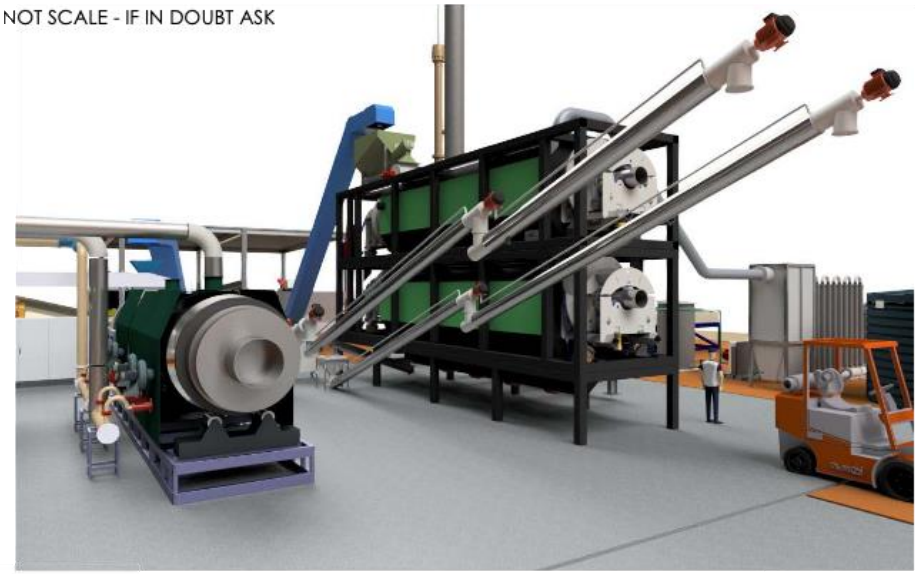
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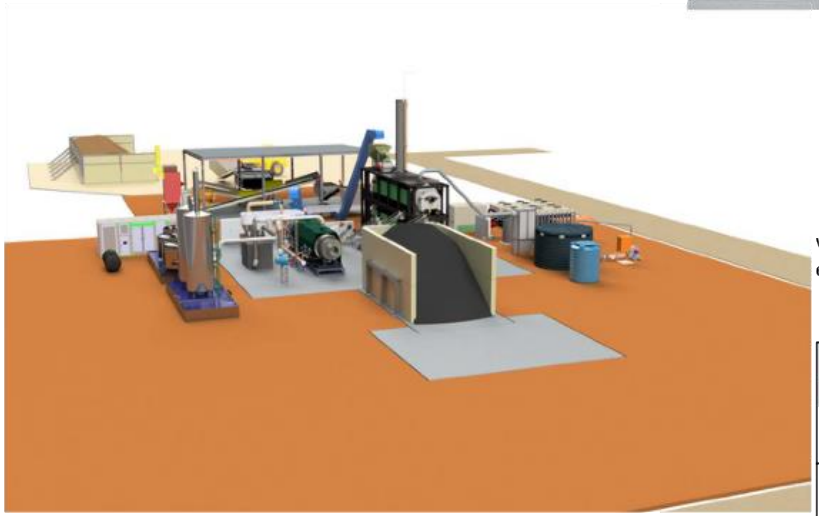
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View of outfeed screws, (*note* end product storage hidden).





View of product outfeed and end product storage

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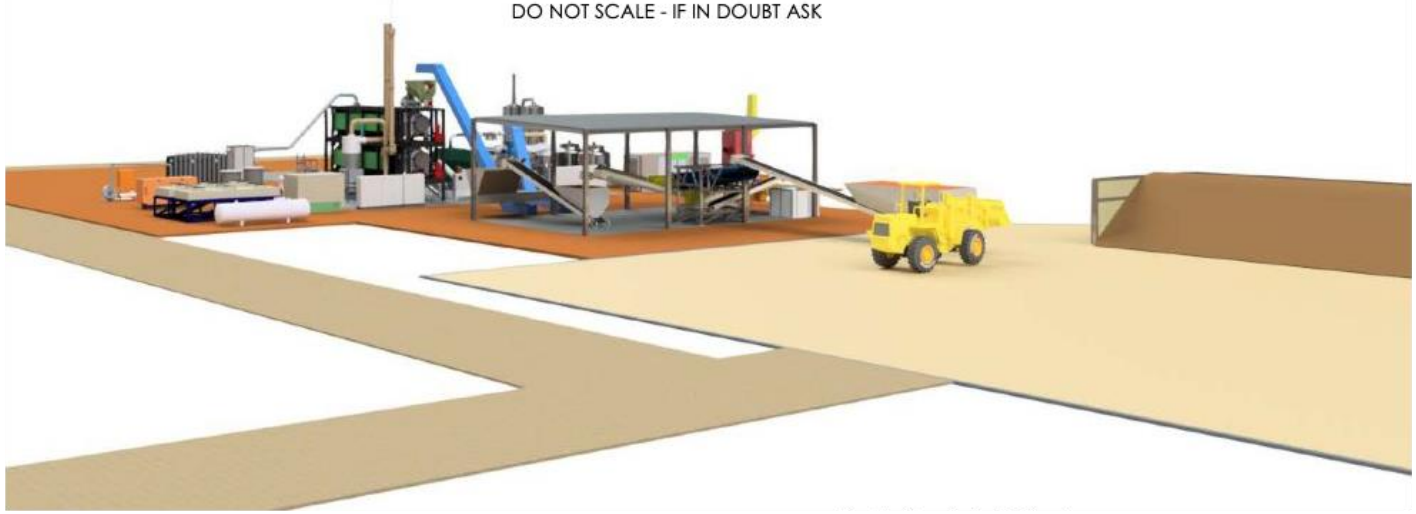
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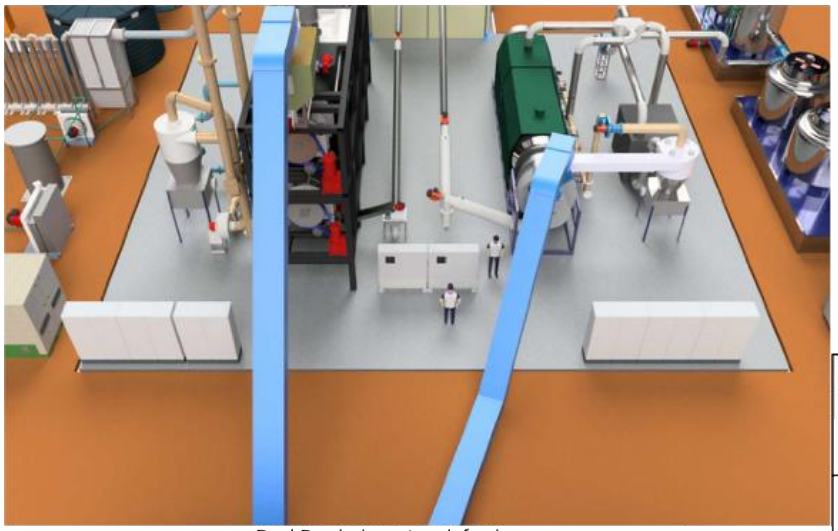
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Mardie Char A plant infeed area and re-sizing area.



Dual Pyrolysis system infeed.

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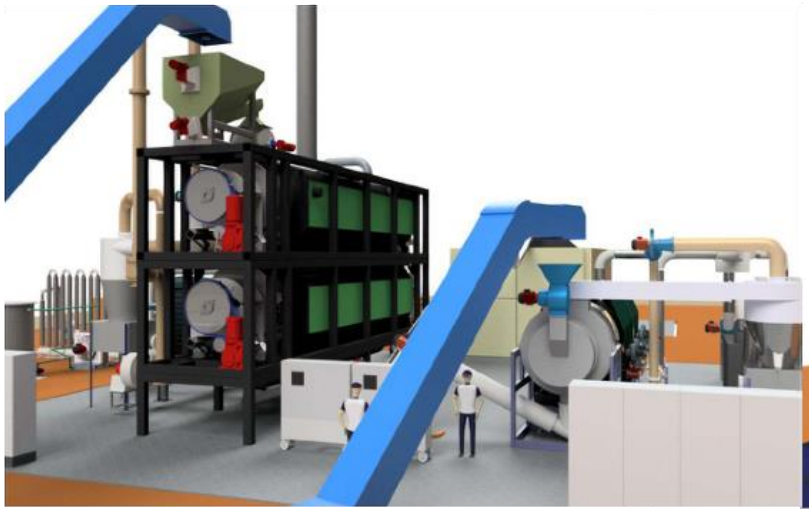
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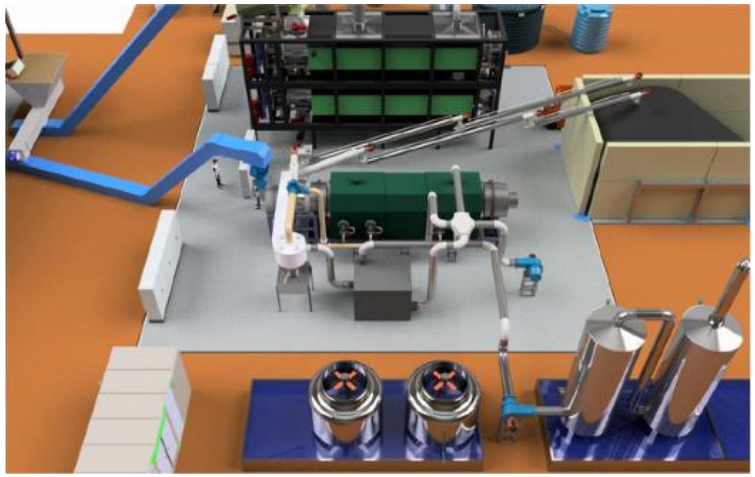
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Bestons BST-50 Pyrolysis unit and auxiliary component views

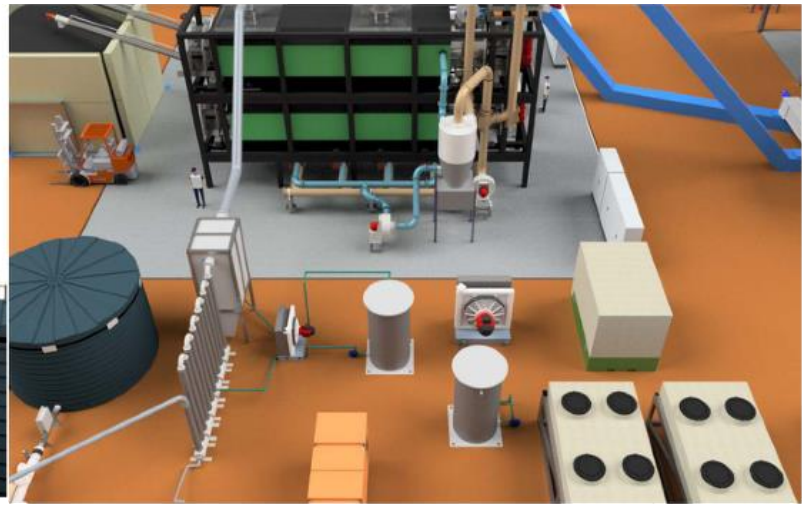
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Carbon Age CA1710 Pyrolysis unit
and auxiliary component views

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APPENDIX B

Rehabilitation Strategy, Reference Ecosystem Framework and Completion Criteria

Mardie Char Project - Mardie Station, Pilbara Region, Western Australia

Prepared by Mardie Pastoral Co Pty Ltd and Biomass Projects Pty Ltd

Document purpose

This appendix sets out a practical rehabilitation strategy and completion framework for mesquite-affected areas of Mardie Station. It is intended to support government, regulator, investor and auditor review by explaining how rehabilitation targets will be developed, implemented, monitored and verified over time.

Contents

1. Introduction
2. Rehabilitation vision and end-state
3. Existing site context and rehabilitation challenge
4. Reference ecosystem framework
5. Rehabilitation methodology
6. Native seed collection and nursery development program
7. Rehabilitation research and development program
8. Success indicators and completion criteria
9. Monitoring methods and verification framework
10. Rehabilitation completion assessment checklist
11. Adaptive management framework
12. Governance, reporting and independent review
13. Target landscape condition
14. Conclusion

1 Introduction

The Mardie Char Project is fundamentally a land rehabilitation initiative designed to address one of the largest infestations of mesquite (Prosopis spp.) on pastoral land in Western Australia. The project seeks to restore ecological function, pastoral productivity, cultural access and long-term landscape resilience across affected areas of Mardie Station through the progressive removal of mesquite and implementation of a structured, science-based rehabilitation program.

This appendix presents the framework that will guide rehabilitation planning, implementation, monitoring and assessment throughout the life of the project. It establishes the methodology for defining rehabilitation targets, measuring success and determining when rehabilitated areas can be considered to have achieved acceptable completion outcomes. The framework is intended to support the requirements of pastoral land administration, declared pest management and responsible land stewardship.

A key challenge for rehabilitation planning at Mardie is the absence of a clearly defined pre-disturbance benchmark. Mesquite infestation has progressively altered large areas of the station over many decades, while historical pastoral activities have also influenced vegetation composition and landscape condition. Mardie Station was settled in the late 1800s and the landscape has therefore experienced more than a century of pastoral use. As a result, it is neither practical nor scientifically robust to prescribe a final rehabilitation endpoint based solely on current information.

Instead, the rehabilitation program adopts a reference ecosystem approach. Rehabilitation objectives and completion criteria will be informed by assessments of comparable landscapes within the Pilbara region that have remained free from significant mesquite infestation or have experienced lower levels of historical disturbance. These reference areas may include neighbouring pastoral properties, regional conservation reserves and other representative ecosystems that provide insight into the vegetation communities, ecological processes and land condition likely to have existed in the absence of mesquite invasion. Traditional ecological knowledge, historical records and regional vegetation mapping will also contribute to the development of a Reference Ecosystem Framework.

The project recognises that successful rehabilitation extends beyond weed removal alone. Long-term recovery requires the re-establishment of stable soils, functional vegetation communities, productive pasture systems, fauna habitat, healthy hydrological processes and culturally accessible landscapes. Rehabilitation success will therefore be assessed using a suite of environmental, pastoral and cultural indicators rather than a single performance measure.

Recognising the scale of the infestation and the unique nature of the project, this Rehabilitation Strategy is intended to function as a living framework. Information obtained through reference ecosystem studies, flora and fauna surveys, rehabilitation trials, biochar research, monitoring programs and adaptive management reviews will progressively refine rehabilitation prescriptions, species selection, completion criteria and monitoring methodologies.

Overarching rehabilitation completion principle

Rehabilitation will be considered complete when rehabilitated areas demonstrate sustained control of mesquite, stable landforms, self-sustaining vegetation communities, improving ecological function, acceptable pastoral condition, recovery trajectories consistent with agreed reference ecosystem benchmarks, and the capacity to be managed under normal pastoral operations without ongoing rehabilitation intervention. Completion will be assessed using a weight-of-evidence approach incorporating vegetation condition, biodiversity outcomes, soil health, hydrological function, pastoral productivity, cultural outcomes and long-term land stability indicators.

2 Rehabilitation vision and end-state

The long-term vision is to transform mesquite-dominated areas of Mardie Station into resilient, productive and ecologically functional pastoral landscapes. The project aims to restore land capability and landscape health in a way that supports environmental outcomes, sustainable grazing, Indigenous stewardship and long-term public benefit.

- Sustained reduction and long-term suppression of mesquite reinfestation.
- Stable soils and reduced erosion risk.
- Functional native grassland, shrubland and riparian vegetation communities.
- Improved pasture productivity and grazing resilience.
- Improved habitat values and biodiversity recovery.
- Improved access to culturally significant areas and stronger Indigenous land management opportunities.
- A scalable rehabilitation model that can be applied to other mesquite-affected pastoral landscapes.

3 Existing site context and rehabilitation challenge

Mardie Station is a large pastoral lease in the Pilbara region that has been significantly affected by mesquite infestation and historical pastoral use. Mesquite has reduced land accessibility, suppressed native and pastoral vegetation, affected drainage and water access, and contributed to reduced pastoral utility in affected areas.

The rehabilitation challenge is not simply to remove mesquite. The project must also re-establish groundcover, stabilise soils, prevent reinfestation, support fauna return, protect hydrological values and enable rehabilitated areas to be managed as part of a sustainable pastoral enterprise.

4 Reference ecosystem framework

The Reference Ecosystem Framework will provide the scientific basis for setting rehabilitation targets and completion criteria. This is necessary because the current condition of mesquite-affected areas does not provide a reliable guide to the vegetation communities and ecological functions that should be restored.

4.1 Reference site sources

Reference source	Role in the framework
Neighbouring pastoral properties	Properties on either side of Mardie that have been more conservatively managed and contain lower levels of mesquite impact may provide practical reference examples of comparable pastoral landscapes in the absence of severe infestation.
Regional conservation estate	Conservation reserves and less disturbed regional ecosystems may assist in identifying native plant systems, structural vegetation patterns, fauna habitat values and ecological functions suitable for rehabilitation planning.
Historical information	Historical aerial imagery, regional vegetation mapping, rangeland survey material and land use records may assist in reconstructing likely pre-infestation landscape condition.
Traditional ecological knowledge	Traditional Owner knowledge can assist in identifying culturally significant plants, historical access routes, water places and landscape values that should inform rehabilitation priorities.
Scientific and industry rehabilitation knowledge	Rehabilitation methods used by the Pilbara mining industry may assist with seed treatment, propagation, landform stability, monitoring methods and completion criteria design.

4.2 Flora gap analysis

Following reference site assessment, BMP will prepare a flora gap analysis identifying species currently present, species suppressed by mesquite, species potentially lost from affected areas, and species suitable for reintroduction. The analysis will inform seed collection, nursery development, revegetation trials and completion criteria.

5 Rehabilitation methodology

The rehabilitation methodology is based on progressive treatment areas, staged implementation and adaptive management. It links mesquite removal with biomass processing, biochar production, soil rehabilitation, revegetation and improved pastoral management.

Step	Description
1. Prioritise treatment areas	Identify mesquite-affected areas based on infestation severity, pastoral value, environmental sensitivity, cultural access priorities and operational feasibility.
2. Remove mesquite	Undertake targeted mechanical removal using methods appropriate to site conditions while retaining desirable native vegetation and landscape features where practicable.
3. Process biomass	Process suitable mesquite biomass through pyrolysis to produce biochar and reduce reliance on conventional burning or disposal methods.
4. Prepare rehabilitation surfaces	Undertake ripping, scarification, contour management, erosion control and soil preparation as required.
5. Apply biochar where appropriate	Use biochar in research plots and rehabilitation areas to test soil health, moisture retention and plant establishment outcomes.
6. Re-establish vegetation	Use natural regeneration, direct seeding, assisted regeneration and nursery-grown plants depending on site condition and reference ecosystem targets.
7. Manage grazing adaptively	Use fencing, water management, timing and stocking strategies to protect early rehabilitation outcomes and enable long-term pastoral use.
8. Monitor, evaluate and refine	Monitor performance against indicators and adjust treatment methods as evidence develops.

6 Native seed collection and nursery development program

A successful rehabilitation outcome requires the re-establishment of vegetation communities appropriate for the ecological, pastoral and climatic conditions of the Pilbara. While natural regeneration is expected to contribute to recovery, active revegetation may be required in some areas to accelerate rehabilitation, improve ecosystem resilience and reintroduce species that may have been lost or suppressed through mesquite infestation and historical land use.

6.1 Species identification program

- Species currently occurring on Mardie Station.
- Species occurring on reference ecosystems and neighbouring pastoral properties.
- Species that have declined or disappeared from mesquite-affected areas.
- Species important for biodiversity, erosion control and landscape stabilisation.
- Species important for pastoral productivity.
- Species of cultural significance identified through engagement with Traditional Owners.

6.2 Seed collection and seedbank development

Seed collection activities may be undertaken from Mardie Station, adjacent pastoral properties, regional conservation areas, Indigenous managed lands and other suitable Pilbara reference ecosystems where approvals are available. Collected seed will be catalogued and stored within a

project seedbank to support future rehabilitation works and safeguard the availability of locally adapted plant genetics.

6.3 Nursery development

BMP intends to progressively establish a rehabilitation nursery capable of propagating priority native grasses, shrubs and other species identified through ecological surveys and reference ecosystem studies. The nursery may support plant production, research trials, seed increase programs, Indigenous training and employment opportunities, and collaborative rehabilitation research with industry and government.

7 Rehabilitation research and development program

The Mardie Char Project represents a significant opportunity to develop practical rehabilitation methods for large-scale mesquite-affected landscapes. Given the scale of the infestation and limited precedent for landscape-scale rehabilitation of this type, BMP proposes an ongoing research and development program to support continuous improvement.

Research theme	Potential focus
Reference ecosystem development	Comparative analysis of adjacent pastoral properties, conservation estate, historical records, Traditional Owner knowledge and regional vegetation mapping.
Vegetation establishment trials	Direct seeding, species selection, seed treatment, nursery propagation and seasonal establishment performance.
Biochar rehabilitation trials	Soil moisture retention, soil carbon, plant establishment, soil biological activity, nutrient cycling and erosion resistance.
Grazing and pastoral recovery studies	Recovery rates following mesquite removal, stocking strategies, carrying capacity changes and long-term pasture resilience.
Hydrological recovery	Groundwater response, riparian recovery, surface water retention, waterhole persistence and landscape water function.
Fauna return monitoring	Habitat utilisation, bird diversity, reptile and mammal observations, and habitat structure development.

8 Success indicators and completion criteria

Completion criteria will be developed using a weight-of-evidence approach. At this stage, absolute numerical thresholds should be treated as provisional until reference ecosystem assessment and baseline monitoring have been completed. The framework below identifies the core indicators and monitoring methods that should be used to assess rehabilitation progress and completion readiness.

Rehabilitation element	Completion criterion	Monitoring methods
Mesquite control	Mesquite no longer dominates treated areas and does not inhibit ecological or pastoral function. Regrowth is present only at manageable levels and no mature seed-producing mesquite remains in completed areas.	Drone mapping; satellite imagery; fixed photo points; field transects; weed surveys; seedling counts.
Land stability	Rehabilitated landforms remain stable with no active erosion attributable to rehabilitation activities. Drainage lines and surface soil condition remain stable following rainfall events.	Erosion assessments; drainage inspections; drone surveys; photopoints; post-rainfall inspections.
Groundcover recovery	Vegetation cover protects the soil surface and demonstrates sustained improvement relative to baseline and reference ecosystem benchmarks. Bare ground declines over time.	Satellite NDVI analysis; quadrat surveys; drone imagery; groundcover transects; photopoints.
Native flora recovery	Native vegetation communities re-establish, persist and trend towards reference ecosystem composition and structure. Priority species are present or appropriately reintroduced.	Botanical surveys; floristic inventories; permanent quadrats; recruitment counts; reference site comparison.

Rehabilitation element	Completion criterion	Monitoring methods
Soil health	Soil condition supports vegetation establishment and shows stable or improving indicators, including soil carbon, infiltration, moisture retention and biological activity.	Soil sampling; laboratory analysis; infiltration testing; soil stability assessments; biochar trial monitoring.
Fauna recovery	Native fauna utilise rehabilitated areas and habitat values increase as vegetation structure develops.	Camera traps; bird surveys; reptile surveys; opportunistic observations; habitat assessments.
Hydrology and groundwater	Surface water and groundwater systems show no adverse project impacts and, where measurable, trend towards improved hydrological function after mesquite removal.	Groundwater monitoring bores; water quality sampling; riparian condition assessments; waterhole observations; drainage surveys.
Pastoral function	Rehabilitated areas are capable of supporting sustainable grazing under managed pastoral operations and demonstrate improved forage availability relative to baseline.	Pasture assessments; carrying capacity estimates; grazing records; rangeland condition assessments; stock utilisation surveys.
Cultural outcomes	Mesquite removal and rehabilitation improve access to culturally significant areas and support Traditional Owner participation in land management.	Traditional Owner assessment; access mapping; site inspections; program reporting.
Regulatory condition	Land condition achieves or demonstrates a trajectory towards acceptable rangeland condition and no outstanding corrective actions remain.	Rangeland Condition Monitoring; independent audits; annual rehabilitation reporting; completion inspections.

9 Monitoring methods and verification framework

The monitoring program should combine remote sensing, permanent field sites, ecological surveys, hydrological monitoring, pastoral performance monitoring and independent review. The intent is to provide both landscape-scale and site-specific evidence of rehabilitation performance.

Monitoring method	Purpose	Indicative frequency
Remote sensing	Satellite imagery, NDVI analysis, drone surveys and mapping to measure vegetation cover, mesquite extent, bare ground and erosion patterns.	Annual and following major events where relevant.
Permanent monitoring sites	Fixed photopoints, permanent quadrats, transects, soil plots and grazing exclosures to provide repeatable long-term datasets.	Annual for photopoints and groundcover; every 2-3 years for detailed ecological surveys.
Flora monitoring	Species inventories, quadrat surveys, recruitment counts and reference ecosystem comparison.	Every 2-3 years, with annual checks in active treatment areas.
Fauna monitoring	Camera traps, bird surveys, reptile surveys, habitat assessments and opportunistic records.	Annual or every 2-3 years depending on indicator and site sensitivity.
Soil monitoring	Soil carbon, chemistry, infiltration, stability, moisture retention and biological indicators.	Every 3 years and as required for biochar trials.
Hydrological monitoring	Groundwater levels, water quality, waterhole persistence, drainage line stability and riparian condition.	Annual, with additional review after major rainfall or flood events.
Pastoral monitoring	Pasture biomass, carrying capacity, grazing pressure, stocking records and rangeland condition.	Annual, aligned with pastoral management cycles.
Independent review	External review of monitoring data, completion readiness and adaptive management responses.	At key milestones and at least every five years for strategy review.

10 Rehabilitation completion assessment checklist

The checklist below provides a practical field assessment tool for determining whether a treatment block is ready for completion assessment. It should be completed for each treatment block and supported by monitoring records, maps, photographs and specialist reports where applicable.

Assessment area	
Treatment block ID	
Assessment date	
Assessor(s)	
Reference ecosystem benchmark	

Mesquite control

Assessment item	Yes	No	N/A	Comments
Mesquite has been removed from the treatment area.	☐	☐	☐	
No mature seed-producing mesquite remains.	☐	☐	☐	
Mesquite regrowth is present only at manageable levels.	☐	☐	☐	
No evidence of landscape-scale reinfestation.	☐	☐	☐	
Follow-up control measures have been completed where required.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Land stability

Assessment item	Yes	No	N/A	Comments
Rehabilitation area is free from significant erosion.	☐	☐	☐	
Drainage patterns remain stable.	☐	☐	☐	
No active gullying observed.	☐	☐	☐	
Surface soils remain intact following rainfall events.	☐	☐	☐	
Groundcover provides adequate soil protection.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Vegetation and flora recovery

Assessment item	Yes	No	N/A	Comments
Groundcover has established throughout the treatment area.	☐	☐	☐	
Vegetation demonstrates increasing cover over time.	☐	☐	☐	
Vegetation is self-sustaining without intensive intervention.	☐	☐	☐	
Native recruitment is observed.	☐	☐	☐	
Species composition is trending towards reference ecosystem benchmarks.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Soil health

Assessment item	Yes	No	N/A	Comments
Soil surface is stable.	☐	☐	☐	
No significant soil loss observed.	☐	☐	☐	
Soil health indicators show improvement from baseline.	☐	☐	☐	
Biochar application areas are performing as intended where applied.	☐	☐	☐	
Soil function supports vegetation establishment.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Fauna and habitat recovery

Assessment item	Yes	No	N/A	Comments
Native fauna observed utilising rehabilitation areas.	☐	☐	☐	
Bird species diversity increasing or stable relative to baseline.	☐	☐	☐	
Habitat structures suitable for fauna are present.	☐	☐	☐	
No significant ecological barriers identified.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Hydrology and groundwater

Assessment item	Yes	No	N/A	Comments
No adverse impacts on groundwater identified.	☐	☐	☐	
Watercourses remain stable.	☐	☐	☐	
Riparian areas show signs of recovery where relevant.	☐	☐	☐	
Water monitoring program maintained.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Pastoral recovery

Assessment item	Yes	No	N/A	Comments
Area capable of supporting sustainable grazing.	☐	☐	☐	
Pasture productivity exceeds baseline or trends positively.	☐	☐	☐	
Stock access improved.	☐	☐	☐	
Grazing pressure appropriately managed.	☐	☐	☐	

Assessment item	Yes	No	N/A	Comments
Area capable of normal pastoral operation.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Cultural and Indigenous outcomes

Assessment item	Yes	No	N/A	Comments
Cultural access improved following mesquite removal.	☐	☐	☐	
Traditional Owners involved in monitoring and assessment.	☐	☐	☐	
Rehabilitation outcomes support cultural land management objectives.	☐	☐	☐	
No identified cultural access constraints remain in the treatment area.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Regulatory compliance

Assessment item	Yes	No	N/A	Comments
Rehabilitation objectives achieved or on an agreed trajectory.	☐	☐	☐	
Land condition consistent with Pastoral Lands Board expectations.	☐	☐	☐	
Monitoring obligations completed.	☐	☐	☐	
No outstanding corrective actions identified.	☐	☐	☐	
Area suitable for transition to routine pastoral management.	☐	☐	☐	

Outcome: ☐ Complete ☐ Further management required

Final rehabilitation completion determination

Category	Complete	In progress	Not achieved
Mesquite control	☐	☐	☐
Land stability	☐	☐	☐
Vegetation recovery	☐	☐	☐
Flora recovery	☐	☐	☐
Soil health	☐	☐	☐
Fauna recovery	☐	☐	☐
Hydrology	☐	☐	☐
Pastoral function	☐	☐	☐
Cultural outcomes	☐	☐	☐
Regulatory compliance	☐	☐	☐

11 Adaptive management framework

The rehabilitation strategy is based on adaptive management principles. Rehabilitation prescriptions will be reviewed and refined as new monitoring information becomes available. This approach ensures that rehabilitation outcomes are guided by observed ecological responses rather than fixed assumptions made at project commencement.

Adaptive management cycle Plan -> Implement -> Monitor -> Evaluate -> Adjust -> Reimplement	
Monitoring finding	**Potential management response**
Vegetation establishment below expectations	Modify species selection, change seeding rates, adjust soil preparation or increase nursery planting.
Mesquite regrowth above target levels	Increase follow-up control, surveillance, treatment frequency or buffer management.
Erosion identified	Undertake stabilisation works, review drainage design and increase groundcover protection.
Poor plant survival	Review planting timing, soil preparation, water availability, biochar rates and species suitability.
Poor grazing performance	Modify grazing management, stocking rates, fencing, water points or rest periods.
Reduced biodiversity outcomes	Review habitat requirements, species selection, structural diversity and connectivity.
Hydrological concerns	Investigate causes and implement site-specific mitigation where needed.

12 Governance, reporting and independent review

BMP will maintain overall responsibility for the planning, implementation, monitoring and reporting of rehabilitation activities. The program will be supported through engagement with Wirrawandi Aboriginal Corporation, pastoral land managers, ecological specialists, rehabilitation practitioners, regulators, research institutions and industry partners.

Reporting or review mechanism	**Purpose**
Annual rehabilitation report	Areas treated, mesquite control activities, monitoring results, revegetation performance, flora and fauna observations, soil and groundwater monitoring, research findings and corrective actions.
Independent ecological review	Review of monitoring data quality, rehabilitation methods, completion criteria, recovery trajectory and residual risks.
Five-year strategic review	Assessment of overall progress, effectiveness of management actions, new ecological information, research outcomes and required updates to rehabilitation prescriptions.
Completion assessment records	Treatment block checklist, monitoring evidence, maps, photographs, specialist sign-off and recommended completion determination.

13 Target landscape condition

Following successful rehabilitation, former mesquite-dominated areas are expected to exhibit a stable and resilient landscape condition. The target condition is not a static vegetation endpoint but a functioning pastoral ecosystem capable of maintaining ecological and productive values over time.

Current degraded state	**Rehabilitation pathway**	**Target future state**
Dense mesquite infestation	Parkland-style removal and follow-up control	Sustained mesquite suppression
Poor ground access	Clearing, tracking and adaptive management	Improved pastoral and cultural access
Low groundcover and erosion risk	Soil preparation, biochar trials and revegetation	Stable soils and resilient groundcover
Suppressed vegetation communities	Reference ecosystem planning, seed collection and nursery	Native grassland, shrubland and riparian recovery

Current degraded state	Rehabilitation pathway	Target future state
	propagation	
Reduced biodiversity values	Habitat restoration and monitoring	Improved fauna utilisation and ecosystem function
Reduced pastoral utility	Grazing management and pasture recovery	Sustainable pastoral productivity

14 Conclusion

The Mardie Char Project presents a unique opportunity to rehabilitate one of the largest contiguous mesquite infestations on pastoral land in Western Australia while establishing a scalable model for long-term landscape restoration across the Pilbara. The project is fundamentally focused on returning degraded land to productive pastoral, environmental and cultural use through the progressive removal of mesquite, restoration of ecological function and implementation of sustainable land management practices.

The rehabilitation strategy recognises that successful restoration of mesquite-affected landscapes cannot be achieved through weed removal alone. Long-term success will depend on the recovery of vegetation communities, soil function, hydrological processes, biodiversity values and pastoral productivity. The project therefore adopts a holistic rehabilitation approach that integrates mesquite management, biochar-assisted soil improvement, revegetation, adaptive grazing management, cultural stewardship and ongoing ecological monitoring.

Importantly, the project acknowledges that final rehabilitation targets cannot be fully defined at the commencement of the program. The establishment of reference ecosystems, flora and fauna surveys, seed collection programs, rehabilitation trials and ongoing monitoring activities will progressively refine rehabilitation objectives and completion criteria over time. This adaptive management approach ensures that rehabilitation decisions are informed by site-specific evidence, scientific research and observed environmental outcomes rather than assumptions.

The Reference Ecosystem Framework provides the foundation for meaningful and scientifically defensible rehabilitation benchmarks. By drawing upon adjacent pastoral properties, regional conservation reserves, Traditional Owner knowledge and ecological research, the project seeks to define realistic restoration trajectories that reflect the ecological potential of the landscape while recognising the long history of pastoral land use across the region.

The monitoring, reporting and completion criteria framework has been designed to provide transparency, accountability and continuous improvement throughout the life of the project. Rehabilitation success will be assessed using a weight-of-evidence approach that considers ecological, pastoral, hydrological, cultural and land condition outcomes collectively. The ultimate measure of success will not be the achievement of a single numerical target, but the establishment of a resilient and self-sustaining landscape capable of functioning without ongoing rehabilitation intervention.

Through implementation of this Rehabilitation Strategy, BMP aims not only to rehabilitate Mardie Station but also to demonstrate a repeatable model for the management and restoration of mesquite-affected landscapes throughout Western Australia and other arid regions facing similar land degradation challenges.

Final rehabilitation outcome statement
The Mardie Char Project seeks to restore mesquite-affected land to a resilient, productive and ecologically functional pastoral landscape that supports biodiversity, sustainable grazing, cultural stewardship and long-term environmental health. Rehabilitation will be considered successful when treated areas demonstrate sustained control of mesquite, stable landforms, self-sustaining vegetation communities, recovery trajectories consistent with agreed reference ecosystem benchmarks, improved ecological and hydrological function, and the capacity to be managed through normal pastoral operations without ongoing rehabilitation intervention.
Legacy objective
Beyond rehabilitation of Mardie Station, the project aims to establish the ecological knowledge, seed resources, monitoring methodologies and practical experience required to support landscape-scale rehabilitation of mesquite infestations throughout the Pilbara and broader rangelands of Western Australia, creating a lasting legacy of environmental restoration, Indigenous partnership and sustainable land stewardship.

Completion assessment sign-off

Role	Name	Signature	Date
BMP Rehabilitation Manager			
Wirrawandi Representative			
Pastoral Lessee Representative			
Independent Ecologist			
Regulator / PLB Representative, if required			

Appendix C Mardie A Stage 1 Clearing and Material Handling Methodology

APPENDIX C

Mardie A Stage 1
Clearing and Material Handling Methodology

Pastoral land rehabilitation, declared pest management and ancillary biomass processing infrastructure

Project	Mardie A Stage 1 Rehabilitation Project
Site	Mardie Station, Pilbara, Western Australia
Proponent	Mardie Pastoral Co Pty Ltd / Biomass Projects Pty Ltd, as applicable
Prepared by	Mardie Pastoral Co Pty Ltd
Date	August 2026

Purpose: This document provides a guide to mesquite clearing, biomass recovery, transport, drying, sizing, storage and return-to-soil interfaces as part of the pastoral rehabilitation program on Mardie Station.

Document Control

Date	Version	Prepared / reviewed by	Status
August 2026	Working Draft	Biomass Projects Pty Ltd / Mardie Pastoral Co	Draft for government approvals engagement

1. Purpose

This document describes the clearing and material handling aspects of Mardie A Stage 1. It provides the practical sequence from mesquite mapping and selective clearing through to biomass collection, transport, drying, sizing, storage, pyrolysis feed preparation and return of biochar and fines to rehabilitation areas.

The document should be read as a supporting technical narrative to the Mardie A Stage 1 Approvals Overview. It reinforces that the processing infrastructure is ancillary to the pastoral rehabilitation program and provides the means by which mesquite biomass generated through rehabilitation activities can be managed safely, productively and transparently.

Stage 1 is framed as a limited pilot and enabling phase. Its purpose is to demonstrate clearing, biomass handling, biochar production and rehabilitation performance under Pilbara conditions before any future expansion is considered through separate assessment and approvals.

The operational sequence is designed to limit soil disturbance, preserve desirable vegetation where practical, reduce open burning, provide controlled material handling and return biomass-derived products to the rehabilitation area.

2. Scope of Clearing and Material Handling Activities

The clearing and material handling scope for Mardie A is limited to activities required to support Stage 1 rehabilitation and associated biochar return-to-soil trials.

Activity area	Included in Stage 1	Approvals relevance
Pre-clearing mapping and survey	Satellite imagery, drone survey, on-ground inspection, drainage and heritage exclusions, remnant native vegetation identification.	Supports clearing permit design, avoidance hierarchy and environmental management measures.
Selective parkland clearing	Removal of mesquite while retaining larger native trees, remnant vegetation and groundcover wherever practical.	Demonstrates that clearing is targeted at declared pest management and rehabilitation, not broadacre vegetation removal.
Biomass recovery and consolidation	Use of mobile plant to consolidate mesquite biomass into controlled stockpiles or windrows for processing.	Reduces uncontrolled stockpiling, supports fire and dust management and enables traceable handling.
Chipping and transport	Mobile grinder/chipper near clearing fronts, loading into chip trailers and haulage to the Stage 1 wood yard.	Provides operational control over material movement, traffic, dust, emissions and haulage routes.
Wood yard drying and sizing	Windrow drying, turning, moisture management, oversize removal, re-chipping and fines separation.	Supports feedstock specification, process safety and emissions control.
Feed preparation and storage	Stacking, reclaiming and controlled conveyance to pyrolysis units.	Supports works approval design, prescribed premises assessment and operational controls.
Return of products to land	Return of biochar and separated fines to rehabilitation areas, with application records and monitoring.	Links processing directly to rehabilitation outcomes and Stage 1 success criteria.

3. Operational Sequence

1. Survey, mapping and exclusion planning. The treatment area is mapped before clearing using satellite imagery, drone survey and ground verification. The objective is to identify mesquite density, remnant native vegetation, drainage features, access constraints, heritage exclusions and no-go areas before machinery enters the work front.

2. Work front establishment. Clearing boundaries, access routes, stockpile locations and temporary exclusion zones are marked. Operators are briefed on heritage, environmental and vegetation retention requirements before work commences.

3. Selective parkland clearing. Mesquite is removed using a selective parkland methodology. The intent is to remove the invasive woody weed while retaining large native trees, remnant vegetation, desirable grasses and sensitive drainage features wherever practical.

4. Biomass consolidation. Cleared mesquite is pushed or handled into stockpiles or windrows. Material is positioned to allow safe loading, minimise unnecessary ground disturbance and reduce repeated machinery passes.

5. Mobile grinding / chipping. An excavator or loader feeds the biomass into a mobile horizontal grinder or equivalent chipper. Chipping occurs close to the clearing area where practical to reduce truck movements of bulky unprocessed material.

6. Loading and internal haulage. Wood chips are loaded into suitable chip trailers and transported via internal station roads or approved haul routes to the Stage 1 wood yard. Haulage routes will be selected to avoid sensitive environmental and heritage areas.

7. Wood yard drying and conditioning. Wood chips are laid out in controlled windrows for drying using local hot, dry and windy conditions. Windrows are turned as required to improve consistency and reduce moisture before processing.

8. Sorting, re-sizing and fines management. Material is screened or sorted to remove oversize material and fines. Oversize chips are re-chipped. Fines such as soil, sand and dust recovered from the biomass handling process are retained for return to rehabilitation areas where suitable.

9. Controlled feed to pyrolysis. Within-specification material is transferred via stacker, reclaimer or conveyor systems to the pyrolysis feed system. Feedstock controls are used to manage moisture, size and contamination risk.

10. Biochar handling and return to soil. Biochar is cooled, collected, weighed and transferred for return to cleared rehabilitation areas. Application records, photos, GPS records and soil monitoring are intended to support the Stage 1 monitoring program.

4. Clearing Methodology

The Stage 1 clearing methodology is selective and rehabilitation-led. It is based on a parkland clearing approach in which mesquite is removed from treatment areas while larger native trees, remnant vegetation and other exclusion areas are retained wherever practical.

The role of pre-clearing mapping is central. Drone imagery, satellite interpretation and ground verification provide the information required to identify vegetation retention zones, drainage features, work front constraints and areas requiring more sensitive machinery selection.

A bulldozer fitted with a stick rake or equivalent low-disturbance clearing attachment may be used in suitable areas. In more sensitive areas, including around retained native trees, watercourses or heritage exclusions, smaller equipment such as excavators may be used to improve selectivity and reduce unnecessary disturbance.

The clearing approach will be adaptive. If an area is too sensitive for mechanical removal, alternative controls may be considered, including targeted chemical, biological or manual treatment in accordance with relevant approvals and site-specific management controls.

5. Indicative Equipment and Handling Functions

Equipment / system	Primary function	Key controls	Stage 1 relevance
Bulldozer with stick rake	Selective mesquite removal and consolidation.	Single-pass clearing where practical; avoid retained native vegetation; minimise soil disturbance.	Primary clearing tool in suitable dense mesquite areas.
Excavator with grab / rake	Selective removal, feeding grinder, working around sensitive areas.	Use for precision clearing near retained vegetation, drainage lines or exclusion zones.	Improves selectivity and handling control.
Mobile horizontal grinder / chipper	Reduces bulky mesquite into wood chips suitable for transport and drying.	Controlled feed rate; dust and fire controls; oversize management.	Enables efficient biomass recovery and reduces haulage of whole trees.
Chip trailer / internal haulage trucks	Transport chips from clearing fronts to wood yard.	Defined haul routes; speed limits; dust controls; load management.	Links dispersed clearing fronts to the Stage 1 processing area.

Wood yard windrows	Passive drying and staging of processed biomass.	Separation distances; moisture monitoring; turning; fire controls.	Uses Pilbara conditions to reduce feedstock moisture before processing.
Screening / sorting equipment	Removes oversize material and fines.	Re-chip oversize; retain suitable fines for return to soil.	Controls feedstock specification and contamination risk.
Stacker / reclaimer / conveyors	Controlled storage and feed delivery to processing unit.	Stockpile management; guarding; dust controls; feed consistency.	Reduces repeated mobile plant handling near pyrolysis feed system.
Spreader truck / rehabilitation equipment	Return biochar and suitable fines to cleared areas.	GPS records; application photos; application rate records; soil incorporation.	Connects material handling outputs to rehabilitation outcomes.

6. Environmental, Heritage and Safety Controls

Control area	Potential issue	Proposed management approach
Native vegetation retention	Potential damage to remnant native trees or desirable vegetation.	Pre-clearing mapping, operator briefings, GPS/no-go areas, use of smaller plant around retained vegetation and post-clearing survey.
Cultural heritage	Potential disturbance to heritage sites or culturally significant areas.	Heritage assessment, Traditional Owner engagement, mapped exclusions, stop-work protocol and culturally appropriate monitoring where required.
Soil disturbance and erosion	Wind or water erosion following clearing, hardstand establishment or haulage.	Single-pass clearing where practical, retention of roots and groundcover where possible, drainage-aware work fronts, erosion controls and progressive rehabilitation.
Dust and particulates	Dust from clearing, chipping, haulage, windrows and sorting.	Weather-aware operations, speed controls, defined haul roads, dust suppression where required and equipment design to minimise particulate loss.
Fire hazard	Biomass stockpiles, hot works, mobile plant, electrical systems and thermal processing.	Fire Hazard Management Plan, separation distances, water access, hot-work permits, housekeeping and stockpile monitoring.
Surface water and drainage	Drainage obstruction, sediment movement or erosion during rainfall events.	Avoid drainage features where practicable, maintain natural flow paths, stable crossings and sediment controls.
Regrowth and seedbank	Mesquite seedbank germination and regrowth after clearing.	Early surveillance, targeted follow-up control, groundcover recovery and adaptive grazing management.
Material traceability	Need to demonstrate link between cleared area, biomass handling and biochar return to soil.	Load records, GPS tracking, photo records, application records, monitoring plots and annual reporting.

7. Wood Yard and Feedstock Management

The wood yard is the controlled interface between field clearing operations and the Stage 1 processing facility. Its purpose is to receive chipped mesquite, dry and condition the material, remove oversize or unsuitable material, manage fines and provide consistent feedstock to the pyrolysis system.

Wood chips will be arranged in windrows for passive drying. Mardie Station is located in a hot, dry coastal Pilbara environment and the project intends to use these natural conditions to reduce moisture content before processing. Windrows will be managed to maintain access, separation, fire controls and routine inspection.

Feedstock specification is important for process stability. Oversize chips will be returned to a chipper or grinder for re-sizing. Soil, sand, dust and other fines separated during handling will be retained and returned to rehabilitation areas where suitable, rather than treated as a separate waste stream.

The material handling system is intended to reduce uncontrolled stockpiling and repeated mobile plant movements. Where practical, conveyors, stackers and reclaimers will be used to improve feed consistency, reduce handling losses and support safer operations around the processing facility.

8. Monitoring, Records and Evidence for Approvals

Evidence area	Example records	Purpose	Responsible function
Pre-clearing condition	Drone imagery, vegetation mapping, exclusion maps, photo-points.	Demonstrate baseline and clearing design.	Environment / approvals team.
Clearing implementation	Daily work fronts, machine logs, operator checklists, GPS tracks.	Demonstrate compliance with permit conditions and selective clearing approach.	Site supervisor / contractor.
Biomass handling	Stockpile records, chip volumes, moisture checks, transport records.	Demonstrate controlled handling and feedstock management.	Operations team.
Product return to soil	Biochar batch records, spreader loads, GPS application records, photos.	Demonstrate return of Stage 1 products to Mardie soils.	Operations / rehabilitation team.
Rehabilitation outcomes	Groundcover monitoring, regrowth inspections, treatment logs, soil sampling.	Demonstrate rehabilitation performance and adaptive management.	Rehabilitation / pastoral management team.
Incidents and corrective actions	Environmental incidents, dust/fire observations, corrective action reports.	Demonstrate responsive management and continuous improvement.	Site manager / HSE team.

9. Conclusion

The clearing and material handling system for Mardie A has been designed to support pastoral land rehabilitation rather than create an independent industrial land use. The system provides a practical and controlled pathway for removing mesquite, managing the biomass generated through clearing and returning biochar and suitable fines to Mardie soils as part of the rehabilitation program.

The proposed sequence of mapping, selective parkland clearing, biomass consolidation, mobile chipping, internal haulage, wood yard drying, sorting, controlled feed preparation and return-to-soil provides a clear operational framework for Stage 1. It also provides the basis for monitoring, reporting and adaptive management during the pilot.

By documenting these processes in a dedicated approvals support document, Mardie Pastoral Co can demonstrate to government agencies that clearing, biomass handling and processing infrastructure are integrated components of a rehabilitation methodology directed at restoring pastoral utility, improving land condition and managing a declared pest at practical scale.

Appendix D Annotated Bibliography: Relevant environmental assessments relevant to Mardie Station

Presented in chronological order. Note that this list is not exhaustive and will be added to.

No.	Author	Date	Title	Document Purpose	Abstract / Description of Contents
1	Dodd, J., Reeves, A. and Watkins, R.	November 2012	**Situation Statement: the 'Prickle Bush' Weeds (Mesquite, Parkinsonia and Prickly Acacia) in Western Australia**	DAFWA situation statement describing the distribution, impacts, stakeholders and management of the three 'prickle bush' weeds in the WA Rangelands, intended as a baseline snapshot to lead to state-level management and response plans. Contextual reference for mesquite management obligations on Mardie Station.	Covers mesquite (*Prosopis* spp. and hybrids), parkinsonia (*Parkinsonia aculeata*) and prickly acacia (*Acacia nilotica* subsp. *indica*), all Weeds of National Significance and high-priority Declared Plants in WA, primarily affecting the pastoral industry. Documented extents are approximately 349,836 ha of mesquite statewide (c. 303,502 ha in the Pilbara), extensive parkinsonia in the Kimberley plus c. 800 ha and 785 km of rivers in the Pilbara, and 15,000–17,000 ha of prickly acacia confined to the East Kimberley. Notes that the eradication-target declaration status of mesquite and parkinsonia is inconsistent with the national view that they should be control targets in WA. Key stakeholders include pastoral landholders, Recognised Biosecurity Groups, the Pilbara Mesquite Management Committee and Rangelands NRM, with property-level Weed Action Plans the principal management mechanism and livestock movement flagged as an important seed dispersal pathway. Distinguishes prickly acacia from the widespread mimosa bush (*Vachellia farnesiana*).
2	Commonwealth of Australia Department of the Environment	2013	**Matters of National Environmental Significance – Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999**	he Commonwealth's principal guidance for deciding whether an action is likely to have a significant impact on a matter of national environmental significance and therefore requires referral under the EPBC Act. The benchmark against which the Mardie A Pilot Project's self-assessment is framed.	The 39-page guidelines define a significant impact as one that is important, notable or of consequence having regard to its context or intensity, and establish that an impact is "likely" if there is a real or not remote chance or possibility. They set out significant impact criteria for each MNES category, including separate criteria for critically endangered/endangered species, vulnerable species (framed around "important populations"), threatened ecological communities, and migratory species (framed around "ecologically significant proportions" of populations and "important habitat"). The guidelines address direct and indirect impacts, the precautionary approach where information is limited, and describe the referral, assessment and approval process, with an appendix of sector-specific advice.
3	Department of Environment Regulation (DER)	December 2014	**A Guide to the Assessment of Applications to Clear Native Vegetation – Under Part V Division 2 of the Environmental Protection Act 1986 (ref. DER2014/001295)**	State guidance on how decision-makers assess clearing permit applications under Part V Division 2 of the EP Act, in particular evaluation against the ten clearing principles in Schedule 5, assessment under the Commonwealth–State bilateral agreement with the EPBC Act, and the application of environmental offsets. Framework reference for any clearing permit	The 60-page guide works through each of the ten Schedule 5 clearing principles, (a) to (j) — biological diversity, significant fauna habitat, rare flora, threatened ecological communities, remnant vegetation extent, watercourse and wetland association, land degradation, conservation-area values, water quality deterioration and flooding — providing for each principle guidance notes, worked examples, assessment steps and information sources (e.g. NatureMap, the WA Environmental Offsets Register). It describes when site visits, surveys and additional information are sought, how applications are handled under the bilateral agreement with the Commonwealth, and when environmental offsets may be applied. Each principle is framed as a presumption against clearing where the relevant environmental value is present; the document is expressly general guidance rather than legal advice.

No.	Author	Date	Title	Document Purpose	Abstract / Description of Contents
				application on Mardie Station.	
4	Ecoscape (Australia) Pty Ltd	16 December 2016 (Rev 1; Rev 0 dated 12 December 2016)	**Sino Iron Project Vertebrate Fauna Desktop Review (Report 11075-3861-16R)**	Desktop review commissioned by CITIC Pacific Mining Management to assess the suitability of previously completed vertebrate fauna surveys for the Sino Iron Project at Cape Preston against then-current development plans; lodged as Appendix E to an EPBC Act referral (2017/7862, per the filename). Relevant to Mardie as the adjoining major project c. 15 km north-east, informing cumulative impact considerations.	Reviews three phases of vertebrate fauna assessment for the Sino Iron Project — Halpern Glick Maunsell et al. (2001), Maunsell AECOM (2008) and Phoenix (2009) — together with four additional relevant surveys (Bennelongia 2008, Pendoley 2009, Phoenix 2008, Ecoscape 2016), across tenements including G08/52, G08/74, G08/123 and G08/126. Database searches (Commonwealth PMST, 40 km buffer; DPaW threatened and priority fauna, 50 km buffer; NatureMap; BirdLife Australia Birdata; Atlas of Living Australia, all November 2016) identified 35 MNES species from the PMST, including northern quoll (*Dasyurus hallucatus*), greater bilby (*Macrotis lagotis*), Pilbara leaf-nosed bat (*Rhinonicteris aurantia*), ghost bat (*Macroderma gigas*), night parrot (*Pezoporus occidentalis*), five marine turtles and the Pilbara olive python (*Liasis olivaceus barroni*). A total of 57 conservation significant species (three mammals, 50 birds, four reptiles) had been recorded in previous surveys at Cape Preston, with a further 15 assessed as having a medium to high likelihood of occurrence. The methodology and timing of the 2000 and 2008 baseline surveys were assessed as suitable against EPA (2002) and EPA/DEC (2010) guidance, with updated conservation listings incorporated to reflect the transition from the *Wildlife Conservation Act 1950* to the *Biodiversity Conservation Act 2016*.
5	Phoenix Environmental Sciences Pty Ltd	29 March 2018	**Memo: Mardie Salt Project Preliminary Flora and Vegetation and Terrestrial Fauna Assessment**	Interim memo informing the Pre-Feasibility Study, reporting early findings of the phase 1 detailed flora and vegetation survey and terrestrial fauna investigations; later appended (Appendix 5) to early approvals documentation supporting scoping of the EP Act Part IV assessment.	ummarises interim baseline survey work on the Mardie tenements between Dampier and Onslow. The phase 1 flora and vegetation survey (14–21 March 2018) completed 42 detailed sites (eight transects in *Tecticornia* communities, 29 quadrats of 50 × 50 m and five relevés), bringing combined survey locations to 79; conditions were sub-optimal after 11 months of below-average rainfall. Terrestrial fauna work comprised migratory shorebird aerial and ground counts (December 2017 and January 2018), aerial and land-based marine turtle surveys, SongMeter deployments in mangroves targeting the northern coastal free-tailed bat (*Ozimops cobourgianus*, P1), audio recorders at 12 sites for the night parrot (*Pezoporus occidentalis*) from December 2017 to March 2018, and a Level 1 fauna survey (14–21 March 2018) covering 70 sites. Methods followed EPA (2016) technical guidance and Commonwealth migratory shorebird guidelines.
6	Preston Consulting Pty Ltd	28 November 2018	**Mardie Project – Environmental Scoping Document**	Defines the form, content, timing and procedure of the environmental review of the Mardie Project (EPA Assessment No. 2167; EPBC 2018/8236) under s. 40(3) of the Environmental Protection Act 1986 (WA), conducted by the EPA as an accredited assessment under the bilateral agreement with the Commonwealth covering	Describes the proposed greenfields solar salt and sulphate of potash (SOP) project and export facility c. 80 km south-west of Karratha. Four development envelopes are defined with maximum disturbance limits: Ponds (9,200 ha within a 15,002 ha envelope), Marine (40 ha within 280 ha), Terrestrial Infrastructure (165 ha within 338 ha) and Transhipment Corridor (146 ha within 1,317 ha), with bitterns discharge of up to 3.6 GL/a, groundwater abstraction of up to 2 GL/a and dredging of up to 500,000 m³. Seven preliminary key environmental factors are identified (benthic communities and habitats, marine environmental quality, marine fauna, flora and vegetation, terrestrial fauna, inland waters, social surroundings) with the required survey and assessment work tabulated for each. Relevant MNES are listed threatened species and communities, listed migratory species and Commonwealth marine areas. Sets the agreed assessment timeline through a 10-week public review of the Environmental Review Document.

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				both Part IV requirements and MNES.	
7	Department of Water and Environmental Regulation	4 January 2019	**Decision Report – Application for Works Approval, Division 3, Part V Environmental Protection Act 1986: Works Approval W6172/2018/1 (Mardie Trial Project), including the Issued Works Approval**	ocuments DWER's assessment of Mardie Minerals' application (lodged 10 August 2018) for a works approval under Part V, Division 3 of the EP Act for the Mardie Trial Project (Category 14: solar salt manufacturing) and the determination to grant Works Approval W6172/2018/1 subject to conditions.	Assesses a two-year, nominal 1:10,000-scale pilot trial on tenements E08/1849 and E08/2741, 100 km south-west of Karratha, designed to confirm evaporation rates at each brine density stage, calibrate against Bureau of Meteorology records, and produce raw salt samples and waste bitterns for characterisation (design capacity 350 t/a salt and 7.5 t/a mixed potassium–magnesium salts). Works comprise a seawater inlet and 4.8 km HDPE pipeline, eight evaporation ponds (P1–P8), eleven crystallisers (C1–C11) and 21 pan evaporators; P1–P7 are unlined clay-bunded ponds while P8 and the crystallisers are HDPE-lined. Pond overflow and hypersaline seepage are identified as the key risk events, rated acceptable subject to conditions covering specified infrastructure, compliance reporting and a three-month commissioning period, with an issued licence required before operation. The full-scale Mardie Project is expressly excluded, being under separate Part IV assessment.
8	Department of Water and Environmental Regulation (DWER), Government of Western Australia	August 2019 (content stated current as at November 2013)	**A Guide to the Exemptions and Regulations for Clearing Native Vegetation – Under Part V of the Environmental Protection Act 1986**	State guidance explaining the circumstances in which native vegetation may be cleared without a clearing permit under Part V of the EP Act — the exemptions in Schedule 6 of the Act and those in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Companion to the permit-assessment and referral guidance; directly relevant to characterising the instrument mix for mesquite clearing on Mardie Station.	The 45-page guide is organised in two sections: Section 1 explains the Schedule 6 exemptions and Section 2 the exemptions under the Clearing Regulations, including regulation 4 (intentionally sown, planted or propagated vegetation, including plantations) and regulation 5 (prescribed clearing, including the five-hectare limit). It emphasises that clearing native vegetation without a permit or applicable exemption is an offence, and that the regulation-based exemptions do not apply in environmentally sensitive areas declared under s. 51B of the EP Act. An index of themes lists exempt activities by topic (e.g. clearing for roads and fence lines). Permits are issued by DWER or, for mineral and petroleum activities, DMIRS; other legislation may still impose requirements even where clearing is exempt under the EP Act.
9	RPS Group	29 November 2019	**BCI Mardie Salt Project – Coastal Inundation Studies, Report MAW0616J.006, Rev 3**	Tests whether the external walls of the proposed evaporation ponds would alter natural tidal inundation of the mangrove, saltmarsh and algal mat zones – a key impact question in the Part IV assessment; subsequently Attachment 2-1 to EPBC referral 2022/9169.	A DELFT3D Flow hydrodynamic inundation model was nested within a regional grid covering c. 300 km of the North West Shelf from Onslow to beyond the Dampier Archipelago, with TPXO8.0 tidal forcing and validation against tidal measurements in two creeks. Simulations compared a Base Case with a Pond Case, each re-run with an additional 0.9 m of sea level rise (the EPA-recommended 100-year allowance). Pond walls blocked landward flow at tidal peaks above c. 1.2 m MSL at the northern and southern ends and above c. 1.8 m MSL centrally, but depth increases were confined to within a few hundred metres of the walls and persisted only 15–30 minutes; no seaward areas that flooded in the Base Case remained dry in the Pond Case. Inundation frequency analyses across the algal mat and mangrove zones indicated wall effects dissipate before reaching these zones. Under 0.9 m sea level rise the clay plains would wet far more frequently and the project area would fill to more than 0.5 m depth during the annual king tide.
10	Phoenix Environmental Sciences Pty Ltd	12 February 2020	**Level 2 Targeted Terrestrial Fauna Survey Assessment for the Mardie**	Level 2 targeted terrestrial fauna assessment undertaken to the terms of reference in	Field surveys from December 2017 to August 2019 covered a 29,141.3ha Terrestrial Fauna Study Area and a 64,184.7ha Migratory Shorebird Study Area, including aerial and ground shorebird counts, marine turtle surveys, acoustic recording for bats and night parrot, SRE invertebrate searches and habitat mapping. In

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			Project – Final Report, v3.0 (Phoenix project 1189-MSP-BCI-ECO)	the Environmental Scoping Document, providing the baseline fauna evidence for the EP Act Part IV assessment; also Attachment 2_7-2 to EPBC referral 2022/9169.	total 179 vertebrate species were recorded (129 birds, 23 mammals, 26 reptiles, one amphibian), 33 of conservation significance, including the Pilbara leaf-nosed bat (*Rhinonicteris aurantia*, VU), northern coastal free-tailed bat (*Ozimops cobourgianus*, P1), northern quoll (*Dasyurus hallucatus*), western pebble-mound mouse (*Pseudomys chapmani*, P4) and lined soil-crevice skink (*Notoscincus butleri*, P4). Nesting evidence was recorded for flatback turtle within, and hawksbill turtle north of, the study area, with green turtles foraging in tidal creeks. The Migratory Shorebird Study Area met two criteria for nationally important shorebird habitat, supporting at least 15 East Asian–Australasian Flyway species, six exceeding 0.1% of flyway populations in single counts and three potentially in internationally important numbers.
11	Phoenix Environmental Sciences Pty Ltd	Undated (February 2020); component documents dated 8 and 13 January 2018	**Appendices 1–3 to the Level 2 Targeted Terrestrial Fauna Survey Assessment (Appendix 1: marine turtle survey results; Appendix 2: survey site descriptions; Appendix 3: bat call identification report SZ442)**	Technical appendices supporting the Phoenix Level 2 targeted terrestrial fauna survey assessment, supplied as Appendix 17 to the proponent's Part IV assessment documentation.	Appendix 1 presents Pendoley Environmental's marine turtle track survey data of 13 January 2018, recording adult tracks, nests, false crawls and abandoned egg chambers, predominantly flatback turtle with one hawksbill record, with GPS-located observations and habitat notes. Appendix 2 provides survey site descriptions, including targeted night parrot audio-recording sites (NP01–NP11) on *Triodia* grassland islands and saltflat margins, each with 2–16 nights (c. 24–192 hours) of recordings between 7 December 2017 and March 2018, with habitat, soil and disturbance details noting established *Prosopis* spp. and *Cenchrus ciliaris*. Appendix 3, Specialised Zoological report SZ442 (8 January 2018), analysed 703 WAV files from an SM2BAT detector and identified at least three bat species, noting some low-frequency calls could not be unambiguously attributed to either *Chaerephon jobensis* or *Saccolaimus flaviventris*.
12	RPS Group	11 June 2020	**Mardie Surface Water Assessment, Mardie Salt Project – Report EWP72667.002, Rev 0**	Surface water (hydrology and flood) assessment supporting environmental approval and preliminary engineering design of the proposed 4 Mtpa project. An earlier, shorter issue of the same report supplied as Appendix 15 (23 June 2020 issue, below).	Characterises the hydrology of the project area between the Robe and Fortescue River mouths, where evaporation ponds on supratidal mud flats extend over 25 km of coastline crossed by several creeks; average annual rainfall at Mardie Station is 277 mm (range 9–886 mm) against pan evaporation of c. 3,250 mm/a. Presents intensity–frequency–duration data, flood flow estimates, Fortescue River break-out analysis and coastal inundation considerations, and reports post-development hydraulic modelling of flood height, depth and hazard for 1, 10, 20, 50 and 100-year ARI events. Develops a conceptual flood mitigation design of flood bunds, floodways, culverts, lateral drains and drainage corridors between the ponds, with design flood levels and construction recommendations. Assesses hydrological impacts on downstream mangroves, fringing mudflats and algal mats for 1 and 10-year ARI scenarios, covering flow depth and velocity, inundation time, sediment loads and freshwater flows.
13	Phoenix Environmental Sciences Pty Ltd	23 June 2020	**Detailed Flora and Vegetation Survey for the Mardie Project – Final Report, v2.2**	Consolidated baseline flora and vegetation report used as Appendix 4 to the proponent's Part IV assessment documentation (EPA Report 1704). A later revision (v2.2) of the February 2020 report at Attachment 2_6-3, updated for mangrove mapping (v2.1) and survey of extrapolated areas (v2.2).	Consolidates field surveys over four seasons (autumn and spring 2018, spring 2019 and autumn 2020) across the 29,020.4ha study area, comprising 74 quadrats, 11 transects and 20 relevés. A total of 253 flora taxa (44 families, 122 genera; 245 native, 8 introduced) were recorded, including *Minuria tridens* (EPBC Act-listed; P1) and *Goodenia nuda* (P4), with distribution extensions for six species (*Amaranthus clementii*, *Carissa lanceolata*, *Cassytha aurea* var. *aurea*, *Cyperus rigidellus*, *Melaleuca lasiandra* and *Trianthema cusackianum*) and one *Tecticornia* taxon regarded as an undescribed species. Twenty-four vegetation types were defined (up from 14 in the February 2020 version), dominated by *Tecticornia* spp. shrublands (33.4% of vegetation), with 79.7% of vegetated areas in excellent to very good condition; 483 ha was mapped as the Horseflat Land System of the Roebourne Plains PEC and 11 vegetation types were considered significant.
14	AQ2 Pty Ltd	4 November 2020	**Memo – Mardie Project: Desktop Groundwater Risk Assessment**	Desktop review commissioned after DWER and DAWE submissions on the Environmental Review	Reviews geotechnical, hydrogeological and ecological data, comparing the differing geological models of Soilwater Group (2019) and CMW Geosciences (2020) and favouring the CMW six-unit layered model for analysing flow beneath the ponds. Groundwater beneath the supratidal flats is hypersaline (EC up to 210,000 µS/cm, 3–4 times seawater) with the water table generally less than 1 m below surface, whereas

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				Document identified that risks to vegetation, groundwater and pools from saline pond seepage were inadequately understood; consolidates existing information, identifies knowledge gaps and recommends further investigations. Later Attachment 6 to EPBC referral 2022/9169.	Mardie Pool, the only permanent waterhole in the development envelope, is fresh (EC 370–960 µS/cm), probably maintained by a freshwater lens and base flow. Soilwater modelling indicated hypersaline seepage from the crystallisers could reach the calcarenite aquifer within six months to two years under plausible seepage rates. The riparian species most vulnerable to salinisation are the obligate phreatophyte *Melaleuca argentea* and the aquatic *Typha domingensis*, while *Eucalyptus victrix*, *Sesbania formosa* and acacias are less groundwater dependent or more salt tolerant; literature supports the dependence of *Avicennia marina* mangroves and supratidal algal mats on fresh groundwater inflow. Recommends an expanded monitoring network, test pumping, density-dependent modelling and a groundwater management plan.
15	Mardie Minerals Pty Ltd	20 November 2020	**Mardie Project – Groundwater Monitoring & Management Plan, V0A (**	Draft environmental management plan prepared to the EPA's instructions for Part IV Environmental Management Plans, setting out groundwater monitoring and management measures for construction and operation so that indirect impacts on vegetation, ecosystems and pastoral use from altered groundwater regimes are minimised; prepared while the proposal was under assessment, anticipating the conditions later imposed by MS 1175.	Addresses the key environmental factor of Inland Waters for the proposed 4.4 Mtpa salt and 120 ktpa SOP operation drawing a 150 GL/a seawater intake, with pond construction then scheduled from July 2021. Environmental values at risk from saline seepage and groundwater mounding include benthic communities and habitats (mangrove, algal mat and samphire), Mardie Pool and its associated vegetation and fauna, groundwater-dependent terrestrial vegetation, and pastoral livestock watering bores. Summarises study findings including Soilwater Group (2019) seepage modelling, differing conceptual geological models (Soilwater Group 2019; CMW Geosciences 2020), and Phoenix flora survey results. Key components are expanded baseline hydrogeological investigations, an integrated monitoring network, seepage recovery systems, adaptive management with early response indicators, and consultation including with the Kuruma Marddudhunera and Yaburara Marddudhunera Traditional Owners and the pastoral leaseholder.
16	Pastoral Lands Board of Western Australia	December 2020	**Good Pastoral Land Management Guidelines, Version 1**	Foundational guidance from the Pastoral Lands Board to assist WA pastoral lessees to manage leases on an ecologically sustainable basis while maintaining productivity and financial viability, and to clarify the Board's expectations of pastoralists. Reference document for pastoral land management obligations relevant to Mardie Station.	The 292-page guidelines set out the legislative context for pastoral land management, including the Land Administration Act 1997, Biosecurity and Agriculture Management Act 2007, Soil and Land Conservation Act 1945, EP Act 1986, EPBC Act 1999 and Biodiversity Conservation Act 2016, together with diversification permits and Native Title interests. Substantive chapters cover principles of economic and ecological sustainability; land management planning, land systems, land condition assessment and pastoral monitoring; infrastructure including water point placement, roads and fencing; grazing management including stocking rates in variable climates, forage budgeting, conservative stocking, spelling and rotational grazing; fire management, biosecurity, introduced weeds (including Weeds of National Significance in the Rangelands), feral animals and wild dogs; and regeneration and rehabilitation of degraded areas. Developed through consultation with pastoralists, the PGA of WA, the Kimberley Pilbara Cattlemen's Association and government departments including DPIRD, DWER, DBCA and DFES.

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17	Advisian Pty Ltd	April 2021	**Mardie Salt Flood Study – Phases 1–3, Rev 2**	Part 2 (figure compilation) of Advisian's baseline flood hydrology and hydraulic modelling study establishing pre- and post-development flood behaviour for the approvals process; Attachment 2-2 to EPBC referral 2022/9169 and the basis for the subsequent Site Wide Flood Impact Assessment.	The 55-page part contains design event hydrographs and the appendix flood maps (narrative text is in Part 1). It opens with design event hydrographs for the Fortescue and Robe Rivers for the 20%, 10%, 5%, 2% and 1% AEP and 1-in-2000 AEP events, with peak Fortescue flows approaching 30,000 m^3/s. Appendix B (Figures B-1 to B-15) maps existing-case peak flood depth, velocity and flood source (local versus regional catchments) for the 20%, 10% and 1% AEP events at 1:150,000 (GDA94 MGA Zone 50). Appendix C (Figures C-1 to C-9) presents sensitivity mapping of the existing-case 1% AEP event under 2090 climate scenarios RCP4.5 and RCP8.5 and with 30% increased hydraulic roughness. Appendix D (Figures D-1 to D-25) maps design-case (post-development) peak flood depth, velocity and afflux against the proposed pond layout.
18	AQ2 Pty Ltd	2 June 2021	**Memo – Mardie Project: Groundwater Risk Assessment – Optimised Project (AQ2 Job 293F, Doc 019a)**	Supplementary groundwater risk assessment triggered by the Optimised Project layout changes (relocated and enlarged crystallisers and evaporation ponds), updating AQ2's 2020 desktop assessment; Attachment 2-4 to EPBC referral 2022/9169.	Reassesses groundwater risks for the optimised layout, in which Ponds 7–9 extend 5 km further north-east, the Primary Crystalliser (c. 7.5 km × 2.5 km) sits c. 1 km ENE of Mardie Pool, and infrastructure extends further across the Fortescue River alluvial aquifer (estimated average annual recharge 11 GL, with a freshwater lobe grading to saline towards the coast). Concludes the Mt Salt mound spring, 1,400 m north of the proposed SOP Plant and fed by a confined saline (27,800 mg/L TDS) Cretaceous source, is unlikely to be affected. Cumulative drawdown from dewatering at Citic Pacific's Sino Iron Project, 15 km north-east with an 8 GL/a allocation, could lower water levels beneath the crystallisers by 0–0.3 m. Key risks remain hypersaline seepage and mounding affecting Mardie Pool, mangrove habitat and algal mat communities, with earlier Soilwater (2019) seepage modelling criticised for assuming a static water level of 8 m below ground where data suggest less than 1 m. Recommends an expanded bore network, test pumping, geophysical salinity profiling, 3D density-dependent modelling and a Groundwater Management Plan with triggers, thresholds and adaptive management.
19	Environmental Protection Authority	June 2021	**Mardie Project, Mardie Minerals Pty Ltd – EPA Report 1704 (Assessment No. 2141)**	EPA assessment report under s. 44 of the EP Act 1986 setting out the outcomes of the Part IV assessment and the EPA's recommendations to the WA and Commonwealth Ministers for Environment; also fulfils the accredited assessment of the controlled action under the *EPBC Act 1999.*	The 190-page report assesses the proposal to use seawater to produce raw salts for processing into high-purity salt and sulphate of potash, 80 km south-west of Karratha, comprising a seawater intake, concentrator and crystalliser ponds, processing plant, bitterns disposal to the marine environment and a trestle jetty export facility. Eight key environmental factors are assessed: inland waters, marine environmental quality, flora and vegetation, benthic communities and habitat (intertidal and subtidal), terrestrial fauna, marine fauna and social surroundings. Quantified likely impacts include clearing of 2,319 ha of vegetation in good to excellent condition, 145 ha of the Horseflat PEC, 854 ha of landward samphire, up to 880 ha of algal mat and up to 17 ha of mangroves (including 4 ha within the Robe River Delta Mangrove Management Area), a 17.3 ha Low Ecological Protection Area around the bitterns diffusers, and disturbance of 11,142 ha of fauna habitat. The EPA concluded reasonable conditions could be imposed and recommended the proposal may be implemented subject to the conditions in Appendix A, advising that future salt proposal referrals must assess regional and cumulative impacts, particularly on intertidal benthic communities and habitats.
20	Department of Water and Environmental Regulation	October 2021	**Native Vegetation Clearing Referrals – Native Vegetation Clearing Activities Regulated under the Environmental Protection Act 1986 and**	Non-mandatory guidance explaining the clearing referral process introduced by the Environmental Protection Amendment Act 2020 (s. 51DA of the EP Act,	The 16-page guideline explains what a clearing referral is, how it differs from a Part IV referral of significant proposals to the EPA, which activities are unsuitable for the referral pathway, and how to submit a referral. Referrals are assessed against the s. 51DA(4) criteria, beginning with Criterion 1 (the proposed clearing area must be small relative to total remaining vegetation), with thresholds tabulated by region. It describes the 21-calendar-day decision timeframe, the possible determinations, and DMIRS delegated authority for minerals and petroleum referrals under the DWER–DMIRS Administrative

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			Environmental Protection (Clearing of Native Vegetation) Regulations 2004	proclaimed October 2021), under which proponents may refer proposed clearing to DWER or DMIRS to determine whether a Part V Division 2 clearing permit is required; sets the criteria identifying very low environmental impact clearing that can proceed without a permit.	Agreement, and cross-references the companion guides on exemptions and on assessment against the Schedule 5 clearing principles.
21	Advisian Pty Ltd for BCI Minerals	12 November 2021	**Technical Memorandum – Site Wide Flood Impact Assessment Summary**	Quantifies the surface water (flood) impacts of the optimised project layout with its proposed flood management measures, in direct support of the approvals process; Attachment 2-3 to EPBC referral 2022/9169.	Extends the Mardie Salt Flood Study Phases 1–3 model suite by adding frequent events (1EY and 0.5EY) using a proportional loss model and Mean Sea Level tailwater, then compares existing-case and design-case flood behaviour for the 1EY, 0.5EY, 10%, 2% and 1% AEP events with mapping attached. In the existing case, Fortescue River breakouts dominate the northern half of the site in rare events (peak salt pan depths over 1.5 m in the 1% AEP), while local catchments (Peter Creek and surrounds) dominate frequent events with peak depths of c. 200–300 mm in the minor salina. In the design case, which diverts flows up to the 2% AEP around the project or through diversion channels between Ponds 3 and 4 and Ponds 5 and 6, flood extents increase north of the crystallisers where the Port Access Road redirects regional breakout flows. Other changes are largely confined to the Development Application boundary, apart from discrete reductions in inundation adjacent to Pond 1 (mostly outside the delineated Mangrove Management Area) and north-west of Pond 8; in frequent events direct precipitation dominates tidal flat inundation.
22	Phoenix Environmental Sciences	November 2021	**Detailed Flora and Vegetation Survey for the Mardie Salt Project Optimisation and Quarry Area – Final, v0.2**	Baseline detailed flora and vegetation survey of the Optimisation area (c. 4,420.8 ha) and Quarry area (15.1 ha), commissioned to define flora values, inform project design and support impact assessment of the optimised project; Attachment 2_6-1 to EPBC referral 2022/9169.	Reports a two-season detailed survey to EPA (2016) guidance: phase 1 in September 2020 and phase 2 in May and June 2021, c. 105 km south-west of Karratha. A total of 224 flora taxa (41 families, 120 genera; 217 native, 7 introduced) were recorded; no Threatened or Priority flora were found, but significant range extensions were recorded for *Cassytha aurea* var. *aurea* (c. 107 km), *Cassytha racemosa* forma *pilosa* (c. 315 km) and *Dipteracanthus australasicus* subsp. *australasicus* (c. 170 km), and six anomalous *Tecticornia* specimens were considered potentially to represent new species. Eleven vegetation types were defined, with shrublands dominated by the declared pest *Prosopis glandulosa* x *velutina* comprising 57.82% of the study area and *Triodia longiceps* hummock grassland c. 13%. No TEC was represented; approximately 0.26 ha of the Horseflat Land System of the Roebourne Plains PEC was recorded, and seven vegetation types were considered locally significant.
23	AQ2 Pty Ltd	16 November 2021	**Memo – Mardie Project: Proposed Investigation and Monitoring Program – Revised Layout**	Sets out the groundwater monitoring bore network, monitoring regime and staged modelling programme responding to data gaps identified in AQ2's 2020 and 2021 risk assessments; Attachment 2-5 to EPBC referral 2022/9169, intended to feed future revisions of the project's GMMP.	Proposes a terrestrial monitoring network around Mardie Pool and the crystallisers installed in two phases (heritage agreements prevent clearing or structures within 50 m of Mardie Pool): Phase 1 comprises 19 fully screened bores (MP01–MP19) providing background monitoring, first- and second-line seepage detection around the Primary, Secondary and KTMS Crystallisers, and base flow characterisation along Mardie Creek; Phase 2 adds six nested bores (FMP01–FMP06) adjacent to the pool to characterise the conceptual freshwater lens. A coastal (playa) network of eleven bore sites, arranged as three transects between the pond sea wall and the nearest mangrove stands plus two sites in mapped algal mat habitat, would use paired shallow and deep screens to quantify vertical gradients and salinity stratification. Monitoring would be at least quarterly, with quarterly laboratory sampling for two years to establish baseline, hydraulic testing of all bores, and remediation/abstraction bores foreshadowed if seepage triggers are exceeded. Supporting investigations include reprocessing 2010 Fugro airborne

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					electromagnetic data, Mardie Pool bathymetry and examination of a possible fault control on Mardie Creek, with a two-stage modelling programme (2D density-dependent sections, then regional flow modelling) underpinned by a Leapfrog Geo hydrostratigraphic model.
24	Minister for Environment	24 November 2021	**Ministerial Statement No. 1175**	Ministerial approval under s. 45 of the EP Act 1986 agreeing that the Mardie Project (Assessment No. 2167; EPA Report 1704) may be implemented, and setting the legally binding implementation conditions binding Mardie Minerals Pty Ltd. A duplicate copy appears in the folder as EPBC referral Attachment 4.	The 40-page Statement authorises construction and operation of the solar salt production plant and export facility, including seawater intake, evaporation and crystalliser ponds, processing plant, trestle jetty and supporting infrastructure. Condition 1 fixes maximum extents, including no more than 2,319 ha of clearing of good-to-excellent condition vegetation within the 15,667 ha terrestrial development envelope, 145 ha direct impact to the Horseflat PEC, 854 ha landward and 296 ha coastal samphire, 880 ha algal mat, 4 ha of mangrove clearing within the Robe River Delta Mangrove Management Area (RRDMMA), 800,000 m³ of dredging, bitterns discharge up to 3.6 GL/a at a specific gravity no more than 1.25, and a mine life of up to 63 years. Detailed conditions require a revised peer-reviewed design before any disturbance in the RRDMMA, protection of water levels and quality in Mardie Pool, a CEO-approved Groundwater Monitoring and Management Plan before any pond filling, achievement of specified marine levels of ecological protection, and decommissioning of marine infrastructure within five years of the end of mine life. An offset of $2,102 per hectare applies to approved disturbance of mangroves within the RRDMMA.
25	Phoenix Environmental Sciences Pty Ltd	November 2021 (final v1.0 dated 24 November 2021)	**Basic (Level 1) Terrestrial Fauna Survey for the Mardie Salt Project Optimisation Area and Quarry Area – Final, v1.0**	Basic (Level 1) terrestrial vertebrate and short-range endemic (SRE) invertebrate fauna survey of the Optimisation Area (4,421.72 ha) and Quarry Area (14.91 ha), defining fauna values to inform design and impact assessment of the proposed expansion; Attachment 2_7-1 to EPBC referral 2022/9169.	Field surveys between August 2019 and May 2021 included an SRE invertebrate survey, autonomous acoustic recording targeting night parrot and bats, and motion cameras, following a desktop review that identified 306 terrestrial vertebrate species (62 conservation significant) in the vicinity. Four conservation significant species were recorded: grey falcon (*Falco hypoleucos*, VU), northern quoll (*Dasyurus hallucatus*, EN), western pebble-mound mouse (*Pseudomys chapmani*, P4) and lined soil-crevice skink (*Notoscincus butleri*, P4). Eleven fauna habitats were identified; northern quoll denning/shelter habitat (spinifex grassland on rocky hills) occurs only north of the Quarry Area, which itself is considered foraging habitat. Three SRE-group taxa were collected, including two potential SRE isopods (*Buddelundia* 'sp. indet. (mardie 1)' and Buddelundiinae 'sp. indet (mardie 2)') and the widespread land snail *Rhagada convicta*; the potential SREs' habitats occupy 61.82% of the study area and extend well beyond it, so restricted distributions were considered unlikely.
26	Phoenix Environmental Sciences Pty Ltd	9 December 2021	**Memo Report of Targeted Searches at Mardie Salt Project for *Minuria tridens***	Reports a targeted pre-clearance survey for the Priority 1, EPBC Act Vulnerable-listed Minnie daisy within the development envelope, requested to ensure compliance with EP Act conditions, assist planning and quantify proportional impacts; flags the trigger of MS 1175 condition 5-3(2)(b). Attachment 2_6-2 to EPBC referral 2022/9169.	Targeted searches were conducted on foot (meandering transects c. 100 m apart) from 28 September to 4 October 2021 within potential habitat vegetation types AcAjTe (93 areas, 763 ha) and AtAjTe (3 areas, 25 ha). Revisits to the four previously known populations (76 plants, all outside the development envelope) found no additional individuals, while four new populations totalling 266 plants were found inside the development envelope, bringing the project total to 342 recorded plants, 22% of which occur outside the envelope. All new records were in vegetation type AcAjTe, typically on west-, south- or east-facing edges of sandy inland islands near collapsing dunes or low sand cliffs, in association with *Prosopis glandulosa*, *Cenchrus ciliaris* and *Triodia epactia*; eight voucher specimens were confirmed taxonomically. Notes the 'SW' population lies within the proposed Pond 1 footprint due for seawater filling as early as July 2022, triggering the MS 1175 condition 5-3(2)(b) requirement to develop a research strategy into propagation and transplanting before filling.
27	Commonwealth Department of	12 January 2022	**Approval – Mardie Project, 80 km South-West of**	Approval decision under ss. 130(1) and 133(1) of the	The action is approved under all six controlling provisions (listed threatened species and communities, ss. 18/18A; listed migratory species, ss. 20/20A; Commonwealth marine area, ss. 23/24A), with effect until 24

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	Agriculture, Water and the Environment		**Karratha, WA (EPBC 2018/8236), with Annexure A – Conditions of Approval**	EPBC Act 1999 (Cth) for construction and operation of the Mardie salt and SOP project, following referral 2018/8236. Included as Attachment 5 to EPBC referral 2022/9169 as the existing Commonwealth approval that the Optimised Mardie Project sought to change.	November 2084 and subject to the conditions in Annexure A. Condition 1 sets clearance limits including 2,562 ha of *Triodia* grassland habitat, 64.5 ha of low rocky hill habitat, 0.12 ha of marine turtle nesting beach, 17 ha of mangrove, 79 ha of subtidal benthic communities and habitat, 296 ha of coastal samphire and 880 ha of algal mat. Groundwater conditions require a Minister-approved Groundwater Monitoring and Management Plan before operations, independent hydrologist review, and remediation or offset obligations if threshold criteria protecting Mardie Pool and other protected matters are exceeded. Surface water conditions impose an Intertidal Flow Objective on the intertidal rock causeway, with monitoring and potential removal if flows are impeded. Further conditions require mesquite and weed management (plan approved by the Pilbara Mesquite Management Committee), fauna spotter-catchers during clearing, daylight-only works within 1 km of Mardie Pool, feral animal control, fauna egress from evaporation ponds, and vessel speed limits (8 knots in port operational waters and within 500 m of any cetacean, dugong or marine turtle).
28	BCI Minerals Limited	22 January 2022	**Environment Policy, BCI-ENV-POL-001, Rev 0 (Issued for Use)**	Corporate environment policy of BCI Minerals Limited and its subsidiaries, provided as Attachment 7 to EPBC referral 2022/9169 to demonstrate the proponent's environmental governance framework.	The two-page policy commits BCI to minimising environmental impacts by following the WA EPA's mitigation hierarchy (avoid, minimise, rehabilitate), full compliance with applicable environmental laws, sustainable management of natural resources, and preservation of biological diversity and ecological integrity. It commits to strategies to reduce direct and indirect carbon emissions, sustainable waste reduction, and collaboration with government, industry, Aboriginal groups and the community on environmental programmes. BCI undertakes to operate an Environmental Management System aligned with AS/NZS ISO 14001:2015, to target zero material environmental incidents, to set and review environmental targets, and to communicate performance openly. The document control record shows the policy superseding earlier combined Environment and Community Policies of 2017 and 2020.
29	Preston Consulting Pty Ltd	Undated (January 2022); lodged with the referral signed 9 March 2022	**Supplementary Report – Optimised Mardie Project (Part 2: Sections 7–14)**	Attachment 2 (Part 2) to EPBC referral 2022/9169 and the parallel s. 38 EP Act referral to the EPA, providing the detailed environmental impact assessment supporting approval of the Optimised Mardie Project as a 'significant change' to the approved project.	Part 2 (from page 139) covers Flora and Vegetation, Terrestrial Fauna, Social Surroundings, Other Key Environmental Factors, Offsets, Matters of National Environmental Significance, Holistic Impact Assessment and Cumulative Impact Assessment (Sections 7–14). The flora and vegetation assessment draws on Phoenix's two-season detailed survey of the Optimised and Quarry study areas within the Roebourne (PIL4) and Chichester (PIL1) subregions, comprising 76 quadrats, 18 relevés and 8 transects (phase 1 September 2020; phase 2 May–June 2021), with targeted searches for threatened and priority flora, declared pests and Weeds of National Significance. A targeted pre-clearance survey for *Minuria tridens* (28 September – 4 October 2021, under MS 1175 conditions) covered 763 ha of AcAjTe and 25 ha of AtAjTe potential habitat. Methods are benchmarked against EPA Technical Guidance (2016), conservatively assuming additional significant flora, including sterile *Tecticornia* taxa, may be present. Later sections assess residual impacts and proposed offsets for the Pilbara leaf-nosed bat, northern quoll and threatened and migratory shorebirds.
30	Mardie Minerals Pty Ltd / BCI Minerals Ltd	Undated compilation January 2022	**Optimised Mardie Project: Figures 1 to 11 (including Figures 5a and 47)**	Attachment 1 to EPBC referral 2022/9169, providing the map set referenced throughout the referral form for the Optimised Mardie Project as a 'significant change' to the project approved under EPBC 2018/8236.	Comprises 12 A3/A4 map sheets covering the regional location, the original (DFS) project design, and the optimised development envelopes and indicative disturbance footprint, including the additional pond area (3,855.5 ha), quarry (89 ha), access road (25.5 ha), salt plant additions (16.8 ha), navigation channel additions and secondary seawater intake (1.3 ha), relative to the 16,023.1 ha existing development envelope. Figure 4 maps conservation-significant flora recorded during field surveys, including *Minuria tridens*, *Goodenia nuda*, *Cassytha aurea* var. *aurea* and several *Tecticornia* taxa; Figures 5 and 5a map vegetation types dominated by *Triodia* hummock grasslands, *Tecticornia* tidal mudflat shrublands, *Avicennia marina* and *Rhizophora stylosa* mangal, and widespread *Prosopis glandulosa* x *velutina* (mesquite) infestation. Figure 6 compares modelled zones of dredging influence within subtidal benthic habitat for the original and optimised proposals, and Figure 7 compares the 2020 and 2021 LEPA and

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					MEPA boundaries for bitterns discharge. A Phoenix figure (5 November 2021) presents desktop results of previous *Minuria tridens* records and potential AcAjTe/AtAjTe habitat.
31	Mardie Minerals Pty Ltd / BCI Minerals Ltd	Undated February 2022; lodged with the referral signed 9 March 2022	**Attachment 3 – Proposed Changes to Proposal Elements (Table 1: Proposed Changes to Approved Location and Extent of Physical and Operational Elements)**	Attachment 3 to EPBC referral 2022/9169, tabulating the proposed changes to the approved location and maximum extents of the physical and operational elements authorised under MS 1175 and EPBC 2018/8236 for the Optimised Mardie Project.	The two-page table compares approved and proposed extents for each regulated proposal element. Principal changes are: enlargement of the terrestrial development envelope from 15,667 ha to 19,645 ha; clearing of good-to-excellent condition vegetation increased from 2,319 ha to 3,014 ha; landward samphire clearing from 854 ha to 863 ha; coastal samphire direct impacts from 296 ha to 330 ha; Pilbara leaf-nosed bat foraging habitat clearing from 2,562 ha to 3,254 ha; northern coastal free-tailed bat foraging habitat from 1,132 ha to 1,186 ha; northern quoll foraging habitat from 64.5 ha to 80 ha; dredge disturbance from 55 ha to 65 ha within an enlarged 307.5 ha dredge envelope (dredge volume unchanged at 800,000 m^3); and bitterns discharge increased from 3.6 GL/a to 5.5 GL/a at a specific gravity of no more than 1.25. Limits left unchanged include Horseflat PEC impacts (145 ha direct, 20 ha indirect), algal mat (880 ha), mangrove disturbance (13 ha outside and 4 ha inside the RRDMMA), Pilbara olive python habitat (6 ha), seawater intake velocity (0.15 m/s), the prohibition on dewatering and the mine life of up to 63 years.
32	Preston Consulting Pty Ltd	4 February 2022	**Mardie Project – Environmental and Social Management Plan, BCI-ESM-PLN-001, Rev 0 (Issued for Use)**	Overarching Environmental and Social Management Plan for construction and operation of the Mardie Project, provided as Attachment 8 to EPBC referral 2022/9169 to demonstrate the management framework through which statutory approvals under the EPBC Act, EP Act Part IV (MS 1175) and other legislation will be implemented.	Identifies the environmental and social management framework for the project, which will use seawater to produce raw salts as feedstock for high-purity salt, fertiliser-grade sulphate of potash and potential by-products, with a combined disturbance footprint of 11,283 ha across terrestrial, intertidal and marine components accessed through the Mardie Station pastoral lease. It is designed to ensure compliance with key approvals, consents and obligations, to identify the subsidiary management plans required, and to catalogue applicable Commonwealth and State legislation (including the EPBC Act 1999, Native Title Act 1993, EP Act 1986, Biodiversity Conservation Act 2016, Aboriginal Heritage Act 1972 and Contaminated Sites Act 2003). Tabulates current approvals and agreements, remaining approval requirements and the suite of required management plans, and sets out arrangements for incident response, inspections, internal and external audit, review and reporting. Scope covers construction and operational activities but excludes investigative and exploration work.
33	Mardie Minerals Pty Ltd	9 March 2022	**EPBC Act Referral 2022/9169 – Optimised Mardie Solar Salt Project (change to EPBC 2018/8236)**	Referral under the EPBC Act 1999 (Cth) seeking approval for the Optimised Mardie Solar Salt Project as a 'significant change' to the project approved under EPBC 2018/8236, lodged in parallel with a s. 38 referral to the EPA under Part IV of the EP Act; the proponent sought an accredited assessment by DWER should the action be declared a controlled action. A duplicate copy and the full attachment set are also held	Describes changes arising from the Optimised Feasibility Study (August 2020) following acquisition of tenement E08/3182, lifting production from 4.4 to 5.35 Mtpa of salt and from 120 to 140 ktpa of SOP. Key changes include a 3,978 ha increase in the Terrestrial Development Envelope (2,334 ha additional disturbance), seawater intake increased to 180 GL/a, brine discharge increased to 5.5 GL/a, a secondary seawater intake in Mardie Creek, a 10 ha increase in dredge disturbance footprint and a new quarry adjacent to Mardie Road, with a proposed operating period from 2022 to 2082. Impacts on MNES are assessed for *Minuria tridens* (no records within the optimised development envelope), Pilbara leaf-nosed bat *Rhinonicteris aurantia* (an additional 678 ha of *Triodia* grassland foraging habitat), northern quoll *Dasyurus hallucatus* (15.5 ha of additional foraging habitat at the quarry) and threatened and migratory shorebirds including *Calidris canutus*, *Calidris ferruginea*, *Numenius madagascariensis*, *Charadrius leschenaultii* and *Charadrius mongolus* (34 ha of additional coastal samphire disturbance, 0.9% of habitat in the Migratory Shorebird Study Area). The revised Low Ecological Protection Area for bitterns discharge increases by 3.9 ha but remains within the dredge channel, and the 53.9 ha Moderate Ecological Protection Area is relocated further offshore. Residual impacts on shorebird and bat habitat are acknowledged as significant, with offsets proposed.

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34	Mardie Minerals / BCI Minerals	10 November 2022	**Mardie Project – Water Bores, Figure 1 (Drawing MAR_0285_00_2022_GW MMP)**	Single map figure prepared for the Mardie Project Groundwater Monitoring and Management Plan (GWMMP), showing the water supply borefield in relation to licence tenure, aquifer boundaries and sensitive coastal vegetation, supporting the project's groundwater monitoring and management commitments to DWER.	A single A1 map sheet at 1:70,000 (GDA2020 MGA Zone 50), not a narrative report. Shows the locations of production water bores PB01–PB15 and proposed production bores, together with monitoring/water supply bores including MP001, MM002, PWM1P, PWM2P, WS06P and WS14P. Boundaries mapped include the Fortescue Alluvial and Hamersley Fractured Rock groundwater areas (with the Carnarvon Superficials also labelled), water licence tenure, live BCI tenements, the Approved Development Envelope, the OMP Development Envelope and the Proposed Disturbance Footprint. Coastal environmental receptors are overlain as vegetation types: algal mat, mangrove associations and coastal samphire.
35	BCI Minerals	18 January 2023 (V5; revises the strategy of 18 August 2022 approved by EPA Services on 20 September 2022)	***Minuria tridens* MS1175 Research Strategy and EPBC 2018/8236 Offset Strategy (memorandum, V5)**	Implements Ministerial Statement 1175 condition 5-3(2)(b), requiring a research strategy to inform potential re-establishment of a regional population of *Minuria tridens* where individuals found in pre-clearance surveys cannot be avoided; revised in this version to also serve as the offset strategy required by EPBC 2018/8236 condition 25.b.iii under the Commonwealth Environmental Offsets Policy.	The 12-page strategy addresses *Minuria tridens* (EPBC Act Vulnerable; WA Priority 1), populations of which occur within the Mardie development envelope where some impacts are unavoidable. Drawing on the National Recovery Plan for *Olearia macdonnellensis*, *Minuria tridens* and *Actinotus schwarzii* (Nano and Pavey 2008), it maps the recovery plan objectives to ten committed actions, including two targeted regional surveys for additional populations and habitat, annual population and habitat monitoring under MS 1175 condition 12-1(4), seed collection with third-party genetic testing and taxonomic determination against the type specimen, and propagation/translocation trials using plants from the initial clearing footprint. Identified threats include invasion by *Cenchrus ciliaris*, spread of *Prosopis pallida* (managed under the Mesquite Management Plan required by EPBC 2018/8236 condition 13), fire and low inter-population gene exchange. If regional surveys fail to locate additional populations, a Translocation Plan informed by the trials will be developed and submitted to the CEO, with results published through the MS 1175 compliance assessment report and the EPBC annual compliance report.
36	AQ2 Pty Ltd	2022–23; PDF created 3 February 2023	**Pumping Test Summary (single-page table; no formal title, report number or revision)**	Appendix ('App 1') summarising constant-rate pumping test results for the project's water supply borefield, compiled to accompany groundwater documentation supporting DWER licensing and the GWMMP. A data table, not a narrative report.	A single-page tabular summary listing 15 bores (PB01–PB15) with coordinates in MGA94 Zone 50, static water levels (0.66–8.78 m below measuring point), screened intervals (variously between 6 and 60 m), constant-rate test rates (<1 to 8 L/s), maximum drawdowns (1.6–14.1 m), potential 12-hour and continuous pumping rates (up to 12 L/s and 8 L/s respectively), recommended pump depths, and approximate electrical conductivity ranging from c. 1,960 µS/cm (fresh to brackish bores in the Fortescue alluvium, e.g. PB05, PB06, PB10, PB15) to 237,000 µS/cm (hypersaline bores, e.g. PB07). Comments flag behaviours including evidence of dewatering cavities (PB01), slowly increasing drawdown at several bores, possible narrow aquifer conditions (PB05) and bores that may need redevelopment (PB03, PB12, PB13).

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37	O2 Marine for Mardie Minerals Pty Ltd	22 March 2023 (Rev 8)	**Mardie Project – Marine Environmental Quality Monitoring & Management Plan, Rev 8**	Establishes the management framework to ensure implementation of the Mardie Project does not compromise the environmental values and environmental quality objectives of the Mardie coastal area under Ministerial Statement 1175, applying the EPA Environmental Quality Management Framework; Rev 8 incorporates updates from EPA review of the Optimised Mardie Project referral. Scope covers waste bitterns discharge from salt, SOP and desalination operations and day-to-day port operations.	The 103-page plan adopts the five environmental values and eight environmental quality objectives from the Pilbara Coastal Waters Consultation Outcomes (DoE 2006) and spatially allocates four levels of ecological protection (maximum, high, moderate and low), with the low protection area confined to the bitterns mixing zone. Whole-of-effluent toxicity testing set dilution requirements of 200 dilutions (90% species protection) at the LEPA/MEPA boundary and 303 dilutions (99% species protection) at the MEPA/HEPA boundary, with the c. 300 ppt bitterns pre-diluted five-fold before discharge through a 20-port diffuser at the trestle jetty berth pocket. Environmental quality criteria comprise two-tier guidelines and standards for physico-chemical parameters, toxicants in water and sediment, and biological indicators, with exceedance of a standard triggering pre-defined risk-based management responses. Monitoring is staged across a two-year pre-commissioning baseline (quarterly physico-chemical profiling at 14 sites, biannual water sampling, annual sediment and benthic infauna sampling, quarterly subtidal benthic habitat surveys), a commissioning/validation phase to verify plume modelling and diffuser performance, and operational monitoring at 21 locations. Receptors include mixed subtidal benthic communities and *Halophila* seagrass meadows.
38	Mardie Minerals / BCI Minerals	29 June 2023	**Mardie Project Mesquite Density – Figure 1 (Drawing MAR_0111_00_2023_MesquiteOverview)**	Single-page A3 GIS map figure supplied as Appendix 3 to Mardie Project environmental management documentation, mapping the density of mesquite infestation across the project area to inform weed management planning under the project's approval conditions.	Consists solely of one A3 map at 1:50,000 (GDA2020 MGA Zone 50) showing mesquite (*Prosopis*) density across the development envelope in five classes (0.1%, >0.1–5%, >5–20%, >20–50% and >50%). Overlays the base case project footprint and existing clearing with project elements including Ponds 4 to 9, the primary and secondary salt crystallisers, KTMS and pre-KTMS crystallisers, SOP plant, salt wash plant, secondary seawater intake, village, North South Road and Mardie Homestead, together with a 1 km buffer around Mardie Pool. There is no accompanying text, methodology or analysis.
39	Mardie Minerals Pty Ltd / BCI Minerals Limited	21 October 2023 (Rev 4, Issued for Use)	**Mardie Project – Mesquite Management Plan, 0000-EV-PLN-0005, Rev 4 (Issued for Use)**	nvironmental management plan providing management actions for mesquite infestation within the Original and Optimised Mardie Project areas, implementing EPBC 2018/8236 condition 13(d) ('implement the approved Mesquite Management Plan for the life of the project'; the corresponding EPBC	The 16-page plan addresses the key environmental factor of Flora and Vegetation, with the stated outcomes of controlling the spread of mesquite within the Original and Optimised Proposal development envelopes and preventing its spread outside them, so that the mesquite footprint does not increase as a direct result of construction and operational activities relative to pre-works survey cover. Mesquite (*Prosopis* species and hybrids) is a Declared Plant in WA and a Weed of National Significance; a thornless variety introduced to Mardie Station around the 1920s had established a dense hybrid infestation exceeding 1,000 ha by the 1950s, and Mardie Station is now recognised as the largest single core infestation in Australia, covering over 150,000 ha of which c. 45,000 ha is medium to high density, with a declaration status of 'containment' for most of the station. Phoenix detailed flora and vegetation surveys (2017–2020, 29,020.4 ha) recorded two mesquite taxa — *Prosopis glandulosa* x *velutina* and *Prosopis pallida* — widespread across all habitats except tidal mudflats and tidal creeks, densest in the north at the proposed crystalliser areas. Management measures comprise mechanical controls (clearing and

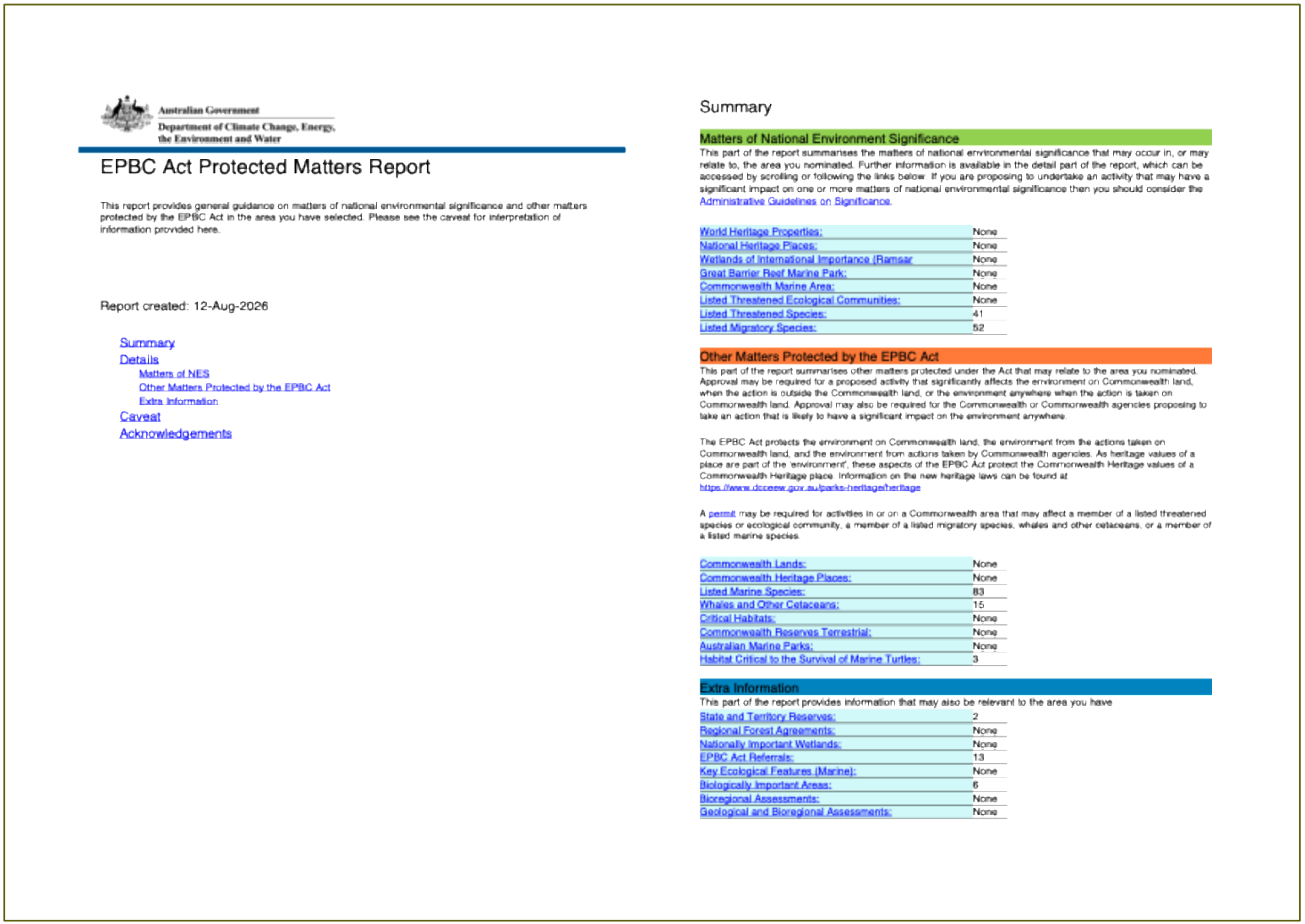
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				2022/9169 condition clause to be confirmed) and satisfying mesquite management requirements under the Biosecurity and Agriculture Management Act 2007 (WA). Required prior to operations rather than pre-construction; construction commenced 21 February 2022.	contaminated topsoil management), chemical controls, disposal by fire treatment, maintenance of cleared areas and prevention of spread through weed hygiene (washdown, certification, tracking of mobilisation and auditing of vehicles, equipment, mobile plant and machinery), supported by defined roles and responsibilities and reporting and monitoring arrangements referencing DPIRD requirements for C2 and C3 declared organisms.
40	WA Marine Pty Ltd	13 November 2023 (Rev D, DCCEEW updates; authorised 24 October 2023)	**Mardie Project – Benthic Communities and Habitat Monitoring and Management Plan, Rev D**	Provides the monitoring and management measures protecting the health, diversity and extent of benthic communities and habitat (BCH), aligning with Ministerial Statement 1175 conditions 2-1, 3-1(4), 6 (6-1 to 6-6) and 14-1(4) and condition 23 of EPBC 2018/8236, with consideration of MS 1211 (approved 19 October 2023) pending a future revision; Rev D specifically addresses DCCEEW comments.	Key outcomes include no adverse impact on the ecological function of the Robe River Delta Mangrove Management Area, no change to more than 5 ha of intertidal BCH from groundwater changes, direct impacts to coastal samphire of no more than 7.2% of the study-area extent, and algal mat disturbance limited to 25% of the study-area extent and 8% of the west Pilbara coast extent, with no long-term (>5 year) net detectable loss of algal mat outside the footprint. The monitoring design uses impact and reference sites along twelve-plus fixed intertidal transects plus subtidal sites: algal mats (8 impact, 4 reference sites), mangroves (21 impact, 6 reference sites; replicate 8 × 8 m quadrats recording canopy cover, density, chlorophyll-a, biomass and recruitment), samphire (9 impact, 4 reference) and subtidal seagrass (5 impact, 3 reference), monitored quarterly for two years then biannually, supplemented by continuous tidal and surface-water level stations and multispectral remote sensing. Dominant receptors are closed-canopy seaward mangroves of *Avicennia marina* with *Rhizophora stylosa* and *Ceriops australis*, *Tecticornia*-dominated samphire flats and *Halophila* seagrass. Early-warning trigger and threshold criteria (exceedance of the latter constituting non-compliance under MS 1175 condition 6-6) drive investigation and management actions, with formal interlinkages to the GMMP, MEQMMP, Dredge Management Plan and the shorebird and turtle monitoring programmes.
41	BCI Minerals / Mardie Minerals Pty Ltd	26 July 2024 (Rev 3)	**Mardie Salt and Potash Project – Aboriginal Cultural Heritage Management Plan, 0000-LH-PLN-0001, Rev 3**	Together with the executed Land Access Deeds, forms the heritage management system achieving the outcomes of Ministerial Statement 1211 and the EPA objectives for Social Surroundings, setting out how BCI, contractors and employees identify and manage Aboriginal heritage in compliance with the Aboriginal Heritage Act 1972 (WA), the Deeds and commitments to Traditional Owner groups, stated to exceed minimum legislative requirements.	The 105-page plan covers project areas within the Yaburara & Mardudhunera (YM) Native Title determination area (WAD127/1997) and formally recognises the Robe River Kuruma (RRK) People's connection to the unresolved south-western area, operating under Land Access Deeds executed with the YM People (November 2012) and RRK People (October 2012) plus a 2022 RRKAC Supplement Deed, with heritage processes administered through Wirrawandi Aboriginal Corporation. It records the framework and results of archaeological and ethnographic surveys, tabulates Section 18 notices and consents under the Aboriginal Heritage Act 1972 (including S18-69-17160 for Mardie Station, with consents updated to 2024) and their conditions, and summarises heritage finds in both YM and RRK areas. Protective measures include a Ground Disturbance Permit system with prior heritage impact assessment, demarcation and exclusion zones (including Mardie Creek Exclusion Zones 1–3 and registered sites such as DPLH ID 17833 and 10536), archaeological salvage and relocation programmes (e.g. Mardie Salt 02, salvaged April 2024), cultural awareness inductions and protocols for unexpected finds and skeletal remains. Rev 3 updates the plan for the Optimised Mardie Project, MS 1211 conditions, consultation from November 2021 to July 2024, revised salvage and demarcation registers, and the intra-Indigenous agreement requiring RRK participation in surveys.

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42	Mardie Minerals Pty Ltd	21 March 2025 (Rev P, responding to DCCEEW comments; Rev O of 21 February 2025 responded to DWER comments)	**Groundwater Monitoring & Management Plan, Mardie Salt and Potash Project, 000-EV-PLN-0005, Rev P**	Ensures changes to benthic communities and habitat, Mardie Pool and intertidal receptors from altered groundwater regimes or quality are detected as early as possible and managed, implementing Ministerial Statement 1211 conditions B1-3, B1-4 and B3-1 and EPBC 2018/8236 (as varied) and 2022/9169 conditions (notably 30, 31, 33, 34, 40–42 and 61–71). Regulator approval of this revision was required before filling of Evaporation Ponds 4–9 and the crystallisers could proceed.	The 193-page plan sets out a precautionary, adaptive framework built on a telemetered bore network — 56 coastal bores, 18 terrestrial bores and 66 gas pipeline corridor bores — transmitting approximately hourly groundwater level and salinity data assessed daily against statistically derived triggers and thresholds using a modified Before-After-Control-Impact (m-BACI) methodology designed by Data Analytics Australia, operational since staged filling of Ponds 1–3 began on 10 September 2024 (300 mm increments with one-week pauses). A regional three-dimensional density-dependent flow and transport model, calibrated by manual methods and ensemble space inversion (PEST_HP/PESTPP-IES) against pre-development data and the observed Pond 1–3 filling response, predicts only short-term localised water level and salinity changes over the 60-year project life, not extending to downstream mangrove areas; annual model updates are committed for the first three years. Exceedances trigger the Groundwater Management Response Framework linking groundwater triggers, ecological thresholds and management actions protecting MNES habitats (mangroves, coastal samphire, algal mats and *Triodia* communities), Mardie Pool and Mt Salt Mound Spring. The methodology incorporates lessons from Pond 1–3 filling and the Pink Lake Analytics peer review, including redefined trigger/threshold definitions and reallocated impact and reference bores.
43	Phoenix Environmental Sciences Pty Ltd	3 October 2025 (Rev 4.1)	**Optimised Mardie Project – Migratory Shorebird Monitoring & Management Plan, V4 (supersedes the Long-term Migratory Shorebird Monitoring Program)**	Describes the monitoring and management programme for migratory shorebirds at the Optimised Mardie Project, the management responses if a project-attributable negative impact is observed, and reporting and stakeholder engagement processes; prepared to satisfy Ministerial Statement 1211 conditions B6-1, B6-4 and C4-3(1)–(5) (no change in abundance and diversity of migratory shorebirds using coastal samphire and mudflat habitats) and the corresponding EPBC 2018/8236 and 2022/9169 requirements.	The plan's outcomes are no project-attributable decline in the relative abundance or richness of migratory shorebirds using coastal samphire and mudflat habitats in the development envelope, and avoidance or minimisation of fatalities and injuries. Annual aerial and ground surveys run in late January to early February over spring tides, comprising eight sampling events (four high-tide and four low-tide counts over four consecutive days) across fixed transects of ten 500 m² quadrats, in an impact area within 10 km of the development envelope and a control area 10–45 km to the south-west, continuing for a minimum of ten years post-construction. Three indicators (relative abundance, relative richness and encounter rate) are analysed using negative binomial generalised linear models (glmmTMB in R), with preliminary triggers set at a greater than 20% impact-versus-control difference at p = 0.05, reviewed annually by a DWER-consulted biostatistician. Six indicator species are used: *Actitis hypoleucos*, *Limosa lapponica*, *Tringa brevipes*, *Tringa nebularia*, *Numenius phaeopus* and sand plovers (*Charadrius mongolus* and *Charadrius leschenaultii*). Results are provided annually to BirdLife Australia, DCCEEW and DBCA within one month of finalisation, and trigger exceedances reported to DWER within one week.
44	Mardie Minerals Pty Ltd	7 October 2025 (Rev 0)	**Annual Compliance Report, Mardie Project (EPBC 2018/8236 and EPBC 2022/9169), 0000-EV-REP-**	Prepared to satisfy conditions 106 and 107 of EPBC approval 2018/8236 (as varied 9 October 2024) and of EPBC	The 85-page report covers a construction-phase year including completion of Evaporation Ponds 7–9, commencement of crystalliser ponds, jetty head and conveyor construction, initial seawater filling of Ponds 1–9 and construction of the secondary seawater intake. It summarises implementation of eleven management instruments and reports condition-by-condition compliance with the 126 conditions of both

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			0046, Rev 0 — reporting periods 14 January – 8 September 2025 (2018/8236) and 9 September 2024 – 8 September 2025 (2022/9169)	approval 2022/9169 (Optimised Mardie Project), requiring an annual report detailing compliance and non-compliance with each condition, all plan commitments, plan implementation and any incidents under the EPBC Act 1999 (Cth).	approvals, including cumulative clearing against limits (486.35 ha of 2,040 ha *Triodia* grassland; 12.32 ha of 17 ha mangrove; 564.32 ha of 880 ha algal mat). Groundwater monitoring recorded numerous trigger and threshold exceedances for level and salinity, attributed to natural variation and pond seepage, prompting additional monitoring, temporary cessation of pond filling and seepage-recovery sumps. Ten non-compliances are reported: two operational (a suspected giant manta ray entangled in a hydrophone mooring rope not reported to DBCA within two hours, condition 25; marine fauna records not submitted on time, condition 29), two arising from impracticable condition wording (conditions 32(d) and 32(f), tidal visual monitoring — DCCEEW advised on 7 August 2025 it intends a directed variation under s. 143(1)(a)), and administrative late notifications and reports (conditions 113, 114, 115(a), 115(b)). The first biennial Impact Reconciliation Report was approved in April 2025 and a first contribution of $513,684 was paid to the Pilbara Environmental Offsets Fund in May 2025. Significantly, the report records the WA Herbarium's February 2025 finding that WA *Minuria* material comprises two new taxa (*Minuria* sp. Murchison and *Minuria* sp. Onslow) rather than *Minuria tridens*, under Commonwealth review at the reporting date.
45	Minister for the Environment	22 December 2025	**Ministerial Statement No. 1264 – Statement that a Significant Amendment to an Approved Proposal May Be Implemented (Environmental Protection Act 1986): Optimised Mardie Project – Revised Proposal (Assessment No. 2500; EPA Report 1795)**	The statutory instrument under s. 45 of the EP Act by which the Minister agrees the significant amendment proposal (Proposal Content Document, September 2025) may be implemented, following EPA assessment reported in EPA Report 1795. It supersedes Ministerial Statement 1211 under s. 40AA(6)(b) and imposes the implementation conditions now governing the whole amended proposal — the current head WA approval for the Mardie Project.	The 46-page Statement authorises the Optimised Mardie Project – Revised Proposal, with conditions arranged in Part A (proposal extent), Part B (environmental outcomes, prescriptions and objectives), Part C (environmental management plans and monitoring) and Part D (compliance), plus Schedule 1 (spatial data) and Schedule 2 (residual impact and risk management funding under condition B10). Condition A1-1 caps the terrestrial development envelope at 19,763 ha, terrestrial disturbance at 13,476 ha, clearing of good-to-excellent condition native vegetation at 3,014 ha, landward samphire at 863 ha, coastal samphire at 330 ha, direct disturbance of the Horseflat PEC at 145 ha (plus 20 ha indirect), mangrove habitat outside the RRDMMA at 13 ha (none within it), algal mats at 880 ha and capital dredging at 355,000 m^3, with foraging-habitat clearing limits of 3,254 ha for *Rhinonicteris aurantia* and 1,186 ha for *Ozimops cobourgianus* and further limits for *Liasis olivaceus barroni* habitat; seawater intake is limited to 180 GL/a through screens at no more than 0.15 m/s. Schedule 2 commits pre-construction research payments of $1,500,000 (west Pilbara samphire), $500,000 (algal mat) and $500,000 (intertidal BCH), $2,102 per hectare for monitored project-attributable indirect losses, and $300,000 per year (CPI-adjusted, with a $500,000 reserve) for subtidal BCH research and management.
46	Worley Limited	4 February 2026 (Rev 6, Issued for Use)	**Marine Turtle Monitoring Program, Mardie Salt and Potash Project, 0000-EV-PLN-0008 (Worley 311012-02566-EN-REP-0001), Rev 6**	Establishes the compliance monitoring framework to detect, assess and substantiate whether the marine turtle environmental outcomes of Ministerial Statement 1264 are achieved — conditions B5-1, B5-3, C4-1 and C4-2 (no adverse change in turtle orientation, nesting beach utilisation, nesting success or hatchling survivorship from artificial light) — and conditions 37,	The 70-page programme monitors nesting flatback (*Natator depressus*), hawksbill (*Eretmochelys imbricata*) and green (*Chelonia mydas*) turtles at the regulated nesting beaches listed in MS 1264 condition B5-1(2) — Long, Sholl, Angle, Middle Passage and Round islands and mainland beaches east and west of Mardie Creek — within a 20 km artificial-light buffer around the export jetty. Each season comprises three 14-day field surveys aligned with new-moon windows (October, December and February) delivering four work scopes: track census, incubation success, hatchling orientation (fan mapping) and artificial light monitoring consistent with the National Light Pollution Guidelines for Wildlife (DCCEEW 2023). Outcome-based indicators (hatchling misorientation/disorientation and nesting beach utilisation) carry defined trigger and threshold criteria, exceedance of the latter constituting non-compliance where attributable to project lighting (MS 1264 condition C4-5), while nesting success and hatchling survivorship are trended as contextual indicators. Results are compared annually against the Pendoley Environmental baseline (2019–2023); monitoring continues until the EPA CEO confirms the condition B5-1 outcomes have been and will continue to be met.

No.	Author	Date	Title	Document Purpose	Abstract / Description of Contents
				38, 45 and 53(c) of EPBC 2018/8236 and 2022/9169. Operates alongside the Mardie Illumination Plan, which implements light mitigation.	
49	National Environmental Protection Agency (National EPA), Commonwealth of Australia	August 2026 (Version 1)	**Agriculture and the EPBC Act – Guide to the Environment Protection and Biodiversity Conservation Act 1999, Version 1** File: EPBC Act Agriculture Guidelines August 2026.pdf	Plain-English guidance for landholders on how agricultural activities interact with the EPBC Act following the 2025 reforms (including the EPBC Regulations 2025 and the 1 December 2025 amendments to the s. 43B continuing-use exemption), prepared by the National EPA in consultation with agricultural representatives. Directly relevant to characterising the Mardie A pastoral rehabilitation program's Commonwealth obligations.	The 59-page guide explains the nine categories of protected matters, the interaction of state regulation with national law, and the revised s. 43B exemption for lawful continuing land uses — which now expressly does NOT apply to land not cleared for 15 years or more, or within 50 m of a Great Barrier Reef watercourse. A landholder decision flow chart and a three-tier risk table (Table 1) classify common farm activities: routine activities on existing cleared footprints (including weed management targeted at declared weeds in line with state requirements) are low risk; clearing near identified habitat, regrowth meeting TEC criteria, and oversowing native grasslands are medium risk; and any clearing of never-cleared vegetation that could provide habitat for listed species, clearing that fragments habitat, and large-scale land-use change are high risk warranting a pre-referral meeting and referral. The guide sets out a self-assessment process (with template at Appendix B), record-keeping expectations (retain self-assessments for at least five years for uncertain/high-risk actions), free pre-referral meetings, referral/assessment timeframes and the National EPA's risk-based compliance posture, with worked scenarios including invasive weed control near a waterway and a "frequent flyers" appendix of species and communities most often encountered on farms.

Appendix E EPBC PMST Search Report 13 August 2026



Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 12-Aug-2026

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Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	41
Listed Migratory Species:	52

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	83
Whales and Other Cetaceans:	15
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	3

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	13
Key Ecological Features (Marine):	None
Biologically Important Areas:	6
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Sternula albifrons Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wimanji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat may occur within area	In buffer area only
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Rhinonicteris aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat may occur within area	In feature area
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
Minuria tridens Minnie Daisy [13753]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
REPTILE			
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area	In buffer area only
Liasis olivaceus barroni Pilbara Olive Python [66699]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In buffer area only
SHARK			
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
null			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera omurai			
Omura's Whale [87136]		Species or species habitat likely to occur within area	In buffer area only
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna pacifica			
Wedge-tailed Shearwater [84292]		Breeding likely to occur within area	In buffer area only
Calonectris leucomelas			
Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaethon lepturus			
White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Phaethon rubricauda			
Red-tailed Tropicbird [994]		Species or species habitat may occur within area	In buffer area only
Sternula albifrons			
Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anoxypristis cuspidata			
Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In buffer area only
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Carcharhinus longimanus			
Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharias taurus			
Grey Nurse Shark [64469]		Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Breeding likely to occur within area	In buffer area only
Crocodylus porosus			
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Dugong dugon			
Dugong [28]		Species or species habitat likely to occur within area	In buffer area only
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eubalaena australis as Balaena glacialis australis			
Southern Right Whale [40]	Endangered	Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae			
Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi			
Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In buffer area only
Mobula birostris as Manta birostris			
Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In buffer area only
Orcaella heinsohni			
Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Orcinus orca			
Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis clavata			
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pristis pristis			
Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat may occur within area	In feature area
Pristis zijsron			
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sousa sahulensis as Sousa chinensis			
Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tursiops aduncus (Arafura/Timor Sea populations)			
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area	In buffer area only
Migratory Terrestrial Species			
Hirundo rustica			
Barn Swallow [662]		Species or species habitat may occur within area	In feature area
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius veredus			
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Glareola maldivarum			
Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area
Limnodromus semipalmatus			
Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Limosa lapponica			
Bar-tailed Godwit [844]		Species or species habitat likely to occur within area	In buffer area only
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Anous stolidus			
Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna pacifica as Puffinus pacificus			
Wedge-tailed Shearwater [84292]		Breeding likely to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Calonectris leucomelas			
Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
Chalcites osculans as Chrysococcyx osculans			
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius leschenaultii			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius veredus			
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chroicocephalus novaehollandiae as Larus novaehollandiae			
Silver Gull [82326]		Breeding likely to occur within area	In buffer area only
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Glareola maldivarum			
Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster			
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundo rustica			
Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
Limnodromus semipalmatus			
Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Limosa lapponica			
Bar-tailed Godwit [844]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Merops ornatus			
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In feature area
Phaethon lepturus			
White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Phaethon lepturus fulvus			
Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaethon rubricauda			
Red-tailed Tropicbird [994]		Species or species habitat may occur within area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Sternula albifrons as Sterna albifrons			
Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Fish			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bulbonarious brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area	In buffer area only
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area	In buffer area only
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In buffer area only
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus negrosensis Flagtail Pipefish, Masthead island Pipefish [66213]		Species or species habitat may occur within area	In buffer area only
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area	In buffer area only
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area	In buffer area only
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In buffer area only
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In buffer area only
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In buffer area only
Hallichthys taeniophora as Hallichthys taeniophorus Ribboned Pipehorse, Ribboned Pipefish, Ribboned Seadragon [94706]		Species or species habitat may occur within area	In buffer area only
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In buffer area only
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In buffer area only
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In buffer area only
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In buffer area only
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area	In buffer area only
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area	In buffer area only
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In buffer area only
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In buffer area only
Mammal			
Dugong dugon Dugong [28]		Species or species habitat likely to occur within area	In buffer area only
Reptile			
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In buffer area only
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In buffer area only
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area	In buffer area only
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area	In buffer area only
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93736]		Species or species habitat may occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area	In buffer area only
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area	In buffer area only
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area	In buffer area only
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In buffer area only
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area	In buffer area only
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In buffer area only
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In buffer area only
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In buffer area only
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In buffer area only

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Balaenoptera omurai Omura's Whale [87136]		Species or species habitat likely to occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Habitat Critical to the Survival of Marine Turtles [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
All year (Jun - Aug)			
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur	In buffer area only
Oct - Feb			

Scientific Name	Behaviour	Presence	Buffer Status
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Nesting	Known to occur	In buffer area only
Oct - Mar			
Chelonia mydas			
Green Turtle [1765]	Nesting	Known to occur	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Great Sandy Island	Nature Reserve	WA	In buffer area only
Great Sandy Island	Nature Reserve	WA	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Gorgon Gas Development	2003/1294		Post-Approval	In buffer area only
Optimised Mardie Project 7 Additional Triodia Grassland Habitat Clearing	2024/10094		Referral Decision	In feature area
Optimised Mardie Solar Salt Project	2022/9169		Post-Approval	In feature area
Controlled action				
Balmoral South Iron Ore Mine	2008/4236	Controlled Action	Post-Approval	In buffer area only
Binowee Iron Ore Project	2001/366	Controlled Action	Proposed Decision	In buffer area only
Greater Gorgon Development - Optical Fibre Cable, Mainland to Barrow Island	2005/2141	Controlled Action	Completed	In buffer area only
Mardie Project, 80 km south west of Karratha, WA	2018/8236	Controlled Action	Post-Approval	In feature area
Proposed West Pilbara Iron Ore Project	2009/4706	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Expansion of the Sino Iron Ore Mine and export facilities, Cape Preston, WA	2017/7862	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Expansion Proposal, Mineralogy Cape Preston Iron Ore Project, Cape Preston, WA	2009/5010	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Buckland Iron Ore Mining Project, Pilbara region, WA	2013/6867	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Mardie Salt Project, Pilbara region, WA	2018/8183	Referral Decision	Completed	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Marine Turtles			
Chelonia mydas			
Green Turtle [1765]	Foraging	Known to occur	In buffer area only
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Foraging	Likely to occur	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Foraging	Known to occur	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Reproduction	Known to occur	In buffer area only
Seabirds			
Ardenna pacifica			
Wedge-tailed Shearwater [84292]	Reproduction	Known to occur	In feature area
Whales			
Megaptera novaeangliae			
Humpback Whale [38]	Migration	Known to occur	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans. State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.08 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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