

# ATLAS-CAMPASPE

## Mineral Sands Project

ENVIRONMENTAL IMPACT STATEMENT



### APPENDIX C › EPBC ACT CONTROLLING PROVISIONS

ATLAS-CAMPASPE MINERAL SANDS PROJECT  
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EPBC ACT CONTROLLING PROVISIONS



APRIL 2013  
Project No. BMX-11-25  
Document No. 00516321.docx

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## 1 INTRODUCTION

The purpose of this document is to demonstrate how the Atlas-Campaspe Mineral Sands Project (the Project) Environmental Impact Statement (EIS) addresses the requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) as a result of the decision by the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (the Commonwealth Minister) to declare the Project a controlled action under the EPBC Act.

The EPBC Act provides for the protection of the environment in Australia, especially Matters of National Environmental Significance (Commonwealth Department of Sustainability, Environment, Population and Communities [SEWPaC], 2012a). Matters of National Environmental Significance include:

- World Heritage properties;
- National Heritage places;
- wetlands of international importance (Ramsar Wetlands);
- threatened species and ecological communities;
- migratory species, marine and other species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and
- nuclear actions.

Cristal Mining Australia Limited (Cristal Mining) lodged a referral for the Project on the 4 July 2012 to determine whether the proposed action<sup>1</sup> needed formal assessment and approval under the EPBC Act. Under the EPBC Act, an action requires approval by the Commonwealth Minister if the action is likely to have a significant impact on Matters of National Environmental Significance.

On 17 September 2012, a delegate of the Commonwealth Minister declared the Project to be a controlled action for the purposes of the EPBC Act due to potential impacts on the following controlling provisions under Part 3 of the EPBC Act:

- World Heritage Properties (sections 12A and 15A);
- National Heritage Places (sections 15B and 15C);
- listed threatened species and communities (sections 18 and 18A); and
- listed migratory species (sections 20 and 20A).

The delegate of the Commonwealth Minister also determined that the proposed action is to be assessed by accredited assessment under the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* pursuant to section 87(4) of the EPBC Act. A copy of the controlled action decision is provided in Attachment A.

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<sup>1</sup> An action consists of a project, development, undertaking, activity, or a sequence of activities or an alteration of any of these things (Commonwealth Department of the Environment, Water, Heritage and the Arts [DEWHA], 2009).

The Director-General's Requirements (DGRs) (Attachment 1 in the Main Report of the EIS) requires information about the controlled action and its relevant impacts and matters outlined in Schedule 4 of the Commonwealth *Environment Protection and Biodiversity Conservation Regulations, 2000* to be addressed in this EIS. This report provides a reference list of the Commonwealth Requirements listed in the DGRs (Attachment B) and the corresponding section of the EIS where the requirements are addressed.

This document is structured as follows:

Section 1	Introduction.
Section 2	Describes general information on the current status of the action and other actions in the region.
Section 3	Provides a description of the Project.
Section 4	Describes the existing environment and relevant Matters of National Environmental Significance.
Section 5	Describes the relevant impacts of the controlled action on threatened species, ecological communities and migratory species.
Section 6	Outlines the proposed safeguards and mitigation measures.
Section 7	Details other approval conditions.
Section 8	Describes the environmental record of the person proposing to take the action.
Section 9	Lists the matters regarding the EIS information sources.
Section 10	Outlines consultation.
Section 11	Outlines economic and social matters.
Section 12	Lists the references cited in this document.

## 2 GENERAL INFORMATION

Table 1 provides a list of the matters regarding general information about the Project and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 1**  
**Reconciliation of EIS against SEWPaC Requirements – General Information**

Assessment Requirement	Main Report of the EIS Reference
<b>1. General information</b> <i>The background of the action including:</i>	
<i>a. the title of the action;</i>	Section 1
<i>b. the full name and postal address of the designated proponent;</i>	Section 1.1.4
<i>c. a clear outline of the objective of the action;</i>	Section 1.1.2
<i>d. the location of the action;</i>	Section 1 and Figure 1-1
<i>e. the background to the development of the action;</i>	Section 1
<i>f. how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;</i>	Section 2 and Section 2.1 of this document
<i>g. the current status of the action; and</i>	Section 2.2 of this document
<i>h. the consequences of not proceeding with the action.</i>	Section 6.9.6

### 2.1 OTHER ACTIONS IN THE REGION

A separate mineral sands mining operation is proposed by Iluka Resources Limited in the vicinity of the Project, namely, the Balranald Mineral Sands Project. The Balranald Mineral Sands Project consists of two proposed mineral sand mines located approximately 10 kilometres (km) and 45 km south-east of the Project (Figure 4-1 in the Main Report of the EIS).

The Balranald Mineral Sands Project EPBC Act referral (2012/6509) was submitted on 16 August 2012. The Balranald Mineral Sands Project has been declared a controlled action. The potential cumulative impacts from the Project and the Balranald Mineral Sands Project have been assessed.

### 2.2 CURRENT STATUS OF THE ACTION

This action has not yet commenced. It is anticipated that the construction and operation of the Project would commence after all necessary approvals have been obtained. The Project construction and development activities would be undertaken progressively over the life of the Project.

### 3 DESCRIPTION OF THE PROJECT

Table 2 provides a list of the matters regarding the description of the controlled action and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 2**  
**Reconciliation of EIS against Commonwealth Requirements**  
**– Description of the Controlled Action**

Assessment Requirement	Main Report of the EIS Reference
<b>2. Description of the action</b> <i>A description of the action, including:</i>	
<i>a. all the components of the action;</i>	Attachment C of this document
<i>b. the precise location of the preferred option for any works to be undertaken, structures to be built and elements of the action that may have relevant impacts;</i>	Attachment C of this document and Figures 2-3, 2-9 and 2-10 of the Main Report of the EIS
<i>c. how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;</i>	Attachment C of this document
<i>d. to the extent reasonably practicable, a description of any feasible alternatives to the controlled action that have been identified through the assessment, and their likely impact, including:</i>	
<i>i. if relevant, the alternative of taking no action;</i>	Sections 6.9.2 and 6.9.6 of the Main Report of the EIS
<i>ii. a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action; and</i>	Section 6.9 <sup>1</sup> of the Main Report of the EIS
<i>iii. sufficient detail to make clear why any alternative is preferred to another.</i>	Section 6.9.2 of the Main Report of the EIS
<i>e. a description of the long-term and short-term economic and social considerations regarding the project.</i>	Section 6 of the Main Report of the EIS and Appendix I of the EIS

<sup>1</sup> Alternatives were considered in Section 6.9. None were considered viable and therefore were not assessed individually in relation to Matters of National Environmental Significance.



## 4 DESCRIPTION OF THE EXISTING ENVIRONMENT AND RELEVANT MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Table 3 provides a list of the matters regarding the existing environment, relevant Matters of National Environmental Significance of the controlled action and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 3**  
**Reconciliation of EIS against Commonwealth Requirements –**  
**Description of the Existing Environment at the Controlled Action**

Assessment Requirement	Main Report of the EIS Reference
<p><b>3. A description of the existing environment and relevant matters of national environmental significance</b></p> <p>A description of the existing environment including:</p> <p><u>Migratory species, threatened species and ecological communities</u></p> <p>(a) a description of the nature, location and extent of all vegetation types occurring on the sites, immediately adjacent to the sites and in areas likely to be indirectly impacted by the action;</p>	<p>Sections 4.6 and 4.7 and Appendices A and B.</p>
<p>(b) a description and map of the nature, location and extent of likely suitable habitat, and known records for migratory species, threatened species and ecological communities (including breeding, foraging, roosting habitat, habitat critical to the survival of the relevant species and ecological communities, movement corridors and migration paths) within the sites and in surrounding areas that may be impacted by the proposal; and</p>	<p>Appendices A and B.</p>
<p>(c) adequate surveys for relevant species, including detailed description of the methodology, timing, effort and results of all targeted surveys undertaken for all relevant matters, in accordance with any relevant guidelines and a description of any limitations and constraints of the surveys undertaken;</p>	<p>Section 3.3 in Appendix B of the EIS states that the fauna survey methods used are consistent with the Commonwealth survey guidelines for threatened species (Department of Environment, Water, Heritage and the Arts (2010a; 2010b; 2010c; 2011a; and 2011b). The following information is provided in Appendix B of the EIS for each threatened fauna species: survey techniques employed to target each species (Table 8 in Appendix B of the EIS), location of these survey techniques (Figures 5 to 12), survey effort (Tables 4 and 7 in the Appendix B of the EIS), potential habitat figures showing potential foraging and breeding habitat (Appendix C in Appendix B of the EIS), figures showing records of the species in the wider landscape (Appendix C in Appendix B of the EIS) and an assessment of impacts (Appendix D in Appendix B of the EIS).</p> <p>The locations of flora survey sites are shown on Figures 5, 6 and 7 in Appendix A of the EIS. The flora survey timing is provided in Section 3.2.3 in Appendix A of the EIS and targeted searches for threatened species are described in Section 3.2.5 in Appendix A of the EIS. Targeted flora searches were conducted according to the NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DEC, 2004). Potential habitat for the Cobar Greenhood Orchid is mapped on Figure 18 in Appendix A of the EIS.</p>

**Table 3 (Continued)**  
**Reconciliation of EIS against Commonwealth Requirements –**  
**Description of the Existing Environment at the Controlled Action**

Assessment Requirement	Main Report of the EIS Reference
<u>World Heritage and National Heritage values</u>	
(d) <i>a description of the world heritage values and national heritage values of the Willandra Lakes Area;</i>	Section 4.8.2 and Section 14.3 in Appendix E. Sections 5.3 and 5.4 of this document.
(e) <i>the research methodology to assess impacts to the values that have been used and if fieldwork has been undertaken, the process including: the dates the fieldwork was undertaken, the area covered, who did it and the methods employed;</i>	Sections 2, 9, 10, 11.1. Section 11.2 in Appendix E.
(f) <i>the identification of the relevant Indigenous people with rights or interests in the Willandra Lakes Area, and how these people were determined as the relevant Indigenous people; and</i>	Section 4.8.1. Section 4 in Appendix E.
(g) <i>A description of the consultation process undertaken to seek active involvement from the relevant Indigenous people with rights or interests. The department strongly encourages the use of the <u>Ask First</u> principles and the principle of free prior informed consent when engaging with Indigenous communities.</i>	Sections 4.8 and 4.8.1. Section 4 in Appendix E.

## 5 ASSESSMENT OF THE RELEVANT IMPACTS

Table 4 provides a list of the matters regarding the description of the relevant impacts of the controlled action and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 4**  
**Reconciliation of EIS against Commonwealth Requirements –**  
**Description of the Relevant Impacts of the Controlled Action**

Assessment Requirement	Main Report of the EIS Reference
<p><b>4. An assessment of the relevant impacts of the action</b></p> <p><i>An assessment of the relevant impacts of the action including:</i></p> <p>(a) <i>a detailed description and assessment of the nature and extent of all relevant impacts, including direct, indirect and facilitated impacts that the action will have or is likely to have on:</i></p> <ul style="list-style-type: none"> <li><i>i. threatened species and ecological communities listed under sections 18 and 18A of the EPBC Act;</i></li> <li><i>ii. migratory species listed under sections 20 and 20A of the EPBC Act.</i></li> <li><i>iii. the world heritage values of a declared World Heritage property listed under Sections 12 and 15A of the EPBC Act; and</i></li> <li><i>iv. the national heritage values of a National Heritage place listed under section 15B and 15C of the EPBC Act.</i></li> </ul>	<p>Section 4 and Appendices A, B and E.</p> <p>Section 5 of this document.</p>
<p>(b) <i>whether any relevant impacts are likely to be unknown, unpredictable or irreversible;</i></p>	<p>Attachment D of this document assesses the likelihood of relevant impacts being unknown, unpredictable or irreversible.</p>
<p>(c) <i>any technical data and other information used or needed to make a detailed assessment of the relevant impacts, including but not limited, to consultation with the relevant Indigenous people with rights or interests, and the results and conclusions of the groundwater modelling undertaken for the proposed Atlas-Campaspe mine as they relate to relevant matters of national environmental significance;</i></p>	<p>Sections 4.4 and 4.8.1.</p> <p>Section 4 in Appendix E.</p> <p>Section 7 in Appendix F.</p>
<p>(d) <i>a description of the consultation process undertaken to seek active involvement from the relevant Indigenous people with rights or interests. The department strongly encourages the use of <u>Ask First</u> principles and the principle of free prior informed consent when engaging with Indigenous communities;</i></p>	<p>Sections 4.8 and 4.8.1.</p> <p>Section 4 in Appendix E.</p>
<p>(e) <i>If relevant Indigenous people with rights or interests have been involved in a particular study, have asserted a particular view or, have provided information that has influenced the findings of the assessment, please attach a letter from those people confirming that they understand what has been written in your report and agree that this is an accurate reflection of their view and/or involvement; and</i></p>	<p>Section 4.8.1.</p> <p>Section 4.1 of Appendix E.</p> <p>Appendix 1 of Appendix E.</p>
<p>(f) <i>Evidence that any advice has been taken into consideration. If you decide not to follow advice given in the interests of the protection of Indigenous heritage values a robust justification must be provided.</i></p>	<p>Section 4.8.1.</p> <p>Section 4.1 of Appendix E.</p>
<p><i>Please note, the department's consideration of impacts to relevant Indigenous world and national heritage values will be guided by the <u>Ask First</u> principle that Indigenous people are the primary informants on the value of their heritage and how it is best preserved.</i></p>	<p>Section 4.8.</p> <p>Section 4 of Appendix E.</p>

## 5.1 THREATENED SPECIES

Table 5 outlines those threatened flora and fauna species as having potential to be affected by the Project.

**Table 5  
Threatened Species Assessed**

Threatened Species	Conservation Status <sup>1</sup>	Relevance	Main Report of the EIS Reference
<b>Threatened Flora</b>			
Mossgiel Daisy ( <i>Brachyscome papillosa</i> )	V	Recorded outside of the Project disturbance area.	Section 7.4.1 and Appendix M of Appendix A
Winged Peppergrass ( <i>Lepidium monophloecoides</i> )	E	Recorded in the Project disturbance area and within the biodiversity offset area.	Section 7.4.2 and Appendix M of Appendix A
Cobar Greenhood Orchid ( <i>Pterostylis cobarensis</i> )	V	Recorded in the Project disturbance area and within the biodiversity offset area.	Section 7.4.3 and Appendix M of Appendix A
<b>Threatened Fauna</b>			
Australasian Bittern ( <i>Botaurus poiciloptilus</i> )	E	Not recorded during the surveys. Potential habitat exists in the Project disturbance area.	Appendix D of Appendix B
Malleefowl ( <i>Leipoa ocellata</i> )	V	Recorded in the Project disturbance area and within the biodiversity offset area.	Appendix D of Appendix B
Regent Parrot (eastern) ( <i>Polytelis anthopeplus monarchoides</i> )	V	Recorded outside of the Project disturbance area.	Appendix D of Appendix B
Australian Painted Snipe ( <i>Rostratula australis</i> )	V	Recorded outside of the Project disturbance area.	Appendix D of Appendix B
South-eastern Long-eared Bat (also known as Corben's Long-eared Bat) ( <i>Nyctophilus corbeni</i> )	V	Recorded in the Project disturbance area and within the biodiversity offset area.	Appendix D of Appendix B

<sup>1</sup> Conservation Status under the EPBC Act. Status current as of 8 November 2012.

### Threatened Flora Species

Australian Museum Business Services (AMBS) (2013a - Appendix A of the EIS) assessed the likelihood of significant impacts from the Project on threatened flora species using the criteria in the EPBC Act *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA, 2009). A summary of the assessment findings is provided below.

In relation to the criteria, the Project is not likely to introduce a disease that may cause any threatened flora species to decline. None of these species are known to be susceptible to any disease or plant pathogens within this relevant geographical range (Appendix A of the EIS). Management and monitoring measures are provided to minimise invasive species that may be harmful to threatened flora.

#### Mossgiel Daisy - Vulnerable

A population of Mossgiel Daisy (*Brachyscome papillosa*) was recorded either side of a 1.5 km section of the existing Magenta Road along the mineral concentrate transport route during the flora surveys for the Project. In recognition of the Mossgiel Daisy location, Cristal Mining has committed to not widening the section of road in the area of the Mossgiel Daisy population (Figure 4-12 in the Main Report of the EIS), to prevent direct disturbance of the population and to sealing the road surface in this area to minimise potential dust impacts on this population. A full list of measures to avoid and mitigate impacts on this species are described in Section 6.

The conclusion of the assessment was that the Project would not have a significant impact on the Mossgiel Daisy or its habitat (Appendix A of the EIS). The Project is unlikely to lead to a long-term decrease in the size of an important population of a species, fragment or reduce its area of occupancy.

The Project would not adversely affect habitat critical to the survival of the species, or disrupt the breeding cycle of an important population. The Project is unlikely to modify, remove, isolate or decrease the availability of habitat for the species, such that it is likely to decline (Appendix A of the EIS).

#### *Winged Peppercress – Endangered*

The Winged Peppercress (*Lepidium monophloeoides*) was recorded in three locations within the Atlas-Campaspe Mine area (two individual plants from two different locations were identified by AMBS and one location was identified by FloraSearch [2012]) (Figure 4-11 in the Main Report of the EIS). The habitat for the species recorded in the Project area is mostly in poor condition, suffering major disturbance from livestock and goats and at one location the individual and associated habitat was isolated from other vegetation by cleared land.

AMBS recorded an additional 299 individual Winged Peppercress plants across four other locations in the surrounding area (i.e. outside the proposed surface development area at the Atlas-Campaspe Mine) and three of these locations are included in the proposed biodiversity offset area, however, the mine plan would avoid the 25 m-radius zone around this location (in which further individuals could occur) (Figure 4-11 in the Main Report of the EIS). This is in addition to five records in the surrounding area identified by FloraSearch (2012) (Figure 4-11 in the Main Report of the EIS). A number of the proposed offset measures are consistent with recovery plans for this species such as fencing, signposting, weed control and removal of grazing pressure. Measures to mitigate and offset impacts on this species are described in Section 6.

The conclusion of the assessment was that the Project would not have a significant impact on the Winged Peppercress or its habitat. The Project would not lead to a long-term decrease in the size of a population of a species, fragment or reduce its area of occupancy. The Project would not adversely affect habitat critical to the survival of the species, or disrupt the breeding cycle of a population. The Project is unlikely to modify, remove, isolate or decrease the availability of habitat for the species, such that it is likely to decline (Appendix A of the EIS).

#### *Cobar Greenhood Orchid – Vulnerable*

The Cobar Greenhood Orchid (*Pterostylis cobarensis*) was recorded during the flora surveys (Appendix A of the EIS; FloraSearch, 2012), representing the first record of the species from the region. Three of the five known local occurrences of the Cobar Greenhood Orchid (each comprising a single individual) would be removed by the land clearance required for the Project (Figure 4-11 in the Main Report of the EIS). Cristal Mining has committed to refining the design of the stockpiles to avoid impacts on the fourth and fifth locations of the Cobar Greenhood Orchid (comprising four and 11 plants, respectively) and minimise impacts on the orchid and its habitat where practicable. The fifth occurrence (comprising 11 plants) is located within the proposed biodiversity offset area (Figure 4-11 in the Main Report of the EIS). A number of measures (such as fencing labelled with signage) are described to avoid impacts on these two occurrences. Measures to avoid, mitigate and offset impacts on this species are described in Section 6.

The Project is assessed as having a significant impact on the Cobar Greenhood Orchid given the known extent of the population in the area (Figure 4-11 in the Main Report of the EIS). However, extensive areas of mallee woodland, which is potential habitat for Cobar Greenhood Orchid, exists in the biodiversity offset area. It is possible that the species is more widespread given the connectivity of potential habitat surrounding the Atlas-Campaspe Mine area.

### ***Threatened Fauna Species***

AMBS (2013b) (Appendix B of the EIS) also assessed the likelihood of significant impacts from the Project on threatened fauna species using the criteria in the EPBC Act *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA, 2009). A summary of the assessment findings is provided below.

None of the threatened fauna species assessed in Appendix B of the EIS and below are known to be susceptible to any disease or plant pathogens within this relevant geographical range. Management and monitoring measures are provided to minimise invasive species that may be harmful to threatened fauna.

#### ***Australasian Bittern – Endangered***

The Australasian Bittern (*Botaurus poeciloptilus*) was not recorded in the Project area or immediate surrounds with the closest record of this species to the Project being approximately 63 km to the south-east. Approximately 5 hectares (ha) of potential foraging habitat for the Australasian Bittern would be disturbed by the Project. The potential ephemeral wetland habitat that may be impacted by the Project is not considered suitable for breeding. Further, ephemeral wetlands occur within depressions in the landscape such as those associated with the Willandra Lakes World Heritage Area; Chibnalwood Lakes, Lake Mungo, Lake Leaghur, Garnpung Lake and Muluri Lake and are, therefore, more wide-spread throughout the region. This is also evident in the ephemeral drainage system east of the Project (Figure 2-3 of the Main Text of the EIS).

The Project would not have a significant impact on the Australasian Bittern. The Project would not lead to a long-term decrease in the size of an important population of a species, fragment or reduce its area of occupancy. The Project would not adversely affect habitat critical to the survival of the species or disrupt the breeding cycle of an important population. The Project is unlikely to modify, remove, isolate or decrease the availability of habitat for the species, such that it is likely to decline (Appendix B of the EIS).

#### ***Malleefowl - Vulnerable***

Malleefowl (*Leipoa ocellata*) are known to occur in the locality (Figure C-12 in Appendix B of the EIS) and several observations (tracks and mounds) have been made during the surveys by AMBS (Figure 4-16 in the Main Report of the EIS). The Atlas and Campaspe footprints were modified to avoid the records of the Malleefowl mounds.

Potential breeding and foraging habitat has been mapped by AMBS within the Project disturbance area and in the proposed biodiversity offset area (Figures C-13 and C-14 in Appendix B of the EIS). Malleefowl in and around the Atlas-Campaspe Mine study area are part of a broader population in NSW, with approximately 80 percent of the NSW population occurring within the (now repealed) Lower Murray Darling Catchment Management Authority area (Ewin, 2007). Over 300 pairs are estimated to occur on leasehold land such as Petro, Lethero, Wamberra, Arumpo and Wampo Stations (Ewin, 2007).

Based on a review of regional vegetation and records of this species, the Malleefowl is considered by AMBS to have an area of occupancy that greatly exceeds 20,000 square kilometres and Project impact is not considered to significantly reduce the area of occupancy of an important population (Appendix B of the EIS).

Based on the area of potential habitat (1,575 ha) and the home range of the species (100 ha) (Benshemesh, 2007), the theoretical conservative estimate is up to 15 mounds which could potentially be impacted by the Project. Despite this theoretical estimate, detailed surveys revealed only two mounds were found in the proposed surface disturbance area and were avoided through revision of the mine general arrangement.

AMBS conclude that the Project is not considered to lead to the long-term decrease in the size of an important population of the species due to the presence of a broader, larger population (Appendix D in Appendix B of the EIS). Similarly, the Project would not disrupt the breeding cycle of an important population (Appendix D in Appendix B of the EIS).

No critical habitat has been declared for the Malleefowl. However, approximately 1,575 ha of mallee habitat (primary Malleefowl habitat) would be impacted by the Project and, as such would reduce the area of habitat for this species. A further 2,705 ha of potential foraging (or supplementary habitats) which might be used on occasions by Malleefowl, where they adjoin primary mallee habitat, would also be cleared by the Project in the same area. However, mallee habitat is present in a fragmented nature in the region to which the Malleefowl is adapted (Appendix D in Appendix B of the EIS). The Project is not determined to fragment or isolate an existing important population as no part of a population would be separated from the rest of the population.

The Project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline due to the extensive habitat available in the offset (Appendix B of the EIS).

AMBS (2013b) (Appendix B of the EIS) stated that the impact from the Project on the Malleefowl would be significant according to EPBC Act criteria (i.e. reduce the area of occupancy through removal of habitat). However, the Project would have limited detrimental impacts on the regional population of Malleefowl, given the avoidance, mitigation, management and offset measures.

#### *Regent Parrot (eastern) – Vulnerable*

This species was recorded once during surveys, outside the Project area (Figure 4-16 in the Main Report of the EIS). This record was made outside of the species normal range and there are no other records within the locality. The record is, therefore, considered a vagrant.

AMBS (2013b) (Appendix B of the EIS) concluded that the Project would have little to no impact on the Regent Parrot (eastern) (*Polytelis anthopeplus monarchoides*). The Project is unlikely to lead to a long-term decrease in the size of an important population, a reduction in the area of occupancy for this species, or fragmentation of an important population. This is not considered likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline given the species is only likely to occur as a rare vagrant at most. No critical habitat has been declared for the Regent Parrot (eastern) and therefore the Project would not adversely affect habitat critical to the survival of this species. Furthermore, the breeding range of the Regent Parrot (eastern) is associated with the Murray-Darling River system and so the Project is unlikely to disrupt the breeding cycle of any population of Regent Parrot (eastern).

### *Australian Painted Snipe – Vulnerable*

This species was recorded within Ephemeral Wetland habitat near, but outside of, the Campaspe disturbance footprint (Figure 4-16 in the Main Report of the EIS). The Project would remove approximately 5 ha of potential breeding and foraging habitat that may be utilised by this species during wetter periods and may have an indirect impact on ephemeral wetlands (9 ha) as a result of changes in hydrology.

Further, ephemeral wetlands occur within depressions in the landscape such as those associated with the Willandra Lakes World Heritage Area; Chibnalwood Lakes, Lake Mungo, Lake Leaghur, Garnpung Lake and Muluri Lake and are therefore more wide spread through-out the region. This is also evident in the ephemeral drainage system east of the Project (Figure 2-3 of the Main Text of the EIS).

Approximately 21 ha of similar habitat including an Ephemeral Wetland and Grass and Herbland Depressions would be conserved in the proposed biodiversity offset area.

The assessment concluded that the Project would not have a significant impact on the Australian Painted Snipe (*Rostratula australis*). The Project is unlikely to lead to a long-term decrease in the size of an important population, a reduction in the area of occupancy for this species, or fragmentation of an important population. This is not considered likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The Project would not adversely affect habitat critical to the survival of this species (Appendix B of the EIS).

### *South-eastern Long-eared Bat – Vulnerable*

This species was recorded during Project surveys at seven locations within the Atlas-Campaspe Mine footprint, 11 locations outside the Project area including nine locations within the proposed biodiversity offset area (Figure 4-19 in the Main Report of the EIS). The Project would disturb approximately 3,863 ha of potential breeding and foraging habitat.

There would be a small reduction in the area of occupancy of a population of this species, however, the Project is unlikely to lead to a long-term decrease in the size of an important population. This habitat loss would not affect the majority of the regional population and as a result is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline (Appendix B of the EIS).

The habitat that the Project would disturb is considered suitable for breeding, as mentioned above. As such there would likely be a disruption in the breeding cycle for the South-eastern Long-eared Bat (*Nyctophilus corbeni*) within this area, until individuals become independent. Given the extensive areas of vegetation in the Project surrounds and numerous species records in the locality, the Project is unlikely to fragment an existing important population of this species (Appendix B of the EIS).

AMBS (2013b) (Appendix B of the EIS) concluded impact from the Project on the South-eastern Long-eared Bat would be significant according to EPBC Act criteria. However, the Project would have limited detrimental effects on the regional population of the South-eastern Long-eared Bat given management measures (e.g. pest management, conservation of suitable habitat in the biodiversity offset area, reduced stock grazing, fire management and progressive placement of bat roosts) and the biodiversity offset area contains the majority of known local records and approximately 15,830 ha of potential habitat.



## 5.2 MIGRATORY SPECIES

Species listed as migratory under the EPBC Act, predicted to have potential to occur within the locality for both the Atlas-Campaspe Mine, Ivanhoe Rail Facility and surrounds include the following:

- Great Egret (*Ardea alba*);
- Fork-tailed Swift (*Apus pacificus*);
- Cattle Egret (*Ardea ibis*);
- Latham's Snipe (*Gallinago hardwickii*);
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*);
- White-throated Needletail (*Hirundapus caudacutus*);
- Rainbow Bee-eater (*Merops ornatus*); and
- Common Green Shank (*Tringa nebularia*).

Four migratory species listed under the EPBC Act were recorded during surveys of the Project area and surrounds including:

- Great Egret;
- Malleefowl;
- Rainbow Bee-eater; and
- Australian Painted Snipe.

The likelihood of significant impacts on the Malleefowl and the Australian Painted Snipe are discussed in Section 5.1.

For all other migratory species listed above, AMBS (2013b) (Appendix B of the EIS) has concluded that the Project would be unlikely to have a significant impact as it is unlikely that the Project would:

- *substantially modify, destroy or isolate an area of important habitat for a migratory species;*
- *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or*
- *seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.*

## 5.3 WORLD HERITAGE PLACES

The Atlas-Campaspe Mine is located 10 km to the east of the Willandra Lakes Region World Heritage Area. The Willandra Lakes Region World Heritage Area meets the following criteria for inclusion on the World Heritage List (SEWPaC, 2012a):

- (iii) *to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;*
- (viii) *to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;*

The Willandra Lakes Region World Heritage Area was inscribed on the World Heritage List for the following natural and cultural values (SEWPaC, 2012a):

**Natural**

- *as an outstanding example representing the major stages in the earth's evolutionary history; and*
- *as an outstanding example representing significant ongoing geological processes.*

**Cultural**

- *bearing exceptional testimony to a past civilisation.*

SEWPaC (2012a) also provides greater detail regarding the specific nature of these values, as quoted below.

**Outstanding Example Representing a Major Stage in the Earth's Evolutionary History.**

*The Willandra Lakes Region represents major stages of the earth's geological history, particularly associated with the response to major glacial-interglacial fluctuations. The World Heritage values include:*

- *non-glaciated, low-latitude lacustrine landscape lake basins which include:*
  - *lunettes;*
  - *inter-lake areas between major lake basins;*
  - *connecting channels adjacent to the lake system;*
  - *connecting dunefields adjacent to the lake system;*
  - *unusually large clay dunes; and*
  - *complex downstream variability in the character of the lacustrine system;*
- *fossil dunes and lake sediments including those which show:*
  - *evidence of Pleistocene climatic changes and landscape history for the geomorphological record spanning well over 100,000 years;*
  - *detailed stratigraphic, geochemical and pedological evidence for climatic and related environmental changes;*
  - *how non-glaciated inland regions were affected by the major climatic fluctuations associated with oscillations in ice sheets;*
  - *the influence of the westerly winds that prevailed throughout the period of dune formation, a period extending from at least 100,000 years to about 15,000 years ago; and*
  - *evidence of giant extinct marsupial species.*
- *extensive flat plains of lake floors and sedimentary carbonates which show:*
  - *evidence of past salinity fluctuations and the stability of the landscape in this region; and*
  - *evidence of the area's response to major climate change.*
- *stunted blue bush (Maireana sedifolia, M. pyramidata) and saltbush (Atriplex stipulata) on the lake floor showing evidence of final saline phases of lakes.*

**Unique Cultural Tradition.**

*The Willandra Lakes Region demonstrates an exceptional sequence of Aboriginal cultural occupation extending over tens of thousands of years, including an outstanding record of human responses to major changes over time in climate and environments (e.g. due to increasing aridity). The World Heritage values include:*

- *landforms and locations which greatly extend our understanding of Australia's environmental and Aboriginal cultural history, including:*
  - *exposures of sedimentary sequences which reveal Pleistocene sedimentary profiles and associated archaeological and palaeontological materials;*
  - *extensive intact lakeshore landforms that may contain extensive archaeological and palaeontological materials; and*
  - *the remains of hearths, including those with considerable antiquity, which have provided an ideal source for palaeomagnetic measurements;*
  - *archaeological sites which occur within stratified sedimentary sequences and provide evidence for the antiquity and continuing presence of human occupation;*
  - *archaeological sites which contain evidence of utilisation of lacustrine resources during lake full phases, and rangeland resources during arid phases;*
  - *archaeological sites which demonstrate continuity of human occupation for the region through fluctuations in lake levels drying of the system about 15,000 years ago through the Holocene period and up to historic times;*
  - *archaeological sites which provide outstanding examples of hunting and gathering, a way of life that has dominated the Australian continent up to modern times, including:*
    - *evidence of human occupation of, and interaction with, the landscape of lakes, lunettes and sand dunes over time in the form of campsites, middens, fireplaces, quarries, knapping floors and burials; and*
    - *campsites and fireplaces that reflect people's hunting, gathering and fishing diet;*
    - *burial sites which are of global significance for the antiquity of burial practices represented and also for the information they provide on the development of human societies, including Pleistocene and Holocene burial sites; and*
    - *burial sites with associated mortuary goods and evidence of ritual burials that demonstrate the antiquity of particular burial practices and the development of religious beliefs and systems over time.*

Table 6 provides an assessment of the likelihood of significant impacts on the World Heritage Values of the Willandra Lakes Region World Heritage Area against the relevant assessment criteria in the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA, 2009).

**Table 6**  
**Likelihood of Significant Impacts on the World Heritage Values of the Willandra Lakes Region**  
**World Heritage Area – Values Associated with Geology or Landscape**

Assessment Criteria <sup>1</sup>	Assessment	
Is the Action likely to:		
<ul style="list-style-type: none"> <li>Damage, modify, alter or obscure important geological formations in a World Heritage property?</li> <li>Damage, modify, alter or obscure landforms or landscape features, for example, by excavation or infilling of the land surface in a World Heritage property?</li> <li>Modify, alter or inhibit landscape processes, for example, by accelerating or increasing susceptibility to erosion, or stabilising mobile land forms, such as sand dunes, in a World Heritage property?</li> </ul>	No	<p>The Action would not damage, modify, alter or obscure geological formations, landforms or landscapes or modify, alter, inhibit landscape processes in the Willandra Lakes Region World Heritage Area, given:</p> <ul style="list-style-type: none"> <li>The Action is not in the Willandra Lakes Region World Heritage Area. At its closest point the action is located 10 km to the east of the Willandra Lakes Region World Heritage Area.</li> <li>The Atlas-Campaspe Mine is located on undifferentiated dunefields and sandplains which are distinctly different to the landforms of the Willandra Lakes Region World Heritage Area (Appendix E of the EIS).</li> <li>The intervening topography, vegetation and distance mean that any potential views of the Action from the Willandra Lakes Region World Heritage Area would represent a very small proportion of the overall landscape (Section 4.14 in the Main Report of the EIS).</li> </ul>
<ul style="list-style-type: none"> <li>Divert, impound or channelise a river, wetland or other water body in a World Heritage property?</li> <li>Substantially increase concentrations of suspended sediment, nutrients, heavy metals, hydrocarbons, or other pollutants or substances in a river, wetland or water body in a World Heritage property?</li> </ul>	No	<p>The Action would not divert, impound or channelize or substantially increase concentrations of suspended sediment, nutrients, heavy metals, hydrocarbons, or other pollutants or substances in a river, wetland or water body in the Willandra Lakes Region World Heritage Area, given:</p> <ul style="list-style-type: none"> <li>The Action is not in the Willandra Lakes Region World Heritage Area. At its closest point the action is located 10 km to the east of the Willandra Lakes Region World Heritage Area.</li> <li>Accordingly the Action would not divert, impound or channelise a river, wetland or other water body in the Willandra Lakes Region World Heritage Area (Appendix G of the EIS).</li> <li>The above, when combined with the proposed surface water management system which would include sediment/runoff control would not substantially increase concentrations of suspended sediment, nutrient, heavy metals, hydrocarbons, or other pollutants or substances in a river, wetland or water body in the Willandra Lakes Region World Heritage Area.</li> </ul>
<ul style="list-style-type: none"> <li>Restrict or inhibit the existing use of a World Heritage property as a cultural or ceremonial site causing it's values to notably diminish over time?</li> <li>Permanently diminish the cultural value of a World Heritage property for a community or group to which its values relate?</li> <li>Alter the setting of a World Heritage property in a manner which is inconsistent with relevant values?</li> </ul>	No	<p>The Action would not restrict or inhibit the use of the Willandra Lakes Region World Heritage Area or diminish the cultural value for the Aboriginal community to which it's values relate, given:</p> <ul style="list-style-type: none"> <li>The Action is not in the Willandra Lakes Region World Heritage Area. At its closest point the Action is located 10 km to the east of the Willandra Lakes Region World Heritage Area.</li> <li>Consultation has been undertaken for the Action with Aboriginal stakeholders including those from the Paakantyi, Mutthi Mutthi and Ngayampaa tribal groups associated with the Willandra Lakes Region World Heritage Area. The full list of consulted Aboriginal parties include (Appendix E of the EIS): <ul style="list-style-type: none"> <li>Badger Bates;</li> <li>Balranald Local Aboriginal Land Council;</li> <li>Barkandji Elders Council;</li> <li>Ivanhoe Community Working Party;</li> <li>Kullila Site Consultants.</li> <li>Michael Kelly (on behalf of Ngayampaa people);</li> <li>Mutthi Mutthi Nations;</li> <li>National Koorie Site Management; and</li> <li>Willandra Lakes 2 Traditional Tribal Groups Elders Council;</li> </ul> </li> </ul>

**Table 6 (Continued)**  
**Likelihood of Significant Impacts on the World Heritage Values of the Willandra Lakes Region**  
**World Heritage Area – Values Associated with Geology or Landscape**

Assessment Criteria <sup>1</sup>	Assessment	
Is the Action likely to:		
		<ul style="list-style-type: none"> <li>To date, no sites or features associated with the Action area have been identified by the Aboriginal stakeholders as being of particular cultural significance, nor have any of the Aboriginal stakeholders raised any concerns regarding potential impacts to the Willandra Lakes Region World Heritage Area or its values (Appendix E of the EIS).</li> </ul>
<ul style="list-style-type: none"> <li>Remove, damage or substantially disturb cultural artefacts, or ceremonial objects, in a World Heritage property?</li> <li>Permanently damage or obscure rock art or other cultural or ceremonial features with World Heritage Values?</li> </ul>	No	<p>The Action would not remove, damage or substantially disturb cultural artefacts, ceremonial objects or features in the Willandra Lakes Region World Heritage Area, given:</p> <ul style="list-style-type: none"> <li>The Action is not in the Willandra Lakes Region World Heritage Area. At its closest point the Action is located 10 km to the east of the Willandra Lakes Region World Heritage Area.</li> <li>The Action would not impact on Aboriginal heritage sites or values within the Willandra Lakes Region World Heritage Area.</li> </ul>

<sup>1</sup> As defined by the EPBC Act *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA, 2009).

Niche Environment and Heritage (2012) (Appendix E of the EIS) has concluded that the Project would not have a significant impact on the World Heritage values of the Willandra Lakes Region World Heritage Area as it will not cause:

- one or more of the World Heritage values to be lost;
- one or more of the World Heritage values to be degraded or damaged; or
- one or more of the World Heritage values to be notably altered, modified, obscured or diminished.

#### 5.4 NATIONAL HERITAGE PLACES

The Willandra Lakes Region World Heritage Area meets the following criteria for inclusion on the National Heritage List (SEWPaC, 2012a):

- (a) *the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history;*
- (b) *the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history;*
- (c) *the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history;*
- ...
- (g) *the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;*

The SEWPaC (2012a) states that the basis for listing the region as a National Heritage Place is the values under its World Heritage listing (i.e. the values quoted in Section 5.3). Therefore, an assessment against the World Heritage Values is also an assessment against the National Heritage values.

Niche Environment and Heritage (2012) (Appendix E of the EIS) has concluded that the Project would not have a significant impact on the National Heritage values of the Willandra Lakes Region World Heritage Area as it will not cause:

- one or more of the National Heritage values to be lost;
- one or more of the National Heritage values to be degraded or damaged; or
- one or more of the National Heritage values to be notably altered, modified, obscured or diminished.

## 6 PROPOSED SAFEGUARDS AND MITIGATION MEASURES

Table 7 provides a list of the matters regarding the proposed safeguards and mitigation measures and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 7**  
**Reconciliation of EIS against Commonwealth Requirements**  
**– Proposed Safeguards and Mitigation Measures**

Assessment Requirement	Main Report of the EIS Reference
<b>5. Proposed safeguards and mitigation measures</b> <i>A description of changes to the action and feasible mitigation measures, that are intended to avoid, minimise or compensate for relevant impacts, including:</i>	
<i>a. a description of how the action has been designed to avoid impacts to migratory species, threatened species and ecological communities, world and national heritage values;</i>	Sections 4.6.3, 4.7.3 and 4.8.3. Appendices A, B and E. Section 6 of this document.
<i>b. a consolidated list of mitigation measures proposed to be undertaken to prevent or minimise the relevant impacts of the action, before, during and after construction, during operation, decommissioning and rehabilitation;</i>	Appendices A, B and E.
<i>c. for proposed avoidance and mitigation measures relevant to Indigenous heritage values, evidence of consultation with relevant Indigenous people with rights or interest;</i>	Section 4.8. Sections 4 and 15 in Appendix E.
<i>d. a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures, including a justification of the location and design of mitigation measures to be implemented to ensure their effectiveness. This analysis should be based on best available knowledge and baseline data for the relevant areas;</i>	Appendices A and B. Attachment C of this document.
<i>e. a description of the objectives of the mitigation measures, thresholds for corrective actions, and the corrective actions to be implemented should these thresholds be exceeded;</i>	Sections 4.6, 4.7 and 4.8.
<i>f. any statutory or policy basis for the mitigation measures;</i>	Sections 4.6, 4.7 and 4.8.
<i>g. details of environmental management plans that set out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including the person or agency responsible for implementing these programs and provisions for independent environmental auditing;</i>	Sections 4.6, 4.7, 4.8 and 7.
<i>h. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;<sup>1</sup></i>	See footnote.
<i>i. in the event that impacts cannot be avoided or mitigated, a description of any offsets to compensate for any predicted or potential residual impacts on migratory species, threatened species and ecological communities. This should be in accordance with the department's Offsets Policy and include:</i>	Sections 4.6.4 and 4.7.4. Section 8 of Appendix A. Section 7 of Appendix B.
<i>i.</i> <ul style="list-style-type: none"> <li><i>i. an assessment of how any proposed offset compensates for the residual impacts on migratory species, threatened species and ecological communities likely to remain following avoidance and mitigation measures to be implemented;</i></li> <li><i>ii. the location of any proposed offset;</i></li> <li><i>iii. the timing of the delivery of any offset; and</i></li> <li><i>iv. how the offset will be secured and managed in perpetuity.</i></li> </ul>	

<sup>1</sup> Responsibility for endorsing mitigation and monitoring would be specified in the NSW Project Approval. We expect these to be developed in consultation with NSW Office of Environment and Heritage and to the satisfaction of the NSW Department of Planning and Infrastructure and/or SEWPac.

### 6.1 MITIGATION MEASURES

Mitigation measures are described in Sections 4.6.3, 4.7.3 and 4.8.3 in the Main Report of the EIS, in the Flora Assessment and Fauna Assessment (Appendices A and B of the EIS, respectively) and in the Aboriginal and Non-Aboriginal Cultural Heritage Assessment (Appendix E of the EIS). A summary is provided in Section 7 in relation to Matters of National Environmental Significance.

The management and mitigation measures proposed as part of the Project are considered consistent with current best practice in the mining industry. The majority of these matters have substantial evidence of success over a long period of time (e.g. weed and erosion management measures). Attachment E relates to proposed mitigation measures for Matters of Natural Environmental Significance, and effectiveness of these measures.

## 6.2 OFFSETS

A full description of the offset for the Project is provided in Sections 4.6.4 and 4.7.4 in the Main Report of the EIS. Table 8 provides the area of known or potential habitat within the Project area and the proposed biodiversity offset area.

**Table 8**  
**Habitat for Threatened Fauna Species Known or Considered**  
**Likely to Occur in the Project Area and Offset Area**

Species	Conservation Status <sup>1</sup>	Area Impacted (ha)	Area Conserved in Offset Area (ha)	Recorded in Project Area	Recorded in Biodiversity Offset Area and/or Areas Surrounding the Project
Malleefowl	V, M	4,280	16,440	Footprints recorded within the MLA and close surrounds.	Yes
Australian Painted Snipe	V, M	5	21	Recorded from one location (10 individuals) in the MLA, outside of the Campaspe footprint. There is potential habitat present within the Project area and surrounds.	Yes
Regent Parrot	V	1,575	12,765	Recorded in one location to the west of the Atlas footprint. There is potential foraging habitat available within the Project area and surrounds.	Yes
Australasian Bittern	E	5	21	No	No
South-eastern Long-eared Bat (also known as Corben's Long-eared Bat)	V	3,863	15,830	Recorded in seven locations within the Atlas-Campaspe Mine footprint. The species was also recorded in the surrounding area. There is also a record along the mineral concentrate transport route. There is potential habitat available within the Project area and surrounds.	Yes

Source: AMBS (2013b) (Appendix B of the EIS).

<sup>1</sup> Threatened species status under the EPBC Act (current as at 8 November 2012).

V = Vulnerable

E = Endangered

M = Migratory

The EPBC Act and supporting guidelines (refer to *Environment Protection and Biodiversity Conservation Act Environmental Offsets Policy* [SEWPaC, 2012b]) contain a number of requirements for environmental offsets. The Project includes a comprehensive offset proposal as described in Section 8 of the Flora Assessment (Appendix A of the EIS) and Section 7 of the Fauna Assessment (Appendix B of the EIS). Section 5 of the Main Report of the EIS describes the rehabilitation and landscape management for the Project.



A key rehabilitation objective for the Project would be to selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands, e.g. *Eucalyptus largiflorens*, to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the Winged Peppercreep, Australian Painted Snipe and South-eastern Long-eared Bat. As described in Section 5.7.2 in the Main Text of the EIS, Cobar Greenhood Orchid collected from the mining lease would be included in revegetation trials for rehabilitated post mine landforms.

The rehabilitated post mine landforms would contain habitat features suitable for the Malleefowl and Regent Parrot including the establishment of species representative of Linear Dune Mallee and Sandplain Mallee such as *Eucalyptus socialis*, *E. dumosa* and *Callitris* sp.

A reconciliation of the proposed biodiversity offset areas against the Commonwealth Requirements is provided in Table 9.

**Table 9**  
**Reconciliation of the Proposed Offset Strategy against Commonwealth Offset Principles**

Offset Requirements	Elements of the Project Offset that address these Requirements
Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environmental law and affected by the action.	<p>A conservation outcome that improves or maintains the viability environmental matters that are protect by national environmental law and affected by the Project because:</p> <ul style="list-style-type: none"> <li>The biodiversity offset area contains two known nationally threatened flora species (Winged Peppercreep and Cobar Greenhood Orchid) and provides potential habitat for these and several others.</li> <li>Management of the biodiversity offset would include a series of measures likely to improve flora and vegetation values, fauna habitat and reduce pressure on native flora and fauna species, including removal of stock, ecological fire management and feral animal control.</li> <li>Habitat for any nationally threatened fauna species which could be impacted by the Project also occurs within part of the biodiversity offset area, including the Malleefowl, the Australasian Bittern, the Australian Painted Snipe, the Regent Parrot and the South-eastern Long-eared Bat (also known as Corben's Long-eared Bat).</li> <li>270 ha of cleared land would be rehabilitated or revegetated.</li> <li>The biodiversity offset area (totalling 16,540 ha) would be conserved in perpetuity.</li> <li>Measures to monitor and independently audit the biodiversity offset are provided.</li> </ul>
Be built around direct offsets but may include other compensatory measures.	The biodiversity offset area would maintain and improve a similar suite of flora species and vegetation communities to those in the majority of the Atlas-Campaspe Mine area. It contains habitat with a high conservation status, as demonstrated by the presence of numerous nationally threatened fauna species in the biodiversity offset area, including species which would be impacted by the Project.
Be in proportion to the level of statutory protection that applies to protected matter.	Nationally threatened species which are considered to have potential to be impacted by the Atlas-Campaspe Mine are all likely to benefit in the medium to long-term from the offset proposal. All species listed under the EPBC Act that have been recorded in the Atlas-Campaspe Mine area and would be significantly impacted have known and/or potential habitat greater than the area which would be impacted, maintained and improved in the biodiversity offset area.
Be of a size and scale proportionate to the impacts on the protected matter.	The Project would disturb approximately 4,158 ha of native vegetation and 305 ha of cleared land. The biodiversity offset area would conserve and improve in perpetuity approximately 16,270 ha of native vegetation (composed of equivalent and/or additional flora vegetation types/fauna habitat types, with the exception of Chenopod Shrubland vegetation communities and habitat and Sandhill Pine Woodland) and approximately 270 ha of cleared land, which would be revegetated. Two threatened flora species (Winged Peppercreep and Cobar Greenhood Orchid) found in the Atlas-Campaspe Mine area are represented by a number of individuals in the biodiversity offset area.
Effectively account for and manage the risks of the offset not succeeding.	Measures to monitor and independently audit the biodiversity offset area included in the management plan would provide for ongoing adaptive management in the unlikely event that the offset is not succeeding. The implementation of the offset is likely to be a condition of Project Approval.

**Table 9 (Continued)**  
**Reconciliation of the Proposed Offset Strategy against Commonwealth Offset Principles**

Offset Requirements	Elements of the Project Offset that address these Requirements
Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.	The implementation of the offset strategy is beyond existing requirements, in that it is not part of any private conservation reserve system. The biodiversity offset area is new and additional under duty of care or any environmental planning laws.
Be efficient, effective, transparent, proportionate, scientifically robust and reasonable.	<p>The flora and fauna in both the proposed disturbance area and the biodiversity offset area has been extensively surveyed by AMBS (2013a, 2013b) (Appendices A and B of the EIS). Results are supported by rigorous data analysis and mapping.</p> <p>This report provides an assessment of:</p> <ul style="list-style-type: none"> <li>• area of the offset and area of impact;</li> <li>• nationally threatened fauna and flora species present and their conservation status;</li> <li>• connectivity and condition of habitat; and</li> <li>• management actions and security for the biodiversity offset area.</li> </ul>
Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	Cristal Mining intends to reach an agreement with the NSW Government so that the offset would be managed and protected long-term, within 12 months of Project Approval and so it could be permanently added to the adjoining Mungo National Park. As this process may take some time, an interim conservation arrangement would be made for protection and management of the offset area (e.g. a voluntary conservation agreement pursuant to section 69B of the NSW <i>National Parks and Wildlife Act, 1974</i> , as described in contemporary Project Approval conditions pertaining to offsets). Measures to monitor and independently audit the offset are provided. The implementation of the offset is likely to be a condition of Project Approval.

Source: FloraSearch (2012); AMBS (2013a) (Appendix A of the EIS); AMBS (2013b) (Appendix B of the EIS); SEWPaC (2012b).

## 7 OTHER APPROVAL CONDITIONS

Table 10 provides a list of matters regarding the approval conditions for the proposed Project and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 10**  
**Reconciliation of EIS against Commonwealth Requirements – Other Approvals and Conditions**

Assessment Requirement	Main Report of the EIS Reference
<b>6. Other approvals and conditions</b> <i>Any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action. Information must include:</i>	
<i>a. details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:</i>	Sections 6.2 to 6.6.
<i>i. what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy; and</i>	Sections 6.2 to 6.6.
<i>ii. how the scheme provides for the prevention, minimisation and management of any relevant impacts;</i>	Section 6.7.
<i>b. a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply to the action;</i>	Sections 6.1 to 6.4.
<i>c. a statement identifying any additional approval that is required; and</i>	Section 6.4.
<i>d. a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.</i>	Section 6.8.

## 8 ENVIRONMENTAL RECORD OF THE PERSON PROPOSING TO TAKE THE ACTION

Table 11 provides a list of the matters regarding the environmental record of the person proposing to take the action and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 11**  
**Reconciliation of EIS against Commonwealth Requirements – Environmental Record of the Person Proposing to Take the Action**

Assessment Requirement	EIS Reference
<b>7. Environmental record of person proposing to take the action</b> <i>A description of the environmental record of the person proposing to take the action, including:</i>	
<i>a) Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:</i>	
<i>i. the person proposing to take the action; and</i>	
<i>ii. for an action for which a person has applied for a permit, the person making the application.</i>	Not Applicable.
<i>b) If the person proposing to take the action is a corporation – details of the corporation's environmental policy and planning framework.</i>	Section 6. Attachment F of this document.

## 9 INFORMATION SOURCES

Table 12 provides a list of the matters regarding the EIS information sources and the corresponding section in the Main Report of the EIS where the matters are addressed. Each of the specialist assessments were developed by highly qualified, skilled and well respected experts. Where information has been used in the specialist assessments, relevant (and respected) references have been appropriately cited.

**Table 12**  
**Reconciliation of EIS against Commonwealth Requirements – Information Sources**

Assessment Requirement	EIS Reference
<b>8. Information sources</b> <i>For information given in an environmental assessment, the assessment must state:</i>	
<i>a. the source of the information;</i>	Appendices A to O
<i>b. how recent the information is;</i>	
<i>c. how the reliability of the information was tested; and</i>	
<i>d. what uncertainties (if any) are in the information.</i>	

## 10 CONSULTATION

Table 13 provides a list of the matters regarding consultation undertaken about the Project and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 13**  
**Reconciliation of EIS against Commonwealth Requirements - Consultation**

Assessment Requirement	Main Report of the EIS Reference
<b>9. Consultation</b> <i>A description of any consultation undertaken during the assessment, including:</i>	
<i>a) Any consultation about the action, including:</i> <ul style="list-style-type: none"> <li><i>i. any consultation that has already taken place;</i></li> <li><i>ii. proposed consultation about relevant impacts of the action; and</i></li> <li><i>iii. if there has been consultation about the proposed action – any documented response to, or result of, the consultation.</i></li> </ul>	Section 3.1.
<i>b. Identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.</i>	Section 3.1.
<i>c. Methodology and results of consultation with the relevant Indigenous people with rights or interests (as discussed above in sections 3, 4 and 5).</i>	Sections 3.1.7 and 4.8. Sections 4 and 10 of Appendix E.

## 11 ECONOMIC AND SOCIAL MATTERS

Table 14 provides a list of economic and social matters and the corresponding section in the Main Report of the EIS where the matters are addressed.

**Table 14**  
**Reconciliation of EIS against Commonwealth Requirements – Economic and Social Matters**

Assessment Requirement	Main Report of the EIS Reference
<b>10. Economic and social matters</b> <i>The economic and social impacts of the action, both positive and negative, must be analysed. This analysis must include:</i>	
<i>a) details of any public consultation activities undertaken, and their outcomes;</i>	Section 3.1.
<i>b) projected economic costs and benefits of the project, including the basis for their estimation through cost/benefit analysis or similar studies; and</i>	Sections 4.16 and 4.17. Appendix I.
<i>c) employment opportunities expected to be generated by the project (including construction and operational phases).</i>	Section 2.13. Appendix I.

## 12 REFERENCES

Australian Museum Business Services (2013a) *Atlas-Campaspe Mineral Sands Project Flora Assessment*. Prepared for Cristal Mining Australia Limited.

Australian Museum Business Services (2013b) *Atlas-Campaspe Mineral Sands Project Terrestrial Fauna Assessment*. Prepared for Cristal Mining Australia Limited.

Department of Sustainability, Environment, Water, Population and Communities (2012a) *World Heritage List*.

Website: <http://www.environment.gov.au/heritage/places/world/index.html>

Date Accessed: 8 November 2012.

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

Department of the Environment, Water, Heritage and the Arts (2009) *Significant Impact Guidelines 1.1: Matters of National Environmental Significance*.

FloraSearch (2012) *Data from surveys for Pterostylis cobarensis Atlas-Campaspe Study Area and Surrounds - October 2012*.

Niche Environment and Heritage (2012) *Atlas-Campaspe Mineral Sands Project Aboriginal and Non-Aboriginal Cultural Heritage Assessment*. Prepared for Cristal Mining Australia Limited.

ATTACHMENT A

CONTROLLED ACTION AND ASSESSMENT APPROACH DECISION



**Notification of**

**REFERRAL DECISION AND DESIGNATED PROPONENT – controlled action  
DECISION ON ASSESSMENT APPROACH – Accredited Assessment under Part 4  
of the NSW *Environment Assessment and Planning Act 1979* (EP&A Act) - State  
Significant Development**

**Atlas Campaspe Mineral Sands Project, NSW (EPBC 2012/6447)**

This decision is made under section 75 and section 87 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

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<b>proposed action</b>	To construct and operate a mineral sands operation and associated infrastructure near Hatfield NSW, a rail facility area at Ivanhoe, NSW, and to undertake upgrades to the roads between the mine and the rail facility [See EPBC Act referral 2012/6447].
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<b>decision on proposed action</b>	The proposed action is a controlled action. The project will require assessment and approval under the EPBC Act before it can proceed.
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<b>relevant controlling provisions</b>	<ul style="list-style-type: none"><li>• World Heritage properties (sections 12 &amp; 15A)</li><li>• National Heritage places (sections 15B &amp; 15C)</li><li>• Listed threatened species and communities (sections 18 &amp; 18A)</li><li>• Listed migratory species (sections 20 &amp; 20A)</li></ul>
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<b>designated proponent</b>	BEMAX Resources Limited ACN 009 247 858
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<b>assessment approach</b>	The project will be assessed by accredited assessment under Part 4 of the NSW <i>Environment Assessment and Planning Act 1979</i> (EP&A Act) - State Significant Development
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**Decision-maker**

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<b>Name and position</b>	James Tregurtha Assistant Secretary Environment Assessment Branch
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**Signature**

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<b>date of decision</b>	14 September 2012
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ATTACHMENT B

DEPARTMENT OF SUSTAINABILITY, ENVIRONMENT, WATER,  
POPULATION AND COMMUNITIES – SUPPLEMENTARY  
DIRECTOR-GENERAL'S REQUIREMENTS

# Supplementary Director-General's Requirements

## Section 78A(8A) of the *Environmental Planning and Assessment Act 1979*

The delegate for the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities has determined that the proposed action, to develop an open cut mineral sands mine and associated infrastructure near Hatfield NSW, a rail facility at Ivanhoe NSW, and to undertake upgrades to the roads between the mine and the rail facility, is a controlled action under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

This action is likely to have a significant impact on migratory species, threatened species and ecological communities listed under the EPBC Act, the world heritage values of a declared World Heritage property, and the national heritage values of a National Heritage place.

The delegate has also determined that the project be assessed through an accredited assessment of Part 4 of the NSW *Environment Assessment and Planning Act 1979* (EP&A Act) - State Significant Development. In accordance with the accredited assessment process for this project, the assessment of the impacts of the action on the relevant matters of national environmental significance must be integrated into the assessment required for Part 4 of the EP&A Act.

The assessment must include enough information about the controlled action and its relevant impacts to allow the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities, or his delegate, to make an informed decision about whether or not to approve the controlled action under the EPBC Act. To this end, provided below are the assessment requirements under the EPBC Act for input into the Director-General Requirements.

The following matters must be addressed in the assessment of the action:

### Key Assessment requirements:

1. Impacts on threatened species and ecological communities listed under Sections 18 and 18A of the EPBC Act;
2. Impacts on migratory species listed under Section 20 and 20A of the EPBC Act;
3. Impacts on the world heritage values of a declared World Heritage property listed under Sections 12 and 15A of the EPBC Act;
4. Impacts on the national heritage values of a National Heritage place listed under section 15B and 15C of the EPBC Act;
5. Any relevant Commonwealth and State Government technical and policy guidelines;
6. Matters outlined in Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulation 2000*, included in the requirements below; and
7. The requirements outlined below.

## **General information**

### **1. The background of the action, including:**

- a. the title of the action;
- b. the full name and postal address of the designated proponent;
- c. a clear outline of the objective of the action;
- d. the location of the action;
- e. the background to the development of the action;
- f. how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;
- g. the current status of the action; and
- h. the consequences of not proceeding with the action.

## **Description of the action**

### **2. A description of the action, including:**

- a. all the components of the action;
- b. the precise location of the preferred option for any works to be undertaken, structures to be built and elements of the action that may have relevant impacts;
- c. how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;
- d. to the extent reasonably practicable, a description of any feasible alternatives to the controlled action that have been identified through the assessment, and their likely impact, including:
  - i. if relevant, the alternative of taking no action;
  - ii. a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action; and
  - iii. sufficient detail to make clear why any alternative is preferred to another.
- e. a description of long-term and short-term economic and social considerations regarding the project.

## **A description of the existing environment and relevant matters of national environmental significance**

### **3. A description of the existing environment including:**

#### *Migratory species, threatened species and ecological communities*

- a. a description of the nature, location and extent of all vegetation types occurring on the sites, immediately adjacent to the sites and in areas likely to be indirectly impacted by the action;
- b. a description and map of the nature, location and extent of likely suitable habitat, and known records for migratory species, threatened species and ecological communities (including breeding, foraging, roosting habitat, habitat critical to the survival of the relevant species and ecological communities, movement corridors and migration paths) within the sites and in surrounding areas that may be impacted by the proposal; and
- c. adequate surveys for relevant species, including detailed description of the methodology, timing, effort and results of all targeted surveys undertaken for all relevant matters, in accordance with any relevant guidelines and a description of any limitations and constraints of the surveys undertaken;

### *World Heritage and National Heritage values*

- a. a description of the world heritage values and national heritage values of the Willandra Lakes Area;
- b. the research methodology to assess impacts to the values that has been used and if fieldwork has been undertaken, the process including: the dates the fieldwork was undertaken, the area covered, who did it and the methods employed;
- c. the identification of the relevant Indigenous people with rights or interests in the Willandra Lakes Area, and how these people were determined as the relevant Indigenous people; and
- d. a description of the consultation process undertaken to seek active involvement from the relevant Indigenous people with rights or interests. The Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) strongly encourages the use of the *Ask First* principles and the principle of free prior informed consent when engaging with Indigenous communities.

### **An assessment of the relevant impacts of the action**

#### **4. An assessment of the relevant impacts of the action including:**

- a. a detailed description and assessment of the nature and extent of all relevant impacts, including direct, indirect and facilitated impacts that the action will have or is likely to have on:
  - i. threatened species and ecological communities listed under sections 18 and 18A of the EPBC Act;
  - ii. migratory species listed under sections 20 and 20A of the EPBC Act.
  - iii. the world heritage values of a declared World Heritage property listed under Sections 12 and 15A of the EPBC Act; and
  - iv. the national heritage values of a National Heritage place listed under section 15B and 15C of the EPBC Act.
- b. whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- c. any technical data and other information used or needed to make a detailed assessment of the relevant impacts, including but not limited, to consultation with the relevant Indigenous people with rights or interests, and the results and conclusions of the groundwater modelling undertaken for the proposed Atlas-Campaspe mine as they relate to relevant matters of national environmental significance;
- d. a description of the consultation process undertaken to seek active involvement from the relevant Indigenous people with rights or interests. The department strongly encourages the use of the *Ask First* principles and the principle of free prior informed consent when engaging with Indigenous communities;
- e. if relevant Indigenous people with rights or interests have been involved in a particular study, have asserted a particular view or, have provided information that has influenced the findings of the assessment, please attach a letter from those people confirming that they understand what has been written in your report and agree that this is an accurate reflection of their view and/or involvement; and
- f. evidence that any advice has been taken into consideration. If you decide not to follow advice given in the interests of the protection of Indigenous heritage values a robust justification must be provided.

Please note, DSEWPaC's consideration of impacts to relevant Indigenous world and national heritage values will be guided by the *Ask First* principle that Indigenous people are the primary informants on the value of their heritage and how it is best preserved.

### **Proposed safeguards, mitigation and offset measures**

5. A description of changes to the action and feasible mitigation measures, that are intended to avoid, minimise or compensate for relevant impacts, including:

- a. a description of how the action has been designed to avoid impacts to migratory species, threatened species and ecological communities, world and national heritage values;
- b. a consolidated list of mitigation measures proposed to be undertaken to prevent or minimise the relevant impacts of the action, before, during and after construction, during operation, decommissioning and rehabilitation;
- c. for proposed avoidance and mitigation measures relevant to Indigenous heritage values, evidence of consultation with relevant Indigenous people with rights or interest;
- d. a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures, including a justification of the location and design of mitigation measures to be implemented to ensure their effectiveness. This analysis should be based on best available knowledge and baseline data for the relevant areas;
- e. a description of the objectives of the mitigation measures, thresholds for corrective actions, and the corrective actions to be implemented should these thresholds be exceeded;
- f. any statutory or policy basis for the mitigation measures;
- g. details of environmental management plans that set out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including the person or agency responsible for implementing these programs and provisions for independent environmental auditing;
- h. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;
- i. in the event that impacts cannot be avoided or mitigated, a description of any offsets to compensate for any predicted or potential residual impacts on migratory species, threatened species and ecological communities. This should be in accordance with the DSEWPac's Offsets Policy and include:
  - i. an assessment of how any proposed offset compensates for the residual impacts on migratory species, threatened species and ecological communities likely to remain following avoidance and mitigation measures to be implemented;
  - ii. the location of any proposed offset;
  - iii. the timing of the delivery of any offset; and
  - iv. how the offset will be secured and managed in perpetuity.

#### **Other approvals and conditions**

- 6. Any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action. Information must include:
  - a. details of any local or State Government planning scheme, or plan or policy under any local or State Government planning system that deals with the proposed action, including:
    - i. what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy; and
    - ii. how the scheme provides for the prevention, minimisation and management of any relevant impacts;
  - b. a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply to the action;
  - c. a statement identifying any additional approval that is required; and
  - d. a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

#### **Environmental record of person proposing to take the action**

- 7. A description of the environmental record of the person proposing to take the action, including:

- a. Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:
  - i. the person proposing to take the action; and
  - ii. for an action for which a person has applied for a permit, the person making the application.
- b. If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

### **Information sources**

8. For information given in the environment assessment, the assessment must state:

- a. the source of the information;
- b. how recent the information is;
- c. how the reliability of the information was tested; and
- d. what uncertainties (if any) are in the information.

### **Consultation**

9. A description of any consultation undertaken during the assessment, including:

- a. any consultation about the action, including:
  - i. any consultation that has already taken place;
  - ii. proposed consultation about relevant impacts of the action; and
  - iii. if there has been consultation about the proposed action — any documented response to, or result of, the consultation.
- b. identification of affected parties, including a statement mentioning any communities that may be affected and describing their views; and
- c. methodology and results of consultation with the relevant Indigenous people with rights or interests (as discussed above in sections 3, 4 and 5).

### **Economic and Social Matters**

10. The economic and social impacts of the action, both positive and negative, must be analysed. This analysis must include:

- a. details of any public consultation activities undertaken, and their outcomes;
- b. projected economic costs and benefits of the project, including the basis for their estimation through cost/benefit analysis or similar studies; and
- c. employment opportunities expected to be generated by the project (including construction and operational phases).

## ATTACHMENT C

### DETAILED DESCRIPTION OF PROPOSED ACTION

The Action is a proposed mineral sands mining operation with a life of approximately 20 years. The Action would involve the mining of the Atlas and Campaspe deposits and construction of associated infrastructure (Atlas-Campaspe Mine). The Action would also involve the construction and operation of a rail facility area at Ivanhoe (Ivanhoe Rail Facility).

The major activities for the Action would include:

- development and operation of a mineral sands mine consisting of two open pits within the Mining Lease Application 1 area;
- use of conventional mobile equipment to mine and place ore into dry mining unit(s)<sup>2</sup> (DMU) at a maximum ore production rate of up to 7.2 million tonnes per annum (Mtpa);
- mineral processing infrastructure including the primary gravity concentration unit, salt washing facility and a wet high intensity magnetic separation (WHIMS) circuit;
- mineral concentrate stockpiles and materials handling infrastructure (e.g. towers and stackers);
- borefield and associated pump and pipeline systems;
- progressive development of water storage dams, sediment basins, pumps, pipelines and other water management equipment and structures;
- reverse osmosis (RO) plant to supply the salt washing facility and potable water;
- placement of overburden in overburden emplacements or at the rear of the active mining area as mining advances along the mine path;
- placement of process wastes (i.e. sand residues from the primary gravity concentration unit and Mineral Separation Plant [MSP] process waste) in sand residue dams or at the rear of the active mining area as mining advances along the mine path;
- mine facilities area including administration buildings, workshops, stores, ablutions, car parking and laydown areas;
- on-site accommodation camp to accommodate up to approximately 200 people;
- sewerage treatment plant;
- diesel powered generators and associated internal electricity transmission lines;
- access road, internal access roads and haul roads;
- upgrade of sections of Link Road, Magenta Road and Hatfield – The Vale Road and associated intersections;
- construction and operation of the Ivanhoe Rail Facility to the south-west of Ivanhoe;
- transport of mineral concentrates along the mineral concentrate transport route to the Ivanhoe Rail Facility;
- transport of mineral concentrates along the Orange – Broken Hill railway to the Broken Hill MSP;
- transport of back-loaded waste from the MSP to the Atlas-Campaspe Mine (via the Ivanhoe Rail Facility) for placement at the rear of the active mining area as mining advances along the mine path (once operations at the Ginkgo and Snapper Mines have ceased);
- environmental monitoring and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.

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<sup>2</sup> Mining would use conventional open pit methods and would not involve dredge mining.



An indicative general arrangement for the Atlas-Campaspe Mine is shown on Figure 2-3 of the Main Report of the EIS. Figure 2-9 of the Main Report of the EIS shows the indicative general arrangement for the Ivanhoe Rail Facility. Additional details of each of the main Action activities are provided below.

### ***Mineral Resource***

The Murray Darling Basin is a large sedimentary basin covering approximately 300,000 square kilometres extending across the borders of New South Wales (NSW), Victoria, Queensland and South Australia. The basin contains mineral sands deposits within the Loxton-Parilla Sands host unit, a sequence of weakly consolidated, near horizontally bedded sands that were deposited during marine transgressions and regressions in the Late Miocene to Late Pliocene period.

The Lower Loxton-Parilla Sands are typically overlain by barren sand of the Upper Loxton-Parilla Sand unit. The Shepparton Formation overlies the Upper Loxton-Parilla Sands and is a sandy clay unit with thick layers of clay. The Shepparton Formation can outcrop in places but is generally overlain by a thin layer of the Woorinen Formation consisting of very fine to coarse sand, silty sand, sandy clay and minor calcrete.

The Atlas and Campaspe deposits both occur within the Loxton-Parilla sands host unit and consist of fine to medium grained quartz sands which are generally unconsolidated, well sorted and contain little clay.

The Atlas deposit is a continuous body of mineralisation approximately 15 kilometres (km) long and up to 150 metres (m) wide with an average thickness of 6 m. The mineral grade increases in the south-eastern section of the deposit. A 12 km section typically less than 100 m wide would be mined.

The Campaspe deposit is a continuous body of mineralisation approximately 18.5 km long with an average width and thickness of 410 m and 12 m, respectively. As with the Atlas deposit, the mineral grade increases in the south-eastern end of the deposit and approximately 14 km of the south-eastern end of the deposit is proposed to be mined.

The reserve for the Action comprises approximately 109 million tonnes (Mt) of ore, at an average grade of approximately 5.8 percent (%) heavy minerals. This represents some 5 Mt of heavy minerals comprising valuable components of ilmenite, leucoxene, rutile, and zircon.

### ***Mining Operations***

Conventional (non-dredge) mining methods would be utilised at the Atlas-Campaspe Mine, both for overburden removal and for ore extraction. Mining would commence with the development of an initial excavation at the south-eastern end of the Atlas open pit and then progress in a north-westerly direction.

Mining would commence in the Campaspe open pit once mining of the Atlas open pit is complete. An initial excavation at the south-eastern end of the Campaspe open pit would commence and progress in a north-westerly direction.

The general sequence of mining operations would be as follows:

1. Vegetation clearing and soil stripping.
2. Removal of overburden ahead of mining using conventional truck and shovel methods (e.g. excavators and haul trucks).
3. Mining and placement of ore in DMU using dozers and loaders.
4. Placement of overburden at the rear of the active mining area as mining advances along the mine path or in overburden emplacements.
5. Placement of process wastes (i.e. sand residues from the primary gravity concentration unit and MSP process waste<sup>3</sup>) at the rear of the active mining area as mining advances along the mine path or in sand residue dams.
6. Progressive rehabilitation behind the advancing mining operation.

#### *Vegetation Clearance and Soil Management*

Progressive vegetation clearing would be undertaken ahead of the advancing mining operation. Soil stripping would be undertaken progressively and stockpiling procedures would aim to minimise soil degradation prior to its use for progressive rehabilitation.

Stripped soil would be used directly in progressive rehabilitation or placed in temporary stockpiles. Temporary soil stockpiles would be located adjacent the Atlas and Campaspe open pits.

A fleet of dozers, scrapers and water carts would typically be used for vegetation clearing and soil stripping activities.

#### *Overburden Removal and Handling*

Excavators, dozers and front end loaders would be used to remove overburden ahead of the advancing mining operation. Haul trucks would be used to transport the overburden to either the rear of the active mining area as mining advances along the mine path or overburden emplacements.

Overburden would be preferentially placed at the rear of the active mining area as mining advances along the mine path. The overburden would be used to construct a series of cells at the rear of the active mining area to store process wastes.

There would however be periods during mining when there is insufficient capacity to place all overburden at the rear of the active mining area (e.g. the initial stages of mining at both open pits). The overburden would be placed in overburden emplacements during these periods.

#### *Heavy Mineral Concentrate Mining and Handling*

Approximately 109 Mt of ore would be mined from the Atlas and Campaspe open pits.

Mining would typically involve dozers and loaders placing ore in the DMU located in the open pit. Ore would be placed in the DMU at a rate of approximately 500 tonnes per hour (tph) in the Atlas open pit. An additional DMU would be used in the Campaspe open pit to increase the ore feed rate to approximately 1,000 tph.

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<sup>3</sup> Once operations at the Ginkgo and Snapper Mines have ceased, process waste generated from the separation of Project mineral concentrates would be back-loaded to the Project.

The ore would be screened and slurried in the DMU and pumped to the primary gravity concentration unit for primary processing.

#### *Process Waste Handling*

Process wastes (i.e. sand residues/coarse rejects from the primary gravity concentration unit and MSP process waste) would preferentially be placed at the rear of the active mining area in cells constructed from overburden.

There would however be periods during mining when there is insufficient capacity to place all process wastes at the rear of the active mining area (e.g. the initial stages of mining at both open pits). The process wastes would be placed in sand residue dams during these periods.

#### *Mine Dewatering*

The majority of the Atlas and Campaspe open pits would be located above the groundwater table. Minor sections in the central portion of the Atlas and Campaspe open pits would however excavate below the groundwater table.

In these areas, sumps would be excavated in the floor of the active open pits to collect groundwater inflows expected to report to the mine workings. The water collected in the sumps would be transferred to the mine water management system and would be re-used on-site (e.g. dust suppression).

#### *Final Voids*

At the cessation of mining, final voids would remain at the north-western extent of both the Atlas and Campaspe open pits.

The surface catchment of the final void would be designed to a suitable minimum by the use of upslope diversions/bunds and contour drains around the perimeter. The final voids would be designed to have long-term geotechnical stability, with adjustment to the wall batter angles to achieve stability.

### **Processing**

Processing would operate up to 24 hours per day, seven days per week. A description of the processing operations is provided below.

#### *Primary Gravity Concentration Unit*

Primary separation of the valuable minerals from ore would occur in the primary gravity concentration unit. The primary gravity concentration unit would be relocated throughout the life of the mine such that it remains adjacent to the advancing mining operation.

The ore would be pumped from the DMU to the primary gravity concentration unit where it would enter gravity separation circuits within the primary gravity concentration unit to separate valuable minerals from sand residues. The gravity separation circuits would consist of a series of spiral separators.

The gravity separation circuits would produce heavy mineral concentrate (HMC) comprising approximately 94% valuable heavy minerals (principally ilmenite, leucoxene, rutile and zircon). The HMC recovered by the primary gravity concentration unit would be processed further at the HMC treatment facility.

Sand residues separated by the gravity separation circuits would be deposited in purposely-built tailings dams (on-path or off-path).

### *HMC Treatment Facility*

The HMC treatment facility would include:

- salt washing facility;
- WHIMS circuit; and
- RO plant.

The HMC treatment facility would be initially located at the south-eastern end of the Atlas open pit and would be relocated to the south-eastern end of the Campaspe open pit following the cessation of mining operations at the Atlas open pit.

The components of the HMC treatment facility are described below.

#### Salt Washing Facility

Due to the saline nature of the groundwater at the site, HMC pumped from the primary gravity concentration unit would have a high salt content. The residual salt in the HMC would inhibit the efficiency of the separation process in the WHIMS. The mineral concentrate would therefore be washed with desalinated water from the RO plant prior to processing at the WHIMS.

Following salt washing, the HMC would be pumped to the WHIMS circuit. Reject water from the salt washing facility would be recycled in the site water management system.

#### WHIMS Circuit

The WHIMS circuit is a preliminary treatment stage which separates the HMC into ilmenite-rich, leucoxene-rich and non-magnetic (containing rutile-rich and zircon-rich) mineral concentrates.

The WHIMS circuit relies on magnetic separation and requires no chemical reagents. The WHIMS circuit consists of primary and secondary magnetic separators to separate the magnetic and non-magnetic mineral concentrates and product de-watering cyclones.

The mineral concentrates would be stockpiled in the mineral concentrate stockpile area by product stackers.

#### RO Plant

A RO plant would supply desalinated water to the salt washing facility and the WHIMS circuit. Potable water for the Atlas-Campaspe Mine would also be sourced from the RO plant. The borefield would supply feed water to the RO plant.

Wastewater from the RO plant would be combined with reject water from the salt washing facility and then recycled in the site water management system.

## ***Mineral Concentrate Loading and Transport***

### ***Mineral Concentrate Loading***

The mineral concentrates would be stockpiled in the mineral concentrate stockpile area by product stackers. Front end loaders would be used to load mineral concentrates onto road trains (or other NSW Roads and Maritime Services approved vehicles) for transport to the Ivanhoe Rail Facility via the proposed Mineral Concentrate Transport Route (Figure 1-1 of the Main Report of the EIS).

The mineral concentrates would be covered to minimise the potential loss of mineral concentrate during transport.

### ***Road Transport***

The mineral concentrates would be transported in road trains via the mineral concentrate transport route. The mineral concentrate transport route is approximately 175 km long and would comprise sections of the following public roads (Figures 1-1 and 2-3 of the Main Report of the EIS):

- Link Road;
- Magenta Road;
- Hatfield-The Vale Road; and
- Balranald-Ivanhoe Road.

On average 0.3 Mtpa of mineral concentrates, ranging up to 0.5 Mtpa, would be transported from the Atlas-Campaspe Mine to the Ivanhoe Rail Facility. There would be an average of 19 trips per day (38 movements per day) ranging up to a maximum of approximately 24 trips per day (48 movements per day).

### ***Ivanhoe Rail Facility***

The Ivanhoe Rail Facility would be located approximately 4.5 km south-west of the Ivanhoe township (Figure 2-9 of the Main Report of the EIS).

Haulage vehicles would access to the Ivanhoe Rail Facility via an access road off the Balranald-Ivanhoe Road. Mineral concentrate from the haulage vehicles would be placed directly onto mineral concentrate stockpiles. The mineral concentrate would then be loaded with a front end loader into containers on rail wagons. A forklift would be used to remove/replace covers on the rail wagons.

## ***Water Supply and Management***

A water management system is proposed to divert up catchment water around the site or away from disturbed areas and contain any runoff water which has originated from the Atlas-Campaspe Mine development and operational areas.

Diversion of up catchment and collection and storage of runoff water would be achieved through the use of a network of channels, diversion banks, sediment basins and storage dams. This water management system would include permanent features that would continue to operate post-operations and temporary structures that would only be required until the completion of rehabilitation works. It is proposed that the water management system would be developed progressively as the mine path progresses and the water management requirements change over time.

Any runoff water collected as a part of this water management system would be utilised to supplement the Action water supply requirements.

The majority of on-site water supply requirements are proposed to be supplied by the Atlas-Campaspe Mine borefield. The borefield is proposed to be located at the north-western end of the Atlas open pit. It is proposed that the borefield would supply process water to the following:

- DMU;
- primary gravity concentration unit;
- RO plant (for potable water and salt washing);
- salt washing facility and WHIMS circuit (via the RO plant); and
- dust suppression.

### ***Employment***

The Action would facilitate the employment of approximately 200 employees and contractors during operations.

Employment of approximately 150 personnel would be required for the construction of the Action with a maximum of 300 during peak construction activities. Construction activities are expected to occur for approximately one year.

### ***Rehabilitation***

The disturbance areas for the Action would be progressively rehabilitated and revegetated as mining proceeds and infrastructure is decommissioned.

Plant species characteristic of vegetation communities that would be cleared would be used to revegetate mine landforms and disturbance areas. Rehabilitation and revegetation would be progressive and would aim to re-establish vegetation across the disturbance area in order to reduce the impact on habitat connectivity.

## ATTACHMENT D

### RELEVANT IMPACTS TO MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE AND THE CERTAINTY OF THE IMPACT ASSESSMENT

**Table D-1**  
**Mitigation Measures for Matters of National Environmental Significance**

Relevant Matter of National Environmental Significance	Measure	Effectiveness
<b>Flora</b>		
Cobar Greenhood Orchid	<ul style="list-style-type: none"> <li>Refinement of the final design/location of stockpiles to avoid impacts on the fourth and fifth location of the Cobar Greenhood Orchid (Figure 4-11 in the Main Text of the Environmental Impact Statement [EIS]) and fencing and signage of a 25 metre (m)-radius zone to avoid incidental incursions. Locations 1, 2 and 3 are located above the mineral resource and within the proposed mine path. These locations, therefore, cannot be avoided.</li> </ul>	Provides for the avoidance of impacts on known Cobar Greenhood Orchid locations.
	<ul style="list-style-type: none"> <li>Fencing of the 25 m-radius zone would be designed to protect the known occurrences of the Cobar Greenhood Orchid from grazing by goats and rabbits (Locations 4 and 5 shown on Figure 4-11 in the Main Text of the EIS).</li> </ul>	Provides for the mitigation of grazing impacts on known Cobar Greenhood Orchid locations.
	<ul style="list-style-type: none"> <li>Vegetation Clearance Protocol including pre-clearance targeted searches for the Cobar Greenhood Orchid (during mid-October) in the proposed disturbance area and salvage of orchids for use in revegetation trials and rehabilitation areas (Section 5.7.2 in the Main Text of the EIS), in accordance with appropriate licences.</li> </ul>	In areas proposed to be cleared, avoidance is not a viable option. Vegetation Clearance Protocol represents an effective mitigation measure for the Cobar Greenhood Orchid as it allows for the potential to collect and re-establish the Cobar Greenhood Orchid on rehabilitation post mine landforms.
	<ul style="list-style-type: none"> <li>Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).</li> </ul>	Minimises the potential for accidental clearance outside proposed disturbance areas.
	<ul style="list-style-type: none"> <li>Protection of potential habitat (i.e. mallee woodland) outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the Mining Lease Application [MLA]) by removing grazing by stock.</li> </ul>	Allows for the potential mitigation of existing impacts (i.e. grazing) on potential habitat for the Cobar Greenhood Orchid, and any unknown occurrences of this species.
	<ul style="list-style-type: none"> <li>The collection of topsoil around the Cobar Greenhood Orchid populations within the Atlas-Campaspe Mine for reuse on rehabilitation, where practicable.</li> </ul>	Allows for the potential to re-establish the Cobar Greenhood Orchid on rehabilitation post mine landforms.
	<ul style="list-style-type: none"> <li>Feral animal control (goats and rabbits) to reduce erosion and grazing pressure.</li> </ul>	Provides mitigation of potential erosion and grazing impacts as a result of feral animals.
	<ul style="list-style-type: none"> <li>Weed management and monitoring to prevent weed invasion.</li> </ul>	Provides mitigation of potential impacts as a result of weeds.
	<ul style="list-style-type: none"> <li>Fire prevention, control and management.</li> </ul>	Provides mitigation of potential impacts as a result of fire.



**Table D-1 (Continued)**  
**Mitigation Measures for of Matters of National Environmental Significance**

Relevant Matter of National Environmental Significance	Measure	Effectiveness
<b>Flora</b>		
Mossgiel Daisy	<ul style="list-style-type: none"> <li>A section of the existing Magenta Road in the vicinity of the known Mossgiel Daisy population would not be widened (Figure 4-12 in the Main Text of the EIS).</li> <li>This section of road would be sealed to minimise erosion and dust generation.</li> </ul>	Provides for the avoidance and/or mitigation of potential impacts on the known population of Mossgiel Daisy.
	<ul style="list-style-type: none"> <li>Mineral Concentrate Transport Route (MCTR) mainly follows existing road realignments to reduce amount of vegetation clearance required.</li> </ul>	Provides for the avoidance and/or mitigation of potential impacts on habitat along the MCTR which the Mossgiel Daisy is known to occur within.
	<ul style="list-style-type: none"> <li>Stockpiles and machinery associated with road-sealing would be located and stored outside of known habitat.</li> </ul>	Provides for the avoidance of potential Mossgiel Daisy habitat.
	<ul style="list-style-type: none"> <li>Erection of temporary signage and fencing in the location of the Mossgiel Daisy population and habitat (Figure 4-12 in the Main Text of the EIS) during road sealing activities.</li> </ul>	Provides for the potential to mitigate impacts on the known Mossgiel Daisy population.
	<ul style="list-style-type: none"> <li>Coverage of mineral concentrate transport truck loads to minimise dust during transport.</li> </ul>	Provides for the mitigation of potential impacts on the known Mossgiel Daisy population.
	<ul style="list-style-type: none"> <li>Mine staff and contractors would be made aware of the <i>Brachyscome papillosa</i> population along the proposed MCTR.</li> </ul>	Provides for the education to avoid and/or mitigate potential impacts to this species.
	<ul style="list-style-type: none"> <li>Fire prevention, control and management.</li> </ul>	Provides for the avoidance and/or mitigation of potential impacts as a result of fire.

**Table D-1 (Continued)**  
**Mitigation Measures for Matters of National Environmental Significance**

Relevant Matter of National Environmental Significance	Measure	Effectiveness
<b>Flora</b>		
Winged Peppercreess	<ul style="list-style-type: none"> <li>Protection of Black Box Woodland and Grass/Herblands of Drainage Depressions outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA) by removing grazing by stock.</li> </ul>	Allows for the potential mitigation of existing impacts (i.e. grazing) on potential habitat for the Winged Peppercreess, and any unknown occurrences of this species.
	<ul style="list-style-type: none"> <li>The collection of seed bank and topsoil around the Winged Peppercreess within the Atlas-Campaspe Mine for reuse on rehabilitation, where practicable.</li> </ul>	Provides for the potential to re-establish the Winged Peppercreess on rehabilitation post mine landforms.
	<ul style="list-style-type: none"> <li>Vegetation Clearance Protocol including pre-clearance targeted searches for the Winged Peppercreess in the proposed disturbance area and salvage of seed for use in revegetation trials and rehabilitation areas (Section 5.7.2 in the Main Text of the EIS), in accordance with appropriate licences.</li> </ul>	In areas proposed to be cleared, avoidance is not a viable option. Vegetation Clearance Protocol represents an effective mitigation measure for the Winged Peppercreess as it allows for the potential to collect and re-establish the Winged Peppercreess on rehabilitation post mine landforms.
	<ul style="list-style-type: none"> <li>Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).</li> </ul>	Minimises the potential for accidental clearance outside proposed disturbance areas.
	<ul style="list-style-type: none"> <li>Feral animal control (goats and rabbits) to reduce erosion and grazing pressure.</li> </ul>	Provides the potential to mitigation of potential erosion and grazing impacts as a result of feral animals.
	<ul style="list-style-type: none"> <li>Controlling and monitoring of weeds to improve the likelihood of recruitment of this species.</li> </ul>	Provides the potential to mitigation of potential impacts as a result of weeds.
	<ul style="list-style-type: none"> <li>Selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands (e.g. <i>Eucalyptus largiflorens</i>) to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the Winged Peppercreess.</li> </ul>	Provides water management mitigation measures for potential Winged Peppercreess habitat.
	<ul style="list-style-type: none"> <li>Fire prevention, control and management.</li> </ul>	Provides avoidance and/or mitigation of potential impacts as a result of fire.
	<ul style="list-style-type: none"> <li>Protection of habitat in the biodiversity offset strategy.</li> </ul>	Allows for the offset and protection of potential Winged Peppercreess habitat.

**Table D-1 (Continued)**  
**Mitigation Measures for Matters of National Environmental Significance**

Relevant Matter of National Environmental Significance	Measure	Effectiveness
<b>Fauna</b>		
Malleefowl	<ul style="list-style-type: none"> <li>The two mounds in close proximity to the proposed surface development areas would be avoided through considerate mine planning.</li> </ul>	Provides for the avoidance of disturbance to locations of known Malleefowl mounds.
	<ul style="list-style-type: none"> <li>Ivanhoe rail siding facility (retention of existing vegetation: Belah-Rosewood Woodland and Native Grassland).</li> </ul>	Provides for the avoidance of impacts on habitat that the Malleefowl may potentially utilise.
	<ul style="list-style-type: none"> <li>MCTR mainly follows existing road realignments to reduce amount of vegetation clearance required.</li> </ul>	Provides for the avoidance and/or mitigation of impacts on habitat that the Malleefowl may potentially utilise.
	<ul style="list-style-type: none"> <li>Pre-clearance surveys would be undertaken for active Malleefowl mounds in advance of areas to be cleared. If active mounds are found, the eggs would be allowed to hatch and the chicks move away from the nest prior to habitat clearance (where practicable).</li> </ul>	Provides for the avoidance and/or mitigation of impacts on the locations of known Malleefowl mounds.
	<ul style="list-style-type: none"> <li>A Threatened Species Management Protocol would be developed as a component of the Biodiversity Management Plan. This protocol would provide a procedure for minimising impacts on active Malleefowl mounds (e.g. timing habitat clearance to minimise impacts).</li> </ul>	Provides for the avoidance and/or mitigation of impacts on known Malleefowl mounds.
	<ul style="list-style-type: none"> <li>Livestock would be excluded from the MLA area during the period the Atlas-Campaspe Mine would be in operation.</li> </ul>	Allows for the avoidance of impacts from livestock on potential Malleefowl habitat.
	<ul style="list-style-type: none"> <li>Management of exotic animals.</li> </ul>	Allows for the avoidance and/or mitigation of impacts from predation to the Malleefowl.
	<ul style="list-style-type: none"> <li>Management of vehicles.</li> </ul>	Allows for the avoidance and/or mitigation of impacts from vehicles on known Malleefowl and Malleefowl mounds.
	<ul style="list-style-type: none"> <li>Protection of habitat in the biodiversity offset strategy.</li> </ul>	Allows for the offset and protection of potential Malleefowl habitat.
	<ul style="list-style-type: none"> <li>Ivanhoe Rail Facility – vegetation selectively cleared.</li> </ul>	Allows for the potential to avoid and mitigate impacts on potential Malleefowl habitat.
	<ul style="list-style-type: none"> <li>Fire prevention, control and management.</li> </ul>	Provides avoidance and/or mitigation of potential impacts as a result of fire.
	<ul style="list-style-type: none"> <li>Timing of land clearance.</li> </ul>	Provides for the potential to mitigate and/or avoid impacts on the Malleefowl by avoiding breeding season, where practicable.
	<ul style="list-style-type: none"> <li>Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).</li> </ul>	Allows for the potential to avoid and/or mitigate impacts on unknown occurrences of this species during clearance.
	<ul style="list-style-type: none"> <li>Mine design and method, mine progressively over 20 years.</li> </ul>	The mine design and method would enable the avoidance, mitigation and management of impacts to the Malleefowl progressively.

**Table D-1 (Continued)**  
**Mitigation Measures for Matters of National Environmental Significance**

Relevant Matter of National Environmental Significance	Measure	Effectiveness
<b>Fauna</b>		
Australian Painted Snipe	<ul style="list-style-type: none"> <li>Selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands (e.g. <i>Eucalyptus largiflorens</i>) to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the Australian Painted Snipe.</li> </ul>	Provides water management mitigation measures for potential Australian Painted Snipe habitat.
	<ul style="list-style-type: none"> <li>MCTR mainly follows existing road realignments to reduce amount of vegetation clearance required.</li> </ul>	Avoids and mitigates potential impacts on potential Australian Painted Snipe habitat.
	<ul style="list-style-type: none"> <li>Fire prevention, control and management.</li> </ul>	Provides avoidance and/or mitigation of potential impacts as a result of fire.
	<ul style="list-style-type: none"> <li>Vegetation Clearance Protocol including staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).</li> </ul>	In areas proposed to be cleared, avoidance is not a viable option. Vegetation Clearance Protocol represents an effective mitigation measure for the Australian Painted Snipe as it allows for the potential to re-establish the Australian Painted Snipe on rehabilitation post mine landforms.
South-eastern Long-eared Bat	<ul style="list-style-type: none"> <li>Ivanhoe rail siding facility (retention of existing vegetation: Belah-Rosewood Woodland and Native Grassland).</li> </ul>	Would allow for the mitigation of impacts on potential habitat for the South-eastern Long-eared Bat.
	<ul style="list-style-type: none"> <li>MCTR mainly follows existing road realignments to reduce amount of vegetation clearance required.</li> </ul>	Allows for the potential to avoid and/or mitigate impacts on potential South-eastern Long-eared Bat habitat.
	<ul style="list-style-type: none"> <li>Ivanhoe Rail Facility – vegetation selectively cleared.</li> </ul>	Allows for the potential to avoid and/or mitigate impacts on potential South-eastern Long-eared Bat habitat.
	<ul style="list-style-type: none"> <li>Selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands (e.g. <i>Eucalyptus largiflorens</i>) to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the South-eastern Long-eared Bat.</li> </ul>	Provides water management mitigation measures for potential South-eastern Long-eared Bat habitat.
	<ul style="list-style-type: none"> <li>Fire prevention, control and management.</li> </ul>	Provides for the avoidance and/or mitigation of potential impacts as a result of fire.

**Table D-1 (Continued)**  
**Mitigation Measures for Matters of National Environmental Significance**

Relevant Matter of National Environmental Significance	Measure	Effectiveness
<b>Fauna</b>		
South-eastern Long-eared Bat (Continued)	<ul style="list-style-type: none"> <li>Habitat supplementation.</li> </ul>	Provides nest boxes and hollow trunks/branches for habitat features for the South-eastern Long-eared Bat.
	<ul style="list-style-type: none"> <li>Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).</li> </ul>	Minimises the potential for accidental clearance outside proposed disturbance areas.
	<ul style="list-style-type: none"> <li>Management of exotic animals.</li> </ul>	Provides mitigation of potential impacts as a result of feral animals.
	<ul style="list-style-type: none"> <li>Vehicles to remain on existing roads and tracks and inductions will include hazard of driving at dawn and dusk to increase driver awareness.</li> </ul>	Provides for the potential to mitigate collision risk to the South-eastern Long-eared Bat.
	<ul style="list-style-type: none"> <li>Restriction of night-lighting to the minimum required for operational and safety requirements.</li> </ul>	Provides for the potential to mitigate negative impact from artificial lights on the South-eastern Long-eared Bat.

ATTACHMENT E

MITIGATION MEASURES FOR MATTERS OF NATIONAL  
ENVIRONMENTAL SIGNIFICANCE

**Table E-1**  
**Relevant Impacts to Matters of National Environmental Significance and the Certainty of the Impact Assessment**

Controlling Provision	Relevant Impacts	Certainty of the Impact Assessment
<b>Threatened Species</b>		
Threatened Flora (Winged Peppergrass, Cobar Greenhood Orchid and Mossy Daisy)	Vegetation Clearance	The potential impact of vegetation clearance on flora has been assessed in Appendix A of the Environmental Impact Statement (EIS). There is a high level of certainty regarding the assessment of the potential impacts to threatened flora from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and targeted surveys for these species were undertaken within and surrounding the proposed surface disturbance area (Appendix A of the EIS).
	Changes in Hydrology	The potential impact of changes in hydrology on flora has been assessed in Appendix A of the EIS and the hydrological impacts as a result of the Project are detailed in Appendices F and G of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to threatened flora from changes in hydrology. The potential impacts from changing in hydrology are known and well documented by projects throughout NSW.
	Grazing by Rabbits and Goats	The potential impact of introduced animals on flora has been assessed in Appendix A of the EIS. Rabbits and Goats are known to graze upon and impact the Winged Peppergrass and Cobar Greenhood Orchid. Both Rabbits and Goats are known to currently occur within the Project area and surrounds, in locations where these flora species grow. Introduced animals would be controlled in the Project MLA and proposed offset area as part of the Project and there is a high level of certainty that controlling Rabbits and Goats can reduce the potential for them to impact these flora species.
	Introduced Flora	The potential impact of introduced flora on native flora has been assessed in Section 6.2.3 in Appendix A of the EIS. Introduced flora would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to threatened flora from introduced flora.
	Bushfire and Alteration to Fire Regimes	The potential impact of bushfire on native flora has been assessed in Appendix A of the EIS. The potential causes of uncontrolled fire are well known and there is a high level of certainty regarding the assessment of the potential impacts to threatened flora from fire. Measures are provided to mitigate the potential for fire (Section 4.6.3 in the Main Text of the EIS).
	Dust and Pollution	The potential impact of dust on native flora has been assessed in Section 6.2.9 in Appendix A of the EIS. Dust would be minimised where relevant and there is a high level of certainty regarding the assessment of the potential impacts to threatened flora from dust.
Australasian Bittern	Vegetation Clearance	The potential impact of vegetation clearance on fauna has been assessed in Appendix B of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the Australasian Bittern from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and surveys for this species were undertaken within and surrounding the proposed surface disturbance area (Appendix B of the EIS).
	Changes in Hydrology	The potential impact of changes in hydrology on fauna has been assessed in Appendix B of the EIS and the hydrological impacts as a result of the Project are detailed in Appendices F and G of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the Australasian Bittern from changes in hydrology. The potential impacts from changing in hydrology are known and well documented by projects throughout NSW.
	Bushfire and Alteration to Fire Regimes	The potential impact of bushfire on fauna has been assessed in Appendix A of the EIS. The potential causes of uncontrolled fire are well known and there is a high level of certainty regarding the assessment of the potential impacts to threatened fauna from fire. Measures are provided to mitigate the potential for fire (Section 4.6.3 in the Main Text of the EIS).

**Table E-1 (Continued)**  
**Relevant Impacts to Matters of National Environmental Significance and the Certainty of the Impact Assessment**

Controlling Provision	Relevant Impacts	Certainty of the Impact Assessment
<b><i>Threatened Species</i></b>		
Australasian Bittern (Continued)	Introduced Fauna/Predation by Foxes, Cats or Other Animals	The potential impact of introduced fauna on native fauna has been assessed in Section 5.2.7 in Appendix B of the EIS. Introduced fauna would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the Australasian Bittern from introduced fauna.
Malleefowl	Vegetation Clearance	The potential impact of vegetation clearance on fauna has been assessed in Appendix B of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the Malleefowl from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and surveys for this species were undertaken within and surrounding the proposed surface disturbance area (Appendix B of the EIS).
	Bushfire and Alteration to Fire Regimes	The potential impact of bushfire on native fauna has been assessed in Appendix B of the EIS. The potential causes of uncontrolled fire are well known and there is a moderate level of certainty regarding the assessment of the potential impacts to the Malleefowl from bushfire and alteration of fire regimes. Measures are provided to mitigate the potential for fire (Section 4.6.3 in the Main Text of the EIS).
	Grazing by Rabbits and Goats	The potential impact of introduced animals on fauna has been assessed in Appendix B of the EIS. Rabbits and Goats are known to graze upon and impact the habitat of Malleefowl. Both Rabbits and Goats are known to currently occur within the Project area and surrounds, in locations where these species grow. Introduced animals would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the Malleefowl from grazing from Rabbits and Goats.
	Introduced Fauna/Predation by Foxes, Cats or Other Animals	The potential impact of introduced fauna on native fauna has been assessed in Section 5.2.7 in Appendix B of the EIS. Introduced fauna would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the Malleefowl from introduced fauna.
	Vehicular Traffic Movements	The potential impact of vehicular traffic movements (vehicle strike) on native fauna has been assessed in Section 5.1.2 in Appendix B of the EIS. Vehicles would be managed (speed limit, road signs and inductions to increase awareness and restriction of driving to existing roads/tracks) and there is a high level of certainty regarding the assessment of the potential impacts to the Malleefowl from vehicular traffic movement.



**Table E-1 (Continued)**  
**Relevant Impacts to Matters of National Environmental Significance and the Certainty of the Impact Assessment**

Controlling Provision	Relevant Impacts	Certainty of the Impact Assessment
<b><i>Threatened Species</i></b>		
Regent Parrot	Vegetation Clearance	The potential impact of vegetation clearance on fauna has been assessed in Appendix B of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the Regent Parrot from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and surveys for this species were undertaken within and surrounding the proposed surface disturbance area (Appendix B of the EIS).
	Bushfire and Alteration to Fire Regimes	The potential impact of bushfire on native fauna has been assessed in Appendix B of the EIS. The potential causes of uncontrolled fire are well known and there is a moderate level of certainty regarding the assessment of the potential impacts to the Regent Parrot from bushfire and alteration of fire regimes. Measures are provided to mitigate the potential for fire (Section 4.6.3 in the Main Text of the EIS).
	Vehicular Traffic Movements	The potential impact of vehicular traffic movements (vehicle strike) on native fauna has been assessed in Section 5.1.2 in Appendix B of the EIS. Vehicles would be managed (speed limit, road signs and inductions to increase awareness and restriction of driving to existing roads/tracks) and there is a high level of certainty regarding the assessment of the potential impacts to the Regent Parrot from vehicular traffic movement.
	Introduced Fauna/Predation by Foxes, Cats or Other Animals	The potential impact of introduced fauna on native fauna has been assessed in Section 5.2.7 in Appendix B of the EIS. Introduced fauna would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the Regent Parrot from introduced fauna.
Australian Painted Snipe	Vegetation Clearance	The potential impact of vegetation clearance on fauna has been assessed in Appendix B of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the Australian Painted Snipe from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and surveys for this species were undertaken within and surrounding the proposed surface disturbance area (Appendix B of the EIS).
	Changes in Hydrology	The potential impact of changes in hydrology on fauna has been assessed in Appendix B of the EIS and the hydrological impacts as a result of the Project are detailed in Appendices F and G of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the Australian Painted Snipe from changes in hydrology. The potential impacts from changing in hydrology are known and well documented by projects throughout NSW.
	Grazing by Rabbits and Goats	The potential impact of introduced animals on fauna has been assessed in Appendix B of the EIS. Rabbits and Goats are known to graze upon and impact the habitat of the Australian Painted Snipe. Both Rabbits and Goats are known to currently occur within the Project area and surrounds, in locations where these species grow. Introduced animals would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the Australian Painted Snipe from grazing by Rabbits and Goats.
	Introduced Fauna/Predation by Foxes, Cats or Other Animals	The potential impact of introduced fauna on native fauna has been assessed in Section 5.2.7 in Appendix B of the EIS. Introduced fauna would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the Australian Painted Snipe from introduced fauna.

**Table E-1 (Continued)**  
**Relevant Impacts to Matters of National Environmental Significance and the Certainty of the Impact Assessment**

Controlling Provision	Relevant Impacts	Certainty of the Impact Assessment
<b><i>Threatened Species</i></b>		
South-eastern Long-eared Bat	Vegetation Clearance	The potential impact of vegetation clearance on fauna has been assessed in Appendix B of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the South-eastern Long-eared Bat from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and surveys for this species were undertaken within and surrounding the proposed surface disturbance area (Appendix B of the EIS).
	Changes in Hydrology	The potential impact of changes in hydrology on fauna has been assessed in Appendix B of the EIS and the hydrological impacts as a result of the Project are detailed in Appendices F and G of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to the South-eastern Long-eared Bat from changes in hydrology. The potential impacts from changing in hydrology are known and well documented by projects throughout NSW.
	Bushfire and Alteration to Fire Regimes	The potential impact of bushfire on native fauna has been assessed in Appendix B of the EIS. The potential causes of uncontrolled fire are well known and there is a moderate level of certainty regarding the assessment of the potential impacts to the South-eastern Long-eared Bat from bushfire and alteration of fire regimes. Measures are provided to mitigate the potential for fire (Section 4.6.3 in the Main Text of the EIS).
	Introduced Fauna/Predation by Foxes, Cats or Other Animals	The potential impact of introduced fauna on native fauna has been assessed in Section 5.2.7 in Appendix B of the EIS. Introduced fauna would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to the South-eastern Long-eared Bat from introduced fauna.
<b><i>Migratory Species</i></b>		
South-eastern Long-eared Bat (Continued)	Vegetation Clearance	The potential impact of vegetation clearance on fauna has been assessed in Appendix B of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to migratory fauna species from vegetation clearance. The area of proposed surface disturbance is shown on Figures 2-3 and 2-9 in the Main Text of the EIS and surveys for migratory species were undertaken within and surrounding the proposed surface disturbance area (Appendix B of the EIS).
	Changes in Hydrology	The potential impact of changes in hydrology on fauna has been assessed in Appendix B of the EIS and the hydrological impacts as a result of the Project are detailed in Appendices F and G of the EIS. There is a high level of certainty regarding the assessment of the potential impacts to migratory fauna species from changes in hydrology. The potential impacts from changing in hydrology are known and well documented by projects throughout NSW.
	Bushfire and Alteration to Fire Regimes	The potential impact of bushfire on native fauna has been assessed in Appendix B of the EIS. The potential causes of uncontrolled fire are well known and there is a high level of certainty regarding the assessment of the potential impacts to migratory species from bushfire and alteration of fire regimes. Measures are provided to mitigate the potential for fire (Section 4.6.3 in the Main Text of the EIS).
	Introduced Fauna/Predation by Foxes, Cats or Other Animals	The potential impact of introduced fauna on native fauna has been assessed in Section 5.2.7 in Appendix B of the EIS. Introduced fauna would be controlled in the Project MLA and proposed offset area and there is a high level of certainty regarding the assessment of the potential impacts to migratory species from introduced fauna.

ATTACHMENT F  
ENVIRONMENTAL POLICY

## Cristal Global's safety, health and environmental policy states:

*At Cristal Global, we strive to be exemplary in our Safety, Health and Environmental Performance.*

*We manage our worldwide businesses and facilities focusing on the protection of the environment, and the safety and health of employees, contractors, customers, and the public. We believe that all workplace injuries, illnesses and adverse environmental impacts are preventable. Safety, Health, and Environmental Excellence is a global value which unites our company and contributes to our Sustainability.*

*In support of this policy, we are committed to:*

### **Legislative & Standards Compliance**

- *Meet or exceed all applicable laws, regulations and company standards in those countries where we do business.*

### **Workplace and SHE Accountability**

- *Make safety, health, protection of the environment, and security the direct responsibility and accountability of all employees, contractors and visitors. Working in a safe, healthy, secure and environmentally responsible manner is a condition of employment or contract.*
- *Maintain a safe and healthy workplace, operate our facilities in an environmentally responsible manner and assure safe and secure supply chain practices.*
- *Promote and encourage safety, health and wellness programs on and off the job.*

### **Safety, Health and Environmental Priorities**

- *Provide workplace policies, standards, procedures and training to ensure that employees and contractors can perform their jobs in a safe, healthy and environmentally responsible manner.*
- *Implement the principles of risk analysis and risk management in all areas of safety, health and environmental protection.*

### **Resource Conservation**

- *Establish focused efforts to preserve natural resources through rational utilization of operating facilities and raw materials.*

### **Product Stewardship**

- *Incorporate Sustainability and product stewardship in our product and process development efforts and decision-making process in a way that reduces the impacts of our products and processes on the environment and develops new products that contribute to a cleaner environment.*

### **Community Service**

- *Actively participate in communities and support our employees' efforts to positively impact the quality of life locally and beyond.*

### **Continual Improvement**

- *Investigate incidents to determine root causes and take prompt and appropriate actions to correct deficiencies. Communicate the knowledge gained and lessons learned to prevent recurrence in the company.*
- *Periodically review the Safety, Health and Environmental Management System with special emphasis on possible improvements.*

### **Safety, Health and Environmental Excellence**

- *Establish Safety, Health and Environment measurable objectives to drive continual improvement, and routinely communicate the progress against objectives.*
- *Promote discussion, sharing of best practices across all company facilities.*
- *Actively engage in dialog with our stakeholders to promote safety, health, security and environmental outcomes which are mutually acceptable and fully compliant with regulations.*