Yilgarn Operations

Koolyanobbing Range F Deposit

Environmental Protection Act 1986 (WA)
Environmental Impact Assessment
(Public Environmental Review)

September 2015

Document Status

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This report includes recent contributions provided by Cliffs' supporting consultants including (in alphabetical order) Bamford Consulting Ecologists, Bennelongia Environmental Consultants, Biota Environmental Sciences, CAD Resources, Maia Environmental Consultancy, MWH Australia and Woodman Environmental Consulting. The assistance and contributions of these supporting consultants is acknowledged and appreciated.

Limitations

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INVITATION TO MAKE A SUBMISSION

The Environmental Protection Authority (EPA) invites people to make a submission on this proposal. The environmental impact assessment process is designed to be transparent and accountable, and includes specific points for public involvement, including opportunities for public review of environmental review documents. In releasing this document for public comment, the EPA advises that no decisions have been made to allow this proposal to be implemented.

Cliffs proposes to develop a new mine and supporting infrastructure on the Koolyanobbing Range. In accordance with the *Environmental Protection Act 1986*, a Public Environmental Review (PER) document has been prepared which describes this proposal and its likely effects on the environment. The PER document is available for a public review period of 4 weeks from **5 October 2015,** closing on **2 November 2015**.

Comments from government agencies and the public will assist the EPA to prepare an assessment report in which it will make recommendations to government.

Where to get copies of this document

Printed and CD copies of this document may be obtained from Cliffs' Reception at Level 11, 1 William St, Perth. Hard copies of the document cost of $10 (including postage); CDs will be provided free of charge.

The PER may also be accessed through the proponent's website at: www.cliffsnaturalresources.com.

Why write a submission?

A submission is a way to provide information, express your opinion and put forward your suggested course of action – including any alternative approaches. It is useful if you indicate any suggestions you have to improve the proposal.

All submissions received by the EPA will be acknowledged with electronic submissions being acknowledged electronically. The proponent will be required to provide adequate responses to points raised in submissions. In preparing its assessment report for the Minister for Environment, the EPA will consider the information in submissions, the proponent's responses and other relevant information. Submissions will be treated as public documents unless provided and received in confidence, subject to the requirements of the *Freedom of Information Act 1992*, and may be quoted in full or in part in the report.

Why not join a group?

If you prefer not to write your own comments, it may be worthwhile joining a group or other groups interested in making a submission on similar issues. Joint submissions may help to reduce the workload for an individual or group, as well as increase the pool of ideas and information. If you form a small group (up to 10 people) please indicate all the names of the participants. If your group is larger, please indicate how many people your submission represents.

Developing a submission

You may agree or disagree with, or comment on, the general issues discussed in the PER document or on specific elements. It helps if you give reasons for your conclusions, supported by relevant data. You may make an important contribution by suggesting ways to make the proposal more environmentally acceptable.

When making comments on specific elements in the PER document:

- clearly state your point of view;
- indicate the source of your information or argument if this is applicable; and
- suggest recommendations, safeguards or alternatives.

Points to keep in mind

By keeping the following points in mind, you will make it easier for your submission to be analysed:

- attempt to list points so that issues raised are clear. A summary of your submission is helpful;
- refer each point to the appropriate section, chapter or recommendation in the PER document;
- if you discuss different sections of the PER document, keep them distinct and separate, so there is no confusion as to which section you are considering; and
- attach any factual information you may wish to provide and give details of the source. Make sure your information is accurate.

Remember to include:

- your name;
- address;
- date; and
- whether you want your submission to be confidential.

The closing date for submissions is: **2 November 2015**

The EPA prefers submissions to be made at: https://consultation.epa.wa.gov.au.

Alternatively submissions can be:

- posted to: Chairman, Environmental Protection Authority, Locked Bag 10, EAST PERTH WA 6892; or
- delivered to the Environmental Protection Authority, Level 8, The Atrium, 168 St Georges Terrace, Perth.

If you have any questions on how to make a submission, please ring the Office of the Environmental Protection Authority on 6145 0800.

EXECUTIVE SUMMARY

Yilgarn Operations – Koolyanobbing Range F Deposit

Cliffs Asia Pacific Iron Ore Pty Ltd's (Cliffs) Yilgarn Operations include the mining of iron ore deposits at the Koolyanobbing Range, Windarling Range, Mt Jackson Range and the Deception Deposit (undeveloped), processing of the extracted ore at Koolyanobbing, and road and rail transport between these operations and the Port of Esperance where the processed ore is exported to international customers.

Cliffs proposes to continue development of the Yilgarn Operations by extension of the Koolyanobbing Range mine operations to include a new mine development at the Koolyanobbing Range F Deposit ('the Proposal'). The Proposal will operate as a southerly extension to the approved Koolyanobbing Range mine operations, and is expected to yield an estimated 9 million tonnes of iron ore having a gross economic value of approximately A$500million.

The Proposal will be implemented within a spatial area of 211 hectares comprising the following mine infrastructure components:

(a) Mine Pits;

(b) Waste Rock Landform; and

(c) Support Infrastructure.

Implementation of the Proposal is scheduled to be undertaken over a period of approximately 4 years, from 2016 to 2019.

The location of the Proposal is identified by Figure E-1. The key characteristics of the Proposal are outlined by Table E-1.

Environmental Impact Assessment

The Proposal was referred to the Environmental Protection Authority (EPA) under s38(1) of the *Environmental Protection Act 1986* (WA) in July 2014 (Cliffs 2014a), with EPA determining in September 2014 that the Proposal should be subject to an Environmental Impact Assessment (EIA) under s40(2)(b) of the *Environmental Protection Act 1986* (WA) at the level of Public Environmental Review (PER) (EPA 2014a, 2014b). As outlined by EPA (2014a, 2014b, 2014c, 2015a, 2015b,), the key environmental factors and key integrating factors applicable to the assessment of the Proposal are:

(a) 'Flora and Vegetation' (key environmental factor);

(b) 'Terrestrial Fauna' (key environmental factor);

(c) 'Subterranean Fauna' (key environmental factor);

(d) 'Landforms' (key environmental factor);

(e) 'Rehabilitation and Decommissioning' (key integrating factor); and

(f) 'Offsets' (key integrating factor).

This EIA-PER document has been prepared by Cliffs in accordance with the requirements of EPA (2014a, 2014b, 2014c) for the purposes of an environmental assessment of the Proposal under s40(2)(b) of the *Environmental Protection Act 1986* (WA) for the key environmental factors and key integrating factors identified above.

As outlined by this EIA-PER document, Cliffs proposes to implement the Proposal in accordance with its Environmental Policy and international standard AS/NZS ISO 14001:2004 certified Environmental Management System (EMS). Cliffs' EMS comprises a series of Environmental Management Plans (EMP) to ensure the potential environmental effects of mine operations are controlled and monitored to an acceptable standard. These EMPs address the management of a range of environmental aspects, including flora and vegetation, fauna and mine closure.

To manage the potential environmental effects of the Proposal, Cliffs proposes to prepare and implement the following EMPs:

(a) Flora and Vegetation Management Plan;

(b) Fauna Management Plan; and

(c) Mine Closure Plan.

To monitor for potential indirect environmental effects of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens*, Cliffs proposes to prepare and implement a:

(d) *Tetratheca erubescens* Monitoring Plan.

To offset the environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens*, Cliffs also proposes to implement the following EMP:

(e) *Tetratheca erubescens* Environmental Offsets Plan.

This EIA-PER document identifies that the Proposal can be managed to meet EPA's objectives for the key environmental factors of 'Flora and Vegetation', 'Terrestrial Fauna', 'Subterranean Fauna' and 'Landforms', and the key integrating factors of 'Rehabilitation and Decommissioning' and 'Offsets'. A summary of the assessment and management of the key environmental factors and key integrating factors is outlined by Table E-2.

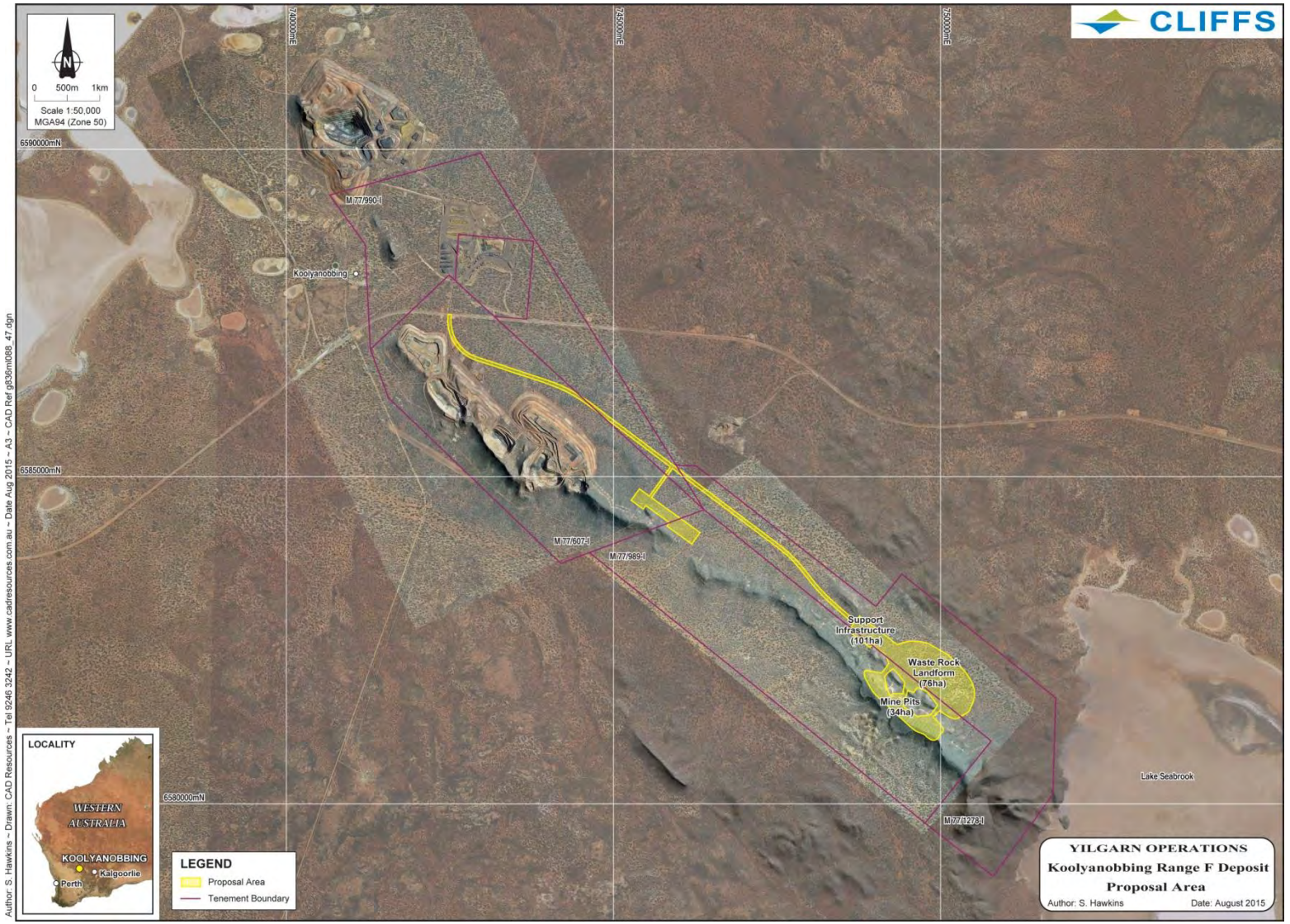

Figure E-1 Location of the Proposal. The Proposal area is identified in yellow, with the infrastructure types and spatial area identified. Cliffs' approved Koolyanobbing Range mine operations are also visible.

Summary of the Proposal		
Proposal Title	Yilgarn Operations - Koolyanobbing Range F Deposit	
Proponent Name	Cliffs Asia Pacific Iron Ore Pty Ltd	
Short Description	The Proposal is for mining of the Koolyanobbing Range F Deposit, located at the southern Koolyanobbing Range approximately 50km north-east of the town of Southern Cross in the Shire of Yilgarn, Western Australia. The Proposal includes Mine Pits, a Waste Rock Landform and Support Infrastructure.	
Physical Elements		
Element	**Location**	**Area**
Mine Pits	Figure E-1	34ha
Waste Rock Landform	Figure E-1	76ha
Support Infrastructure	Figure E-1	101ha
	Total	211ha

Abbreviations:
km = kilometres
ha = hectares

Table E-1 Key Characteristics of the Proposal.

Table E-2 Summary of the Assessment and Management of Key Environmental Factors and Key Integrating Factors.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Theme: Land				
Flora and Vegetation	EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and community level* (EPA 2015a) EPA Guidance: o Guidance Statement #51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004a) o Position Statement #2: *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000) o Position Statement #3: *Terrestrial Biological Surveys as an element of Biodiversity Protection* (EPA 2002a)	The flora values of the southern Koolyanobbing Range include: o 1 flora taxon declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA); o 10 DPaW-classified 'priority' flora taxa; o 16 vegetation units; and o DPaW-classified 'priority ecological community'. (Maia 2013; Woodman 2014)	The Proposal will be implemented within an area of 211ha, of which approximately 194ha contains native vegetation that will be cleared. The Proposal coincides with the following flora values: o 1 flora taxon declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA); o 6 DPaW-classified 'priority' flora taxa; o 9 vegetation units; and o DPaW-classified 'priority ecological community'. The Proposal coincides with individuals of the 'Rare Flora' taxon *Tetratheca erubescens* (Maia 2013; Woodman 2014). The Proposal coincides with approximately 22% of the *Tetratheca erubescens* population, comprising 20% which will be directly removed by the Mine Pits and 2% which occur within a 10m set-back around the outer edge of the Mine Pits which may (or may not) be removed. The remaining approximately 78-80% of the *Tetratheca erubescens* population occur within non-impact areas of the southern Koolyanobbing Range. As outlined by Cliffs (2014b; Appendix 3), the effect of the Proposal to *Tetratheca erubescens* is not expected to change the threat category of "Vulnerable" currently applying under the criteria of the International Union for Conservation of Nature (IUCN) (2012). Based on environmental monitoring undertaken at Cliffs' approved mine operations on the related flora taxon *Tetratheca paynterae* ssp. *paynterae* (Cliffs 2014c) a significant indirect environmental effect to the retained *Tetratheca erubescens* population is not expected. Similarly, as outlined by BGPA (2014), an indirect effect to the genetics of the *Tetratheca erubescens* population is also not expected. The Proposal also coincides with individuals of the	Cliffs proposes to manage the environmental effect of the Proposal to flora values through the preparation and implementation of a: o Flora and Vegetation Management Plan which will include: o Internal site disturbance permit process to control land clearing to within approved areas; o Removal and stockpiling of rehabilitation materials (vegetation, topsoil and subsoil) during land clearing for subsequent use in progressive and post-mining rehabilitation works; o Dampening of cleared areas (daily, as required) using groundwater to minimise the potential for dust generation which could affect the health of adjacent vegetation; o Hygiene procedures to minimise the potential for introduction and spread of introduced flora; o Training of mine personnel in fire risks, fire prevention and fire control, including the provision of fire control equipment (fire extinguishers) within mine vehicles; o Daily visual monitoring of dust generation by mine personnel; o Annual monitoring of vegetation condition at specified locations positioned within 100m of mine operations and at reference sites for any effects of dust emissions and/or saline water use to vegetation;

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
			DPaW-classified 'priority' flora taxa *Beyeria rostellata* (P1), *Acacia dissona* var. *indoloria* (P3), *Hibbertia lepidocalyx* ssp. *tuberculata* (P3), *Lepidosperma ferricola* (P3), *Stenanthemum newbeyi* (P3) and *Banksia arborea* (P4) (Woodman 2014). Each of the DPaW-classified 'priority' flora taxa have distributions across the southern Koolyanobbing Range beyond the Proposal area, and across the broader region. Having regard to the number of individuals of each flora taxa coinciding with the Proposal, and of their broader regional distributions, the environmental effect of the Proposal to DPaW-classified 'priority' flora taxa is not expected to be environmentally significant. The Proposal can also be expected to coincide with a variety of other native flora taxa which are not of conservation significance as a result of their broad regional distributions. The environmental effect of the Proposal to these flora taxa is not expected to be environmentally significant having regard to their broad regional distributions. The Proposal coincides with 9 vegetation units (Woodman 2014), each having distributions across the southern Koolyanobbing Range beyond the Proposal area. Having regard to the spatial area of each vegetation unit which coincides with the Proposal, and of their broader distribution across the southern Koolyanobbing Range, the environmental effect of the Proposal to vegetation units is not expected to be environmentally significant. The Proposal coincides with part of the DPaW-classified 'priority ecological community' (PEC) '*Koolyanobbing Vegetation Complexes (Banded Iron Formation)*' (Woodman 2014). Having regard to the spatial area of the Proposal and the broad extent of the PEC, the environmental effect of the Proposal to the PEC is not expected to be environmentally significant.	o Annual monitoring of introduced flora in areas adjacent to mine operations to detect any new occurrences or spread of existing occurrences, and control (spraying) of introduced flora to minimise and/or eradicate known occurrences; o Recording of sightings by mine personnel of introduced fauna which could affect vegetation through grazing/trampling. o Incident reporting system to identify and communicate and environmental effects to flora values; and o Education and training of mine personnel on flora values (with a particular focus on Rare Flora), and flora monitoring / management. To monitor for potential indirect environmental effects to the *Tetratheca erubescens* population, Cliffs also proposes to prepare and implement a: o *Tetratheca erubescens* Monitoring and Management Plan which will include: o quarterly monitoring for plant health to determine any potential for short-term indirect environmental effects; o annual monitoring for plant health, age-structure, reproductive status, mortality and recruitment to detect any trends in the numbers and health of the population; and o objectives and trigger levels for the implementation of contingency actions in the event that a significant indirect effect to the *Tetratheca erubescens* population

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
				is detected. To provide context, flora management has been successfully implemented across Cliffs' approved Yilgarn Operations, including the Koolyanobbing Range mine operations, for more than a decade. Implementation of a Flora and Vegetation Management Plan and a *Tetratheca erubescens* Monitoring Plan is expected to ensure that the environmental effect of the Proposal to flora values is minimised, monitored and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to flora values, the local and regional distribution of the flora values, and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of flora values at the species, population or community level. Accordingly, the EPA's objective for the key environmental factor of 'Flora and Vegetation' can be met. To additionally note, the environmental effect of the Proposal to *Tetratheca erubescens* will also be subject to assessment and regulation by DPaW under the *Wildlife Conservation Act 1950* (WA).
Terrestrial Fauna	EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level* (EPA 2015a) EPA Guidance: o Guidance Statement #20: Sampling of Short-Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia	The terrestrial fauna values of the southern Koolyanobbing Range include: o 3 fauna taxa declared as 'Specially Protected Fauna' under the *Wildlife Conservation Act 1950* (WA); o 1 DPaW-classified 'priority' fauna taxon; and o A range of potential short-range endemic invertebrate	The Proposal coincides with the following terrestrial fauna values: o Habitat of 3 fauna taxa declared as 'Specially Protected Fauna' under the *Wildlife Conservation Act 1950* (WA) (nil effect to live individuals); o 1 DPaW-classified 'priority' fauna taxon; and o A range of potential short-range endemic invertebrate fauna taxa. The 'Specially Protected Fauna' taxa *Leipoa ocellata*, *Cacatua leadbeateri* and *Merops*	Cliffs proposes to manage the environmental effect of the Proposal to terrestrial fauna values through the preparation and implementation of a: o Fauna Management Plan which will include: o Internal site disturbance permit process to control land clearing (of fauna habitat) to within approved areas; o Removal and stockpiling of

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
	(EPA 2009) o Guidance Statement #56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b) o Position Statement #3: Terrestrial Biological Surveys as an element of Biodiversity Protection (EPA 2002a) o Technical Guide Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA & DPaW 2010)	fauna. (Biota 2012, 2014a, 2014b; BCE 2009, c.2009)	*ornatus* have been recorded within the Proposal area (Biota 2014a, BCE c.2009). As these fauna taxa are understood not to be resident (i.e. inactive nest mounds for *Leipoa ocellata* and fly-over sightings for *Cacatua leadbeateri* and *Merops ornatus*), no removal of live individuals is expected. The Proposal will remove habitat used by these fauna taxa. Having regard to the area of potential fauna habitat coinciding with the Proposal, and of the extent of potential fauna habitat for these taxa across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to the habitat of Specially Protected Fauna is not expected to be environmentally significant. The Proposal coincides with records of burrows for the DPaW-classified 'priority' fauna taxon *Aganippe castellum* (BCE 2009). An estimated 45,000 individuals of *Aganippe castellum* occur across the broader southern Koolyanobbing Range (BCE 2009). Having regard to the confined area of the Proposal and the recorded extent of *Aganippe castellum* burrows across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to the DPaW-classified 'priority' fauna taxon *Aganippe castellum* is not expected to be environmentally significant. The Proposal coincides with a number of potential short-range endemic invertebrate fauna taxa (Biota 2012, 2014b). Whilst several of the potential short-range endemic invertebrate fauna taxa were collected only from within the Proposal area, the extent of connected habitat across the southern Koolyanobbing Range indicates that these taxa are likely to have distributions across the southern Koolyanobbing Range beyond the Proposal area (Biota 2014b). The environmental effect of the Proposal to potential short-range endemic invertebrate fauna is not expected to be environmentally significant, having regard to the confined area of the Proposal and the extent of connected habitat across the southern Koolyanobbing Range.	rehabilitation materials (vegetation, topsoil and subsoil) during land clearing for subsequent use in progressive and post-mining rehabilitation works to restore fauna habitat; o Recording of sightings by mine personnel of introduced fauna which could affect native fauna. o Prohibition of pets within the mine operations; o If required, control of introduced fauna (trapping and/or culling) where any significant disturbance to fauna or fauna habitat is recorded; o Incident reporting system to identify and communicate and environmental effects to fauna values; and o Education and training of mine personnel on fauna values (with a particular focus on Specially Protected Fauna), and fauna management. To provide context, fauna management has been successfully implemented across Cliffs' approved Yilgarn Operations, including the Koolyanobbing Range mine operations, for more than a decade. Implementation of a Fauna Management Plan is expected to ensure that the potential environmental effect of the Proposal to terrestrial fauna is minimised and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to terrestrial fauna, the recorded distribution of terrestrial fauna and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
			The Proposal can also be also expected to coincide with a variety of other native terrestrial fauna taxa which are not of conservation significance (e.g. birds, reptiles, etc) as a result of their broad regional distributions. The environmental effect of the Proposal to these other terrestrial fauna taxa is not expected to be environmentally significant having regard to their broad regional distributions.	ecological function of terrestrial fauna at the species, population or assemblage level. Accordingly, the EPA's objective for the environmental factor of 'Terrestrial Fauna' can be met.
Subterranean Fauna	EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level* (EPA 2015a) EPA Guidance: o Guidance Statement #54a: Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia (EPA 2007a) o Environmental Assessment Guideline #20: Consideration of Subterranean Fauna in Environmental Impact Assessment in Western Australia (EPA 2013a)	Surveys of the southern Koolyanobbing Range for troglobitic subterranean fauna have identified 19 putative taxa, recorded both within and outside of the Proposal area (Bennelongia 2008, 2014). Surveys of the southern Koolyanobbing Range for stygobitic subterranean fauna have not been undertaken. Surveys for stygobitic subterranean fauna at Cliffs' Windarling Range and Mt Jackson Range mine operations did not identify any stygobitic subterranean fauna; believed to be a result of the high groundwater salinity and low dissolved oxygen concentrations (WRM 2008a, 2008b, 2009). For context, the groundwater salinity at the Koolyanobbing Range is an order of magnitude greater than at the Windarling Range and the Mt Jackson Range.	The Proposal coincides with land areas that provide habitat for troglobitic subterranean fauna. This habitat will be disturbed by the excavation of Mine Pits and the construction of an adjacent Waste Rock Landform. The potential effect to troglobitic subterranean fauna has been minimised through the design of the Proposal which minimises the extent of ground excavations and the mass of waste rock requiring disposal. As outlined by Bennelongia (2014), whilst a number of troglobitic subterranean fauna taxa were recorded only from within the area of the Proposal, based on the continuity of habitat across the southern Koolyanobbing Range, it is likely these taxa will have distributions that extend at least across the extent of southern Koolyanobbing Range. The Proposal does not coincide with potential habitat for stygobitic subterranean fauna, noting the Proposal occurs above the natural groundwater level. The Proposal will require only minimal volumes of groundwater abstraction (not dewatering) for dust suppression purposes, such that the groundwater abstraction is unlikely to result in a significant environmental effect to the habitat of stygobitic subterranean fauna (if present). Groundwater abstraction for the Proposal can be appropriately controlled in accordance with Groundwater Licence GWL15549 (DoW 2014) as regulated by DoW in accordance with the *Rights in Water and Irrigation Act 1914* (WA).	Cliffs proposes to manage the potential environmental effect of the Proposal to subterranean fauna through the implementation of: o Minimising ground excavations and land clearing; o Restricting mine operations to above the groundwater level; and o Groundwater abstraction being undertaken in accordance with Groundwater Licence GWL154459 (DoW 2014). Implementation of the above management actions is expected to ensure that the potential environmental effect of the Proposal to subterranean fauna is minimised and controlled to an acceptable level. In consideration of the potential environmental effect of the Proposal to subterranean fauna, the recorded and expected distribution of subterranean fauna, and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of subterranean fauna at the species, population or assemblage level. Accordingly, the EPA's objective for the environmental factor of 'Subterranean Fauna' can be met.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Landforms	EPA Objective: *To maintain the variety, integrity, ecological functions and environmental values of landforms* (EPA 2015a) EPA Guidance: o Guidance Statement #33: Environmental Guidance for Planning and Development (EPA 2008)	The Koolyanobbing Range is an ironstone formation range that extends approximately 30km in length and to 510mAHD in height, covering both the northern and southern Koolyanobbing Ranges. Mining and mineral exploration at the Koolyanobbing Range has a history spanning more than 60 years, with iron ore mining at the Koolyanobbing Range having commenced in 1950. Currently, mining is undertaken at the Koolyanobbing Range Deposits A, B, C, D and K.	The Proposal coincides with part of the southern Koolyanobbing Range. The Proposal area has been subject to several mineral exploration programs, with resulting land disturbance from the construction of access tracks and drilling pads. Mining has yet to be undertaken within the Proposal area. Consistent with the approved Koolyanobbing Range mine operations, the Proposal will modify part of the Koolyanobbing Range through the excavation of Mine Pits (depressions) and construction of an adjacent Waste Rock Landform (an elevated land mass). The effect of the Proposal to the Koolyanobbing Range landform has been minimised through the positioning of the majority of the Proposal area (i.e. 177ha for the Waste Rock landform and Support Infrastructure components) on the surrounding plains, with only a small area (i.e. 34ha for the Mine Pits) coinciding with the Koolyanobbing Range itself. The habitats forming the Koolyanobbing Range landform (e.g. soils, vegetation) which coincide with the Proposal area are considered to be well represented across the Koolyanobbing Range beyond the area of the Proposal. Following the completion of mining, the Proposal area will require rehabilitation as part of the mine closure process (refer 'Rehabilitation and Decommissioning', below). The areas of the Waste Rock Landform and the Support Infrastructure will be rehabilitated with native vegetation. The Mine Pits will remain as open voids, noting the consolidated rock substrate and steep sides will not be conducive to rehabilitation. The Proposal is not expected to be visible from any near residences or public view points. The Proposal will be visually screened on the southern side by the retained topography of the Koolyanobbing Range, with the Waste Rock Landform also assisting to provide visual screening of the Mine Pits from other directions.	In consideration of the potential effect of the Proposal to landform values, the local and regional distribution of such landform values, the Proposal is not expected to result in a significant detrimental effect to the variety, integrity, ecological function or environmental values of landforms and soils. Accordingly, the EPA's objective for the environmental factor of 'Landforms' can be met. The potential effect of the Proposal to the southern Koolyanobbing Range landform can be appropriately managed through contemporary mining processes and mining controls, which will include the implementation of land clearing controls, mine engineering design for safe and stable mining landforms, controlled blasting procedures, monitoring of wall stability during mining, and progressive and post-mining rehabilitation of disturbed areas. These contemporary mining processes and mining controls will assist to ensure the effects to the landform are contained to predictions within the defined Proposal area.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
			Whilst the Koolyanobbing Range (to 510mAHD) is a prominent landform in the local area, the Koolyanobbing Range is of lower elevation than many other ranges in the region, including the Windarling Range (to 570mAHD), Mt Jackson (610mAHD), Mt Manning (630mAHD), Die Hardy Ranges (640mAHD) and the Helena and Aurora Range (680mAHD). Having regard to the long history of mining at the Koolyanobbing Range, the broad spatial extent of the Koolyanobbing Range, and the confined extent of the Proposal (the majority of which is positioned off the range itself), the effect of the Proposal to landforms is not expected to be environmentally significant.	
THEME: Integrating Factors				
Rehabilitation and Decommissioning	EPA Objective: *To ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner* (EPA 2015a) EPA Guidance: o Guidelines for Preparing Mine Closure Plans (DMP & EPA 2015) o Guidance Statement #6: Rehabilitation of Terrestrial Ecosystems (EPA 2006a) o Environmental Protection Bulletin #19: EPA Involvement in Mine Closure (EPA 2013b)	The southern Koolyanobbing Range and its surrounds contain vegetation that provides habitat to a variety of flora and fauna taxa. Consistent with the land tenure of Tenements granted under the *Mining Act 1978* (WA) *and* a Pastoral Lease granted under the *Land Administration Act 1997* (WA), parts of the southern Koolyanobbing Range, including parts of the Proposal area, have previously been disturbed by a combination of mining operations, mineral exploration and agricultural grazing.	The Proposal area will require rehabilitation and closure to restore environmental values, and ensure post-mining landforms are safe and stable to enable continued pastoral land use. To provide context, the approved Koolyanobbing Range mine operations are subject to a Mine Closure Plan (Cliffs 2015a) prepared in accordance with the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*. Cliffs' approved Koolyanobbing Range mine operations have been able to demonstrate successful rehabilitation to date, with results comparing favourably with reference sites and the interim completion criteria. As the Proposal will form an operational extension to the approved Koolyanobbing Range mine operations, and the Proposal is not expected to alter the mine closure profile for the approved Koolyanobbing Range mine operations, it may be appropriate for the Proposal to be incorporated within the next revision of the Mine Closure Plan, currently scheduled for 2018. The Proposal area can be rehabilitated and closed consistent with the mine closure practices currently outlined within the Mine Closure Plan.	Cliffs proposes to manage the environmental effect of the Proposal during rehabilitation and closure through the preparation and implementation of a: o Mine Closure Plan which will include: o Stakeholder consultation, including continued consultation during Proposal implementation; o Mine closure objectives, including public safety, landform stability, infrastructure, soils, vegetation and sustainability; o Post-mining land use, to restore the land condition by rehabilitation with native vegetation suitable for an undefined use compatible with the land tenure of Unallocated Crown Land (or an alternate land use as may be applicable at that time); o Completion criteria, including public safety, landform stability, infrastructure, soils, vegetation and sustainability;

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
				o Monitoring of the mine closure actions to determine progress towards meeting the completion criteria; o Ongoing investigations to further inform mine closure for the Proposal; and o Financial provision to ensure that an appropriate level of funding is provided to enable mine closure to be completed. Implementation of the above management actions is expected to ensure that the Proposal area is appropriately closed and rehabilitated to an acceptable level. To provide context, the approved Koolyanobbing Range mine operations are subject to a Mine Closure Plan prepared in accordance with the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*. Cliffs' approved Koolyanobbing Range mine operations have been able to demonstrate successful rehabilitation to date, with results comparing favourably with reference sites and the interim completion criteria. In consideration of the environmental effect of the Proposal to rehabilitation and mine closure, and of the management actions proposed, it is expected that the Proposal can be rehabilitated and closed consistent with the closure criteria for post-mining pastoral land use. Accordingly, the EPA's objective for the environmental factor of 'Rehabilitation and Decommissioning' can be met. To note, mine closure for the Proposal will be subject to assessment and regulation by DMP under the *Mining Act 1978* (WA).

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Offsets	EPA Objective: *To counterbalance any significant residual environmental impacts or uncertainty through the application of offsets* (EPA 2015a) EPA Guidance: o *WA Environmental Offsets Policy* (Government of Western Australia 2011) o *WA Environmental Offsets Guidelines* (Government of Western Australia 2014) o Environmental Protection Bulletin #1: *Environmental Offsets* (EPA 2014d)	Not applicable	The Proposal coincides with the flora taxon *Tetratheca erubescens*, which has been declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA). The Proposal coincides with approximately 22% of the *Tetratheca erubescens* population; comprising 20% which will be directly removed by the Mine Pits and 2% which occur within a 10m set-back around the outer edge of the Mine Pits which may (or may not) be removed. The remaining approximately 78-80% of the *Tetratheca erubescens* population occur within non-impact areas of the southern Koolyanobbing Range. As outlined by Cliffs (2014b, Appendix 3), the effect of the Proposal to *Tetratheca erubescens* is not expected to change the threat category of 'Vulnerable' currently applying under the IUCN (2012) criteria. Whilst the effect to *Tetratheca erubescens* is not expected to change the threat category under the IUCN (2012) criteria, the effect may still be considered environmentally significant, and for which a consideration of environmental offsets may be applicable.	Cliffs proposes to counterbalance the environmental effect of the Proposal to *Tetratheca erubescens* through the application of environmental offsets as outlined within: o *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4). As outlined by the Environmental Offsets Plan, the environmental offsets comprise financial contributions to assist with: o Preparation of a Recovery Plan for *Tetratheca erubescens*; and o Implementation of restoration actions for *Tetratheca erubescens* (consistent with the objectives of a *Tetratheca erubescens* Recovery Plan). Alternatively, other potential offset arrangements could be considered and agreed between EPA and Cliffs, and in consultation with DPaW. The environmental offsets identified within the Environmental Offsets Plan are consistent with the existing offsets framework applied to Cliffs' Yilgarn Operations for 'Rare Flora' taxa (i.e. *Ricinocarpos brevis*). Consistent with the EPA's objective for the key integrating factor of 'Offsets', the environmental offsets outlined by the Environmental Offsets Plan are expected to counterbalance the significant residual environmental effects of the Proposal by contributing towards both research and management of *Tetratheca erubescens*.

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1.1 The Proponent

The Proponent for the Proposal is:

Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs) (ACN 001 892 995)

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Cliffs' contacts for the Proposal are:

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Cliffs is a supplier of Western Australian iron ore, with mine operations in the Yilgarn region at the Koolyanobbing Range, Mt Jackson Range, Windarling Range and the Deception Deposit (undeveloped), processing of ore at Koolyanobbing, and road and rail facilities between these operations and the Port of Esperance where the processed ore is exported to international customers. The Yilgarn Operations currently produce approximately 11Mtpa of iron ore having a gross economic value of more than A$900million per year.

The Koolyanobbing Range mine operations form the hub for Cliffs' broader Yilgarn Operations, with mining at the Koolyanobbing Range having a history spanning more than 60 years (refer Section 2.9 *Mining History*). The approved Koolyanobbing Range mine operations occupy a spatial area of approximately 790ha comprising open mine pits at the A, B, C, D and K Deposits, associated waste rock landforms, and various support infrastructure (ore stockpiles, rehabilitation stockpiles, administration and workshop facilities, water and wastewater treatment facilities, water dams, power generation facilities, waste management facilities, an airstrip and a mine camp).

Cliffs' mine operations are undertaken in accordance with an Environmental Policy (Cliffs Natural Resources 2014, Appendix 1), which outlines Cliffs' overarching objectives of environmental protection and continual improvement in environmental performance. The Environmental Policy is implemented through Cliffs' Environmental Management System (EMS), which includes

Environmental Management Plans (EMPs) for the management of key environmental aspects. Cliffs' EMS for its Yilgarn Operations is certified and maintained to Australian and New Zealand Standard (AS/NZS) International Standards Organisation (ISO) 14001:2004 (NCSI 2013, Appendix 2).

1.2 Koolyanobbing Range F Deposit Proposal

Cliffs proposes to continue development of the Yilgarn Operations to include a new mine development at the Koolyanobbing Range F Deposit ('the Proposal'), to operate as a southerly extension to the approved Koolyanobbing Range mine operations. The Proposal is expected to yield an estimated 9 million tonnes (Mt) of iron ore having a gross economic value of approximately A$500million.

The Proposal will be implemented within a spatial area of 211 hectares (ha) comprising the following mine infrastructure components:

(a) Mine Pits;

(b) Waste Rock Landform; and

(c) Support Infrastructure.

Implementation of the Proposal is scheduled to be undertaken over a period of approximately 4 years, from 2016 to 2019.

1.3 Key Proposal Characteristics

The key characteristics of the Proposal are provided in Table 1-1. The location of Cliffs' Yilgarn Operations and the Proposal are identified in Figures 1-1 to 1-3. The key characteristics of the Proposal accord with the requirements outlined by EPA (2012b).

Summary of the Proposal		
Proposal Title	Yilgarn Operations - Koolyanobbing Range F Deposit	
Proponent Name	Cliffs Asia Pacific Iron Ore Pty Ltd	
Short Description	The Proposal is for the mining of the Koolyanobbing Range F Deposit, located at the southern Koolyanobbing Range approximately 50km north-east of the town of Southern Cross in the Shire of Yilgarn, Western Australia. The Proposal includes Mine Pits, a Waste Rock Landform and Support Infrastructure.	
Physical Elements		
Element	Location	Area
Mine Pits	Figure 1-3	34ha
Waste Rock Landform	Figure 1-3	76ha
Support Infrastructure	Figure 1-3	101ha
	Total	211ha

Abbreviations:
km = kilometres
ha = hectares

Table 1-1 Key Characteristics of the Proposal.

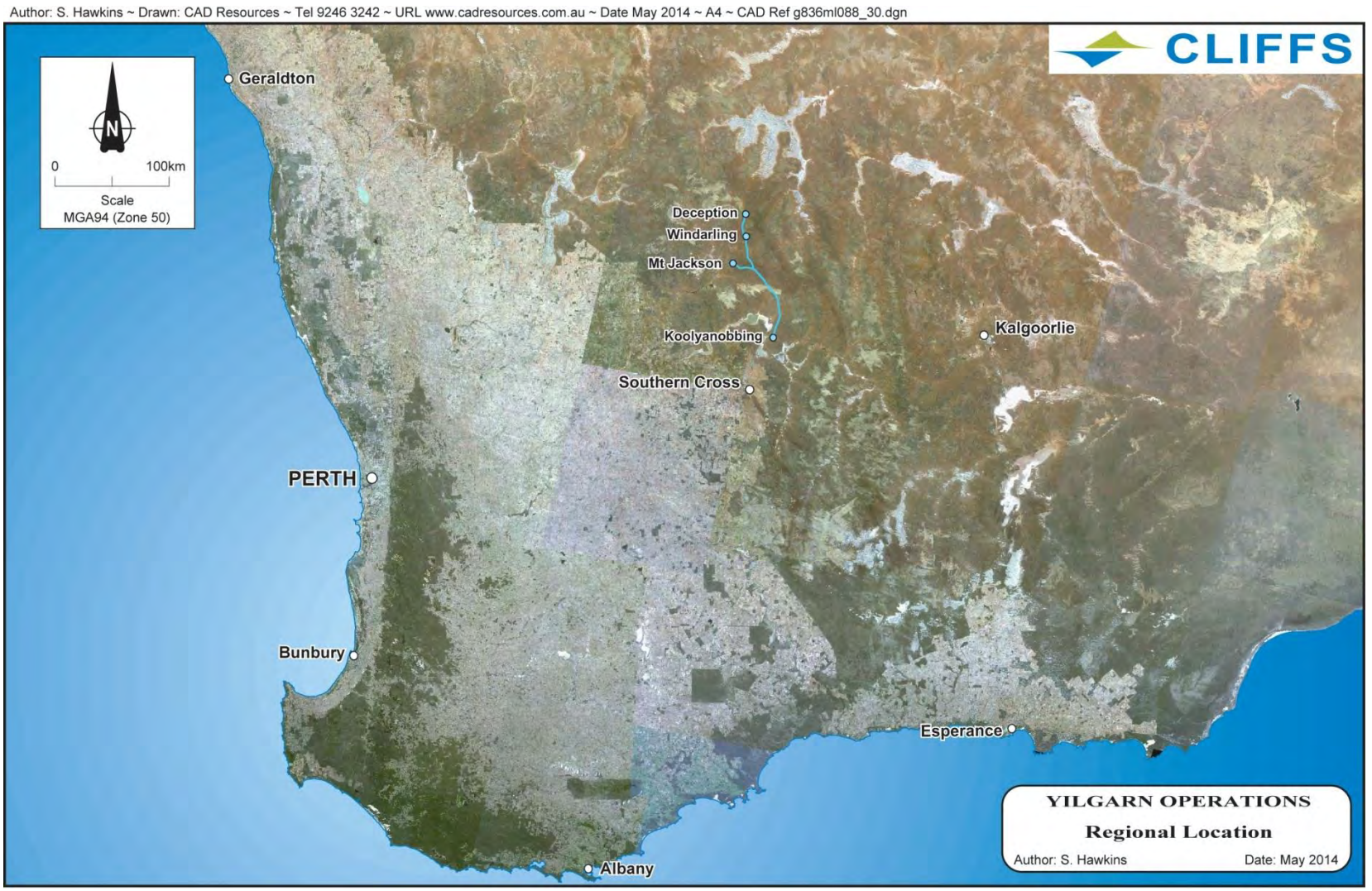

Figure 1-1 Regional Location of the Yilgarn Operations. The regional location of Cliffs' Yilgarn Operations, including the Koolyanobbing Range mine operations, is identified. The Koolyanobbing Range mine operations are located approximately 50km north-east of the town of Southern Cross.

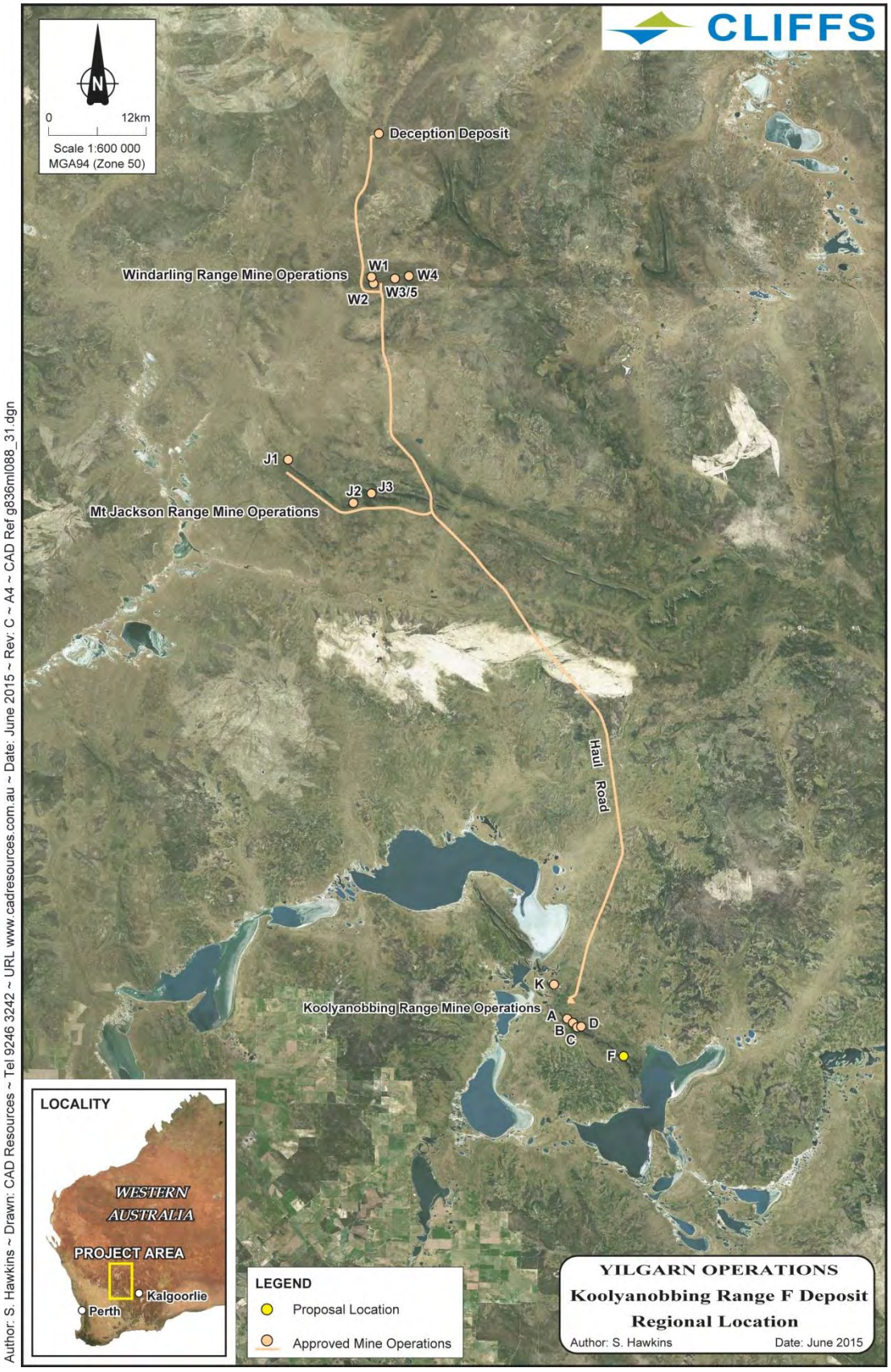

Figure 1-2 Regional Location of the Proposal. The general regional location of the Proposal is identified by the yellow icon. The existing components of Cliffs' Yilgarn Operations at the Koolyanobbing Range, Windarling Range, Mt Jackson Range, Deception Deposit (undeveloped) and the connecting haul roads are identified in blue.

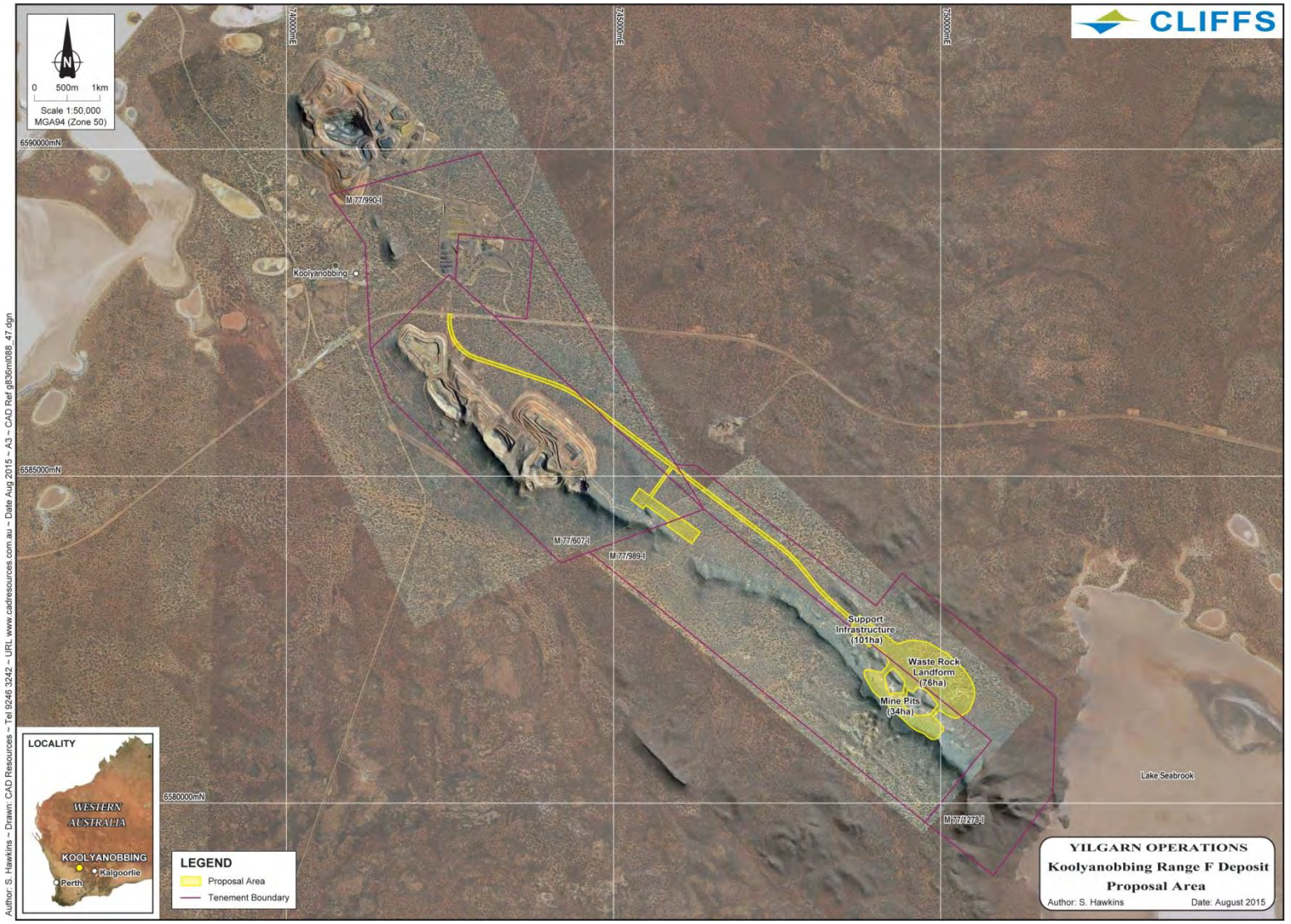

Figure 1-3 Location of the Proposal. The location of the Proposal is shaded in yellow, with the general location of the Proposal infrastructure components identified. Cliffs' approved Koolyanobbing Range mine operations are also visible.

1.4 Proposal Description

The Proposal is for the mining of the Koolyanobbing Range F Deposit, located at the Koolyanobbing Range approximately 50km north-east of the town of Southern Cross in the Shire of Yilgarn, Western Australia. The Proposal will operate as a southerly extension to the approved Koolyanobbing Range mine operations.

The Proposal is expected to yield an estimated 9Mt of iron ore having a gross economic value of approximately A$500million. The iron ore resource will be mined through the conventional open-cut mining techniques of drilling, blasting, loading and transport.

The Proposal will be implemented within a spatial area of 211ha comprising the following mine infrastructure components:

(a) Mine Pits;

(b) Waste Rock Landform; and

(c) Support Infrastructure.

Mapping identifying the Proposal location and the infrastructure components are provided in Section 1.3 *Key Proposal Characteristics.*

Implementation of the Proposal is scheduled to be undertaken over a period of approximately 4 years, from 2016 to 2019.

A detailed description of each infrastructure component for the Proposal is provided below.

1.4.1 Mine Pits

The Mine Pits are expected to yield an estimated 9Mt of iron ore averaging a 58.4% Fe (iron) grade (Cliffs unpublished data). The Mine Pits will require an area of 34ha (Figure 1-3) and provides for development of 3 separate Mine Pits. Approximately 9ha (26%) of the 34ha area for the Mine Pits has previously been cleared for mineral exploration.

Mining will be undertaken by the standard open-cut mining techniques of drilling, blasting, loading and transport. Mining will be undertaken to a depth of approximately 360 metres Australian Height Datum (mAHD), being positioned above the natural groundwater level at approximately 340mAHD (Rockwater 2011).

The area of the Mine Pits includes provision for the temporary stockpiling of cleared rehabilitation materials (vegetation, topsoil and subsoil) prior to its use in progressive and post-mining land rehabilitation. The area of the Mine Pits also includes provision for mine roads between the Mine Pits.

The area of the Mine Pits also incorporates a 10m set-back around the outer edge of the Mine Pits to conservatively account for any potential imprecision in the mine planning process associated with geographical position systems and land contour data.

At mine closure, the Mine Pits will remain as open mine voids. The Mine Pits will not be rehabilitated as the consolidated rock substrate and steep sides will not be conducive to plant growth, with the steep sides also being prohibitive to safe rehabilitation practices.

At mine closure, safety abandonment bunding will be installed across the mine roads leading to the Mine Pits to prevent potential inadvertent access in accordance with the requirements of the Department of Mines and Petroleum (DMP) (1997), with the retained steep topography of the southern Koolyanobbing Range preventing inadvertent access to the Mine Pits from other directions.

1.4.2 Waste Rock Landform

Waste rock excavated from the Mine Pits will be disposed of by construction of an adjacent Waste Rock Landform. The Waste Rock Landform will be constructed within a 76ha area (Figure 1-3), of which approximately 2ha (2%) has previously been cleared for mineral exploration. The Waste Rock Landform will be constructed to an elevation of nominally 420mAHD to accommodate an estimated 20Mt of waste rock. The Waste Rock Landform has been positioned on the plains on the northern side of the Koolyanobbing Range (i.e. not positioned on the elevated main ridge or lower ridges), and aligned parallel to the southern Koolyanobbing Range landform.

Consistent with recent designs for Waste Rock Landforms at Cliffs' Yilgarn Operations, the design for the Waste Rock Landform is based on 10m lifts having a 15^0 batter, a 10m berm with a 5^0 backslope between lifts, and having an overall angle of approximately 10.5^0. The upper level of the Waste Rock Landform will also incorporate a 5^0 backslope. The backslope on the berms and the upper level will control surface water drainage following rainfall. This design configuration conceptually meets a 1:100 year Annual Recurrence Interval (ARI) for rainfall, noting the placement of suitable face rock material and successful post-mining rehabilitation will be necessary to achieve this outcome.

The positioning of the Waste Rock Landform on the plains on the northern side of the Koolyanobbing Range (i.e. not positioned on the elevated main ridge or lower ridges), and its alignment parallel to the southern Koolyanobbing Range landform, will minimise any potential for interference with natural drainage lines associated with the southern Koolyanobbing Range.

The area of the Waste Rock Landform incorporates provision for the temporary stockpiling of cleared rehabilitation materials (vegetation, topsoil and subsoil), and for mine roads to connect the Waste Rock Landform to the area of the Mine Pits and the Support Infrastructure.

Progressively during mining and post-mining, the Waste Rock Landform will be rehabilitated by on-contour ripping of compacted areas and the respreading of rehabilitation materials (vegetation, topsoil and subsoil). The rehabilitation works will be undertaken to meet defined rehabilitation completion criteria.

Consistent with Cliffs' approved Yilgarn Operations, the Waste Rock Landform may also be used for the controlled landfill disposal of wastes. The types and volume of wastes to be disposed of are expected to be consistent with that applying to the approved Koolyanobbing Range mine operations. The use of the Waste Rock Landform for controlled landfill disposal would be subject to a Registration or a Licence (as appropriate) through the Department of Environmental Regulation (DER) in accordance with the *Environmental Protection Regulations 1987* (WA).

1.4.3 Support Infrastructure

The Support Infrastructure will include various standard mine infrastructure components that are necessary for mining development. The Support Infrastructure will require an area of 101ha (Figure 1-3), of which approximately 6ha (6%) has previously been cleared for mineral exploration. The Support Infrastructure has been positioned on the plains on the northern side of the Koolyanobbing Range.

The Support Infrastructure area will include the following mine infrastructure components:

Ore Stockpiles -
The extracted ore may be temporarily stockpiled prior to its transport to Cliffs' approved Koolyanobbing Range Ore Handling Plant for processing.

Rehabilitation Stockpiles -
Rehabilitation materials (vegetation, topsoil and subsoil) cleared from the Proposal area during mine development will be temporarily stockpiled. The rehabilitation materials will be used for progressive and post-mining rehabilitation of the Waste Rock Landform and the Support Infrastructure components.

Mine Roads -
Mine roads will inter-connect the Mine Pits, Waste Rock Landform and the Support Infrastructure components, and connect the Proposal to Cliffs' approved Koolyanobbing Range mine operations.

Gravel Pits -
Gravel pits will supply the gravel sources necessary for the construction of the mine roads and hardstand areas. The gravel pits are expected to be typically between 1m to 4m depth.

Mine Administration Facilities -
Portable mine offices (with kitchen and toilet facilities) will provide for mine administration purposes, including first aid and site security.

Workshops and Maintenance Facilities -
Workshop and maintenance facilities may provide for mechanical and engineering use and storage purposes. Workshops and maintenance facilities will be on hardstands with sumps for the collection and containment of any potential contaminants.

Equipment Storage Facilities -
Multiple locations will provide for the storage of mining equipment, including mining vehicles and spare parts.

Hydrocarbon, Chemical and Explosives Storage Facilities -
Storage facilities for hydrocarbons (including vehicle fuels), chemicals and explosives may be required, with products will be stored and segregated in accordance with the relevant legislation.

Water Treatment Facility -
A small water treatment plant may be required to provide potable (drinking) water to service mine personnel and mine office facilities (kitchens and toilets), with any liquid waste (brine) produced to be transferred to the water storage dams for controlled use in dust suppression.

Water Storage Dams -
Water storage dams will provide for the temporary storage of abstracted groundwater prior to use in dust suppression. The dams will have a stock-fencing perimeter to minimise fauna access, and contain fauna egress matting to assist with fauna escape in the case of inadvertent fauna entry.

Wastewater Treatment Facility -
Wastewater from the mine offices (kitchens and toilets) will be treated to the requirements of the Shire of Yilgarn and in accordance with the *Health Act 1911* (WA) and the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974* (WA).

Power Generation Facilities -
Diesel generators will supply power to the Support Infrastructure components and mobile equipment.

The area of the Support Infrastructure incorporates provision for the temporary stockpiling of cleared rehabilitation materials (vegetation, topsoil and subsoil) prior to its use in progressive and post-mining land rehabilitation.

Drainage for the Support Infrastructure area will be managed using a combination of table drains, sumps and earthen bunding (as appropriate) to control stormwater and allow it to infiltrate and/or evaporate.

At mine closure, infrastructure within the Support Infrastructure area will be removed. The Support Infrastructure area will be rehabilitated with native vegetation, which will include on-contour ripping of compacted areas and the respreading of rehabilitation materials (vegetation, topsoil and subsoil). The rehabilitation works will be undertaken to meet defined rehabilitation completion criteria.

1.5 Existing Facilities

The Proposal will operate as a southerly extension to Cliffs' approved Koolyanobbing Range mine operations. Mining at the Koolyanobbing Range has a history spanning more than 60 years, with iron ore mining having commenced in 1950.

Cliffs' existing infrastructure and facilities at the Koolyanobbing Range mine operations includes mine pits, waste rock landforms, ore stockpiles, rehabilitation stockpiles, administration and workshop facilities, water and wastewater treatment facilities, water dams, power generation facilities, waste management facilities, an airstrip and a mine camp. These existing infrastructure and facilities have been assessed and approved under separate statutory processes, with these infrastructure and facilities to be used to the extent necessary under their existing approvals to support the development of the Proposal. These infrastructure and facilities do not require re-assessment or re-approval for their continued use to support the Proposal.

1.6 Mitigation Hierarchy

As outlined by EPA (2014c; 2015b), assessment of the Proposal should include consideration of the 'Mitigation Hierarchy'. The Mitigation Hierarchy comprises sequential steps that seek to alleviate the environmental effects of an action as far as practicable. The 4 sequential steps of the Mitigation Hierarchy are:

(a) Avoid;
(b) Minimise;
(c) Rehabilitate; and
(d) Offset

A summary of the steps taken for the Proposal in accordance with the Mitigation Hierarchy is provided below.

1.6.1 Avoid

Avoidance measures seek to prevent or change the potential environmental effects of an action before they occur. As an example, avoidance measures may include adjusting the location, scope and/or timing of an action.

As many of the recorded environmental values occur broadly across the length of the southern Koolyanobbing Range, there has been limited availability to actively avoid environmental values, with minimisation then being the key measure (refer Section 1.6.2 *Minimise* below). Whilst noting this, the Proposal design has resulted in avoidance of a variety of recorded environmental values, which include:

(a) DPaW-classified 'priority' flora taxa *Acacia haematites* (P1), *Austrostipa blackii* (P3), *Lepidium genistoides* (P3) and *Styphelia* sp. Bullfinch (P3);

(b) Vegetation Units 4, 7, 12, 13, 14, 15, and 16;

(c) Specially Protected Fauna taxa *Leipoa ocellata* (active nest mounds) and *Falco peregrinus* (roosting sites);

(d) a variety of potential short-range endemic invertebrate fauna taxa; and

(e) a variety of troglobitic subterranean fauna taxa.

1.6.2 Minimise

Minimisation measures seek to reduce the duration, intensity, extent and/or likelihood of environmental effects of an action where such values cannot be completely avoided. As an example, minimisation measures may include adjusting the location, scope or timing of an action so as to result in a reduction in the environmental effect.

During mine planning, Cliffs has considered various mine planning layouts that seek to minimise the environmental effect of the Proposal. Principally, these considerations have related to minimising the environmental effect to:

(a) *Tetratheca erubescens* (Rare Flora).

Cliffs has modified the optimal economic design of the Mine Pits so as to achieve a significant reduction in the environmental effect to *Tetratheca erubescens*. The optimal economic design (which is not proposed) would result in the removal of up to approximately 47% of the *Tetratheca erubescens* population. By comparison, the proposed design will remove up to 22% of the *Tetratheca erubescens* population (refer to Section 3.1 *Flora*). Whilst this design modification has resulted in a reduction in the recoverable ore resource, Cliffs has undertaken such modifications in recognition of the restricted size and distribution of the *Tetratheca erubescens* population, and with a view towards achieving an appropriate balance between resource recovery and the environmental effects. To provide context, the effect of the Proposal of up to 22% of the *Tetratheca erubescens* population has been minimised to fall within the impact benchmarks established by previous assessment and approvals processes under the *Environmental Protection Act 1986* (WA), *Wildlife Conservation Act 1950* (WA) and the *Mining Act 1978* (WA). For example, the environmental effect of the Proposal is less than the approved effect for Cliffs' Windarling Range mine operations to the related 'Rare Flora' taxon *Tetratheca paynterae* ssp. *paynterae* of up to 30%, and to the 'Rare Flora' taxon *Ricinocarpos brevis* of up to 37% (WA Minister for Environment 2003, 2012, 2014a; DPaW 2003, 2011, 2012; DMP 2003, 2012). As further examples within Western Australia, the 'Rare Flora' taxon *Lepidosperma gibsonii* at the Mt Gibson Ranges was previously been approved for up to 47% removal (ATA 2006; EPA 2006b), with the 'Rare Flora' taxon *Kunzea similis* at the Ravensthorpe Range previously approved for up to 59% removal (RNO 2002; EPA 2003).

With regards to minimising the environmental effect to other environmental values, Cliffs has also considered various mine planning layouts. The optimal mining design has been modified through minimising the spatial extent of the Mine Pits (as an artefact of the process described above for *Tetratheca erubescens*) and by positioning of the Support

Infrastructure and the Waste Rock Landform beyond the elevated ridge areas. The modified mine planning layout has resulted in a minimisation of the potential effect to a variety of recorded environmental values, which include:

(a) DPaW-classified 'priority' flora taxa *Beyeria rostellata* (P1), *Hibbertia lepidocalyx* ssp. *tuberculata* (P3), *Lepidosperma ferricola* (P3), *Stenanthemum newbeyi* (P3) and *Banksia arborea* (P4);

(b) Vegetation Units 2, 4, 6, 9, 10 and 11;

(c) DPaW-classified PEC;

(d) Habitat for Specially Protected Fauna taxa *Leipoa ocellata*, *Falco peregrinus*, *Merops ornatus and Cacatua leadbeateri*;

(e) DPaW-classified 'priority' fauna taxa *Aganippe castellum* (P4);

(f) Habitat for potential short-range endemic invertebrate fauna taxa;

(g) Habitat for troglobitic subterranean fauna taxa; and

(h) Landforms of the southern Koolyanobbing Range.

Whilst many of the design modifications result in greater operational cost to Cliffs (for example, due to longer haulage distances for ore and waste rock than optimal), Cliffs has adopted these design modifications to minimise the effect to the recorded environmental values.

An assessment of the environmental values of the southern Koolyanobbing Range and the environmental effect of the Proposal are described in Section 3.1 *Flora* and Section 3.2 *Fauna*. The avoidance of part of the ridge habitat (as described above) is also considered relevant to Section 3.3 *Landforms*.

1.6.3 Rehabilitate

Rehabilitation measures seek to restore environmental values following an action. As an example, rehabilitation measures may include restoration of soils and vegetation following an action.

At mine closure, following removal of infrastructure, the areas of the Waste Rock Landform and the Support Infrastructure will be rehabilitated with native vegetation of local provenance (noting that rehabilitation of the Mine Pits area will not be possible, as outlined by Section 1.4.1 *Mine Pits*). The rehabilitation works will include on-contour ripping of compacted areas and the respreading of rehabilitation materials (vegetation, topsoil and subsoil) that were removed and stockpiled during initial mine development. The rehabilitation works will be undertaken to meet defined rehabilitation completion criteria.

The rehabilitation works will seek to restore many of the environmental values of the Proposal area. For context, a number of flora taxa recorded from the Proposal area have successfully established in rehabilitation works within Cliffs' Yilgarn Operations; thereby providing a degree of confidence as to Cliffs' ability to restore environmental values.

An assessment of the proposed rehabilitation of environmental values for the Proposal are described in Section 3.4 *Mine Closure*. The proposed rehabilitation of the Waste Rock Landform land feature is also considered relevant to Section 3.3 *Landforms*.

1.6.4 Offset

Environmental offsets are measures that seek to counterbalance any significant residual environmental effects which may arise from an action, after appropriate avoidance, minimisation and rehabilitation measures have been taken. In principle, an environmental

offset should be related to the significant residual environmental effect, and should seek to achieve a measurable conservation outcome(s). As an example, where a significant residual environmental effect relates to a flora or fauna taxon, an environmental offset should seek to achieve a measurable conservation outcome(s) for that flora or fauna taxon.

As outlined by Section 3.1 *Flora*, the key integrating factor of 'Offsets' may be applicable to the environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens*. Whilst the effect to *Tetratheca erubescens* is not expected to change the threat category under the IUCN (2012) criteria (as outlined by Cliffs 2014b, Appendix 3), the effect may still be considered environmentally significant, and for which a consideration of environmental offsets may be applicable.

The strategy for the management of 'Rare Flora' within Western Australia is through the preparation and implementation of Recovery Plans to identify and coordinate flora management, with this process managed by DPaW. Currently, no Recovery Plan exists for *Tetratheca erubescens.* The absence of a Recovery Plan for *Tetratheca erubescens* presents a clear gap in the current management of this taxon, and accordingly, provides an opportunity for Cliffs to contribute to this work through an environmental offset.

Accordingly, Cliffs proposes to offset the effect of the Proposal to *Tetratheca erubescens* by providing financial contributions to assist DPaW with the preparation and implementation of a Recovery Plan for *Tetratheca erubescens*. The proposed environmental offset for the preparation and implementation of a *Tetratheca erubescens* Recovery Plan is described within:

(a) *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

Conceptually, the actions required to prepare and implement a *Tetratheca erubescens* Recovery Plan would include:

(a) Drafting of the *Tetratheca erubescens* Recovery Plan, including identification of existing knowledge (e.g. population information, genetics) and the research priorities considered necessary for restoration; and

(b) Implementation of the *Tetratheca erubescens* Recovery Plan, focusing initially on the research priorities considered necessary for restoration, and secondly, on implementing on-ground management for restoration (taking into account the outcomes from the research priorities).

This proposed environmental offset aligns to the WA Environmental Offsets Policy (Government of Western Australia 2011) in that it would include a combination of defined research to provide knowledge, and following, on-ground management following the research outcomes (i.e. adaptive management approach). The proposed environmental offset also aligns to DPaW Policy Statement 44 *Wildlife Management Programs* (DPaW 1992), in that DPaW would retain responsibility for the management of Rare Flora, and with Cliffs providing resources as a non-Government funding source.

The proposed environmental offset for the preparation and implementation of a *Tetratheca erubescens* Recovery Plan is further described within Section 3.1 *Flora*, and within the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

Consistent with WA Environmental Offsets Guidelines (Government of Western Australia 2014), a completed environmental offsets template describing the proposed environmental offsets for *Tetratheca erubescens* is provided at Appendix 5.

With regard to the key environmental factors of 'Flora and Vegetation', 'Terrestrial Fauna', 'Subterranean Fauna' and 'Landforms', and the key integrating factor of 'Rehabilitation

and Decommissioning', as outlined by the assessment of the environmental effect of the Proposal within Section 3.1 *Flora*, Section 3.2 *Fauna*, Section 3.3 *Landforms* and Section 3.4 *Mine* Closure, Cliffs does not consider there are any other significant residual environmental effects of the Proposal for which a consideration of environmental offsets would be necessary.

1.7 Consideration of Alternatives

In accordance with EPA (2012a), Cliffs has considered a number of alternatives in relation to the Proposal. These considerations include no-development and mine pits backfilling, as outlined below.

1.7.1 No Development

As outlined by Section 3 *Environmental Impact Assessment*, subject to implementation of the proposed environmental management controls and environmental offsets, the environmental effects of the Proposal can be managed to achieve EPA's objectives for the key environmental factors of 'Flora and Vegetation', 'Terrestrial Fauna', 'Subterranean Fauna' and 'Landforms', and the key integrating factors of 'Rehabilitation and Decommissioning' and 'Offsets'. Accordingly, a 'no development' alternative has not been proposed.

1.7.2 Restriction of Mine Pits Development

During mine planning, Cliffs has considered various mine planning layouts that seek to minimise the environmental effect of the Proposal, with specific consideration given to mine planning options that minimise the environmental effect to the 'Rare Flora' taxon *Tetratheca erubescens*.

As an outcome of this process, Cliffs has modified the optimal economic design of the Mine Pits so as to achieve a significant reduction to the environmental effect to the *Tetratheca erubescens* population. The optimal economic design (which is not proposed) would result in the removal of up to approximately 47% of the *Tetratheca erubescens* population. By comparison, the proposed design will remove up to 22% of the *Tetratheca erubescens* population. A visual comparison of the proposed design and the optimal economic design is presented in Figure 1-4.

Whilst the design modification outcome has resulted in a reduction in the recoverable ore resource, Cliffs has undertaken such modifications in recognition of the restricted size and distribution of the *Tetratheca erubescens* population, and with a view towards achieving an appropriate balance between resource recovery and the environmental effects.

To provide context, the effect of the Proposal of 22% of the *Tetratheca erubescens* population has been minimised to fall within the impact benchmarks established by previous assessment and approvals processes under the *Environmental Protection Act 1986* (WA) and the *Wildlife Conservation Act 1950* (WA). For example, the environmental effect of the Proposal is less than the approved effect for Cliffs' Windarling Range mine operations to the related 'Rare Flora' taxon *Tetratheca paynterae* ssp. *paynterae* of 30%, and to the 'Rare Flora' taxon *Ricinocarpos brevis* of 37% (WA Minister for Environment 2003, 2012, 2014a).

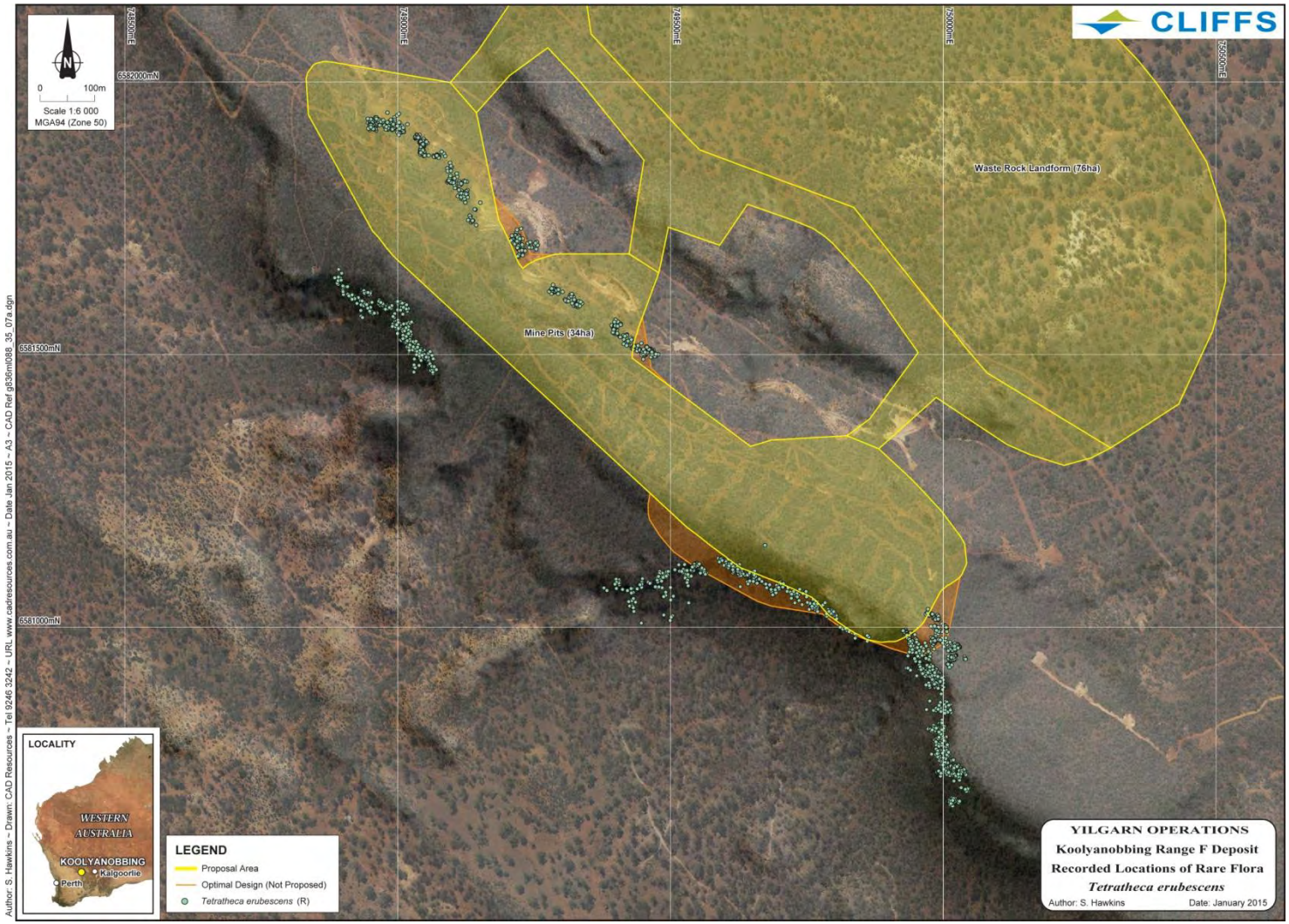

Figure 1-4 Comparison of the Proposed and Optimal Mine Pits Design Areas. The proposed Mine Pits area (yellow shading) coincides with approximately 22% of the *Tetratheca erubescens* population. The optimal mine pits area (orange shading; not proposed) coincides with approximately 47% of the of the *Tetratheca erubescens* population. Data Sources: Maia (2013), Woodman (unpublished) and Cliffs (unpublished).

1.7.3 Mine Pits Backfilling

Backfilling can potentially occur where two or more mine pits developed in close proximity can be scheduled such that waste rock from one mine pit can be disposed of into the completed void of another mine pit. The ability to schedule the development of mine pits can be constrained by various factors including the mineral resource grade (including any impurities) and the required mining rate. Backfilling has the potential to reduce the area of land required for waste rock disposal during mining, and minimise the number and/or spatial area of the mine pits at mine closure. For context, Cliffs currently undertakes backfilling at the Windarling Range W2 and W4 Deposits, with backfilling also proposed for the Koolyanobbing Range C Deposit.

A potential may exist for the partial backfilling of waste rock between the Mine Pits for this Proposal. The effect of the backfilling may reduce the area of the Waste Rock Landform, as well as providing for a shorter haulage distance for waste rock disposal (i.e. reduced fuel usage, reduced cost).

The opportunity to realise this potential for partial backfilling will be subject to future detailed mine scheduling to be undertaken by Cliffs during the initial years of Proposal implementation. Whilst Cliffs is unable to expressly commit to partial backfilling at this stage, partial backfilling will remain an option that Cliffs will continue to evaluate.

Cliffs additionally notes that any partial backfilling will require an approval from DMP under the *Mining Act 1978* (WA) relating to the potential for sterilisation of any retained mineral resource within the completed mine voids.

1.8 Environmental Management

Cliffs commenced mining at the Koolyanobbing Range in 1994, as a redevelopment of previous mining operations which initially commenced in 1950 (refer Section 2.9 *Mining History*). The Koolyanobbing Range mine operations have to date been subject to assessment and approval under the *Mining Act 1978* (WA) as regulated by DMP.

In 2004, Cliffs extended its mine operations to include the Windarling Range mine operations and the Mt Jackson Range mine operations, following approval under the *Environmental Protection Act 1986* (WA) as regulated by EPA, the *Mining Act 1978* (WA) as regulated by DMP, and the *Wildlife Conservation Act 1950* (WA) as regulated by DPaW.

Environmental management across Cliffs' Yilgarn Operations is undertaken in accordance with an Environmental Policy (Cliffs Natural Resources 2014, Appendix 1), which outlines Cliffs' overarching objectives of environmental protection and continual improvement in environmental performance. The Environmental Policy is implemented through Cliffs' Environmental Management System (EMS), which includes Environmental Management Plans (EMPs) for the management of key environmental aspects. Cliffs' EMS for its Yilgarn Operations is certified and maintained to the international standard AS/NZS ISO 14001:2004 (NCSI 2013, Appendix 2).

Cliffs' EMS contains a series of EMPs to ensure the potential environmental effects of mine operations are controlled and monitored to an acceptable standard. These EMPs address the management of a range of environmental aspects, including flora and vegetation, fauna and mine closure. The management actions contained within the EMPs have been refined over a period of approximately 10 years, incorporating review and advice from both State and Commonwealth environmental and mining authorities as part of the various government assessment and approvals processes.

Compliance with the EMS and EMPs is regularly audited both internally and by independent third parties in order to ensure compliance, and to identify any changes that may improve the environmental outcomes. The regular auditing of the EMS and EMPs is consistent with Cliffs' Environmental Policy for evaluation of performance against environmental targets. Cliffs has a strong environmental compliance record, with Cliffs' remaining in compliance with all conditions of environmental and mining approvals granted under the *Environmental Protection Act 1986* (WA), *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Mining Act 1978* (WA) and the *Wildlife Conservation Act 1950* (WA).

For the key environmental factors of 'Flora and Vegetation' and 'Terrestrial Fauna' and the key integrating factor of 'Rehabilitation and Decommissioning' applicable to assessment of the Proposal as identified by EPA (2014a, 2014c), Cliffs considers the environmental effects of the Proposal can be appropriately controlled and managed through the preparation and implementation of a:

(a) Flora and Vegetation Management Plan;

(b) Fauna Management Plan; and

(c) Mine Closure Plan.

For the key integrating factor of 'Flora and Vegetation', Cliffs proposes to monitor for potential indirect environmental effects to the 'Rare Flora' taxon *Tetratheca erubescens* through the preparation and implementation of a:

(d) *Tetratheca erubescens* Monitoring Plan.

For the key integrating factor of 'Offsets', Cliffs proposes to offset the environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens* through the implementation of:

(e) *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

Within this EIA-PER document, Cliffs makes environmental commitments to implement the above plans and programs, with Cliffs' intention being that these commitments may become legally binding in approval of the Proposal by the Western Australian Minister for Environment under s45(5) the *Environmental Protection Act 1986* (WA).

In addition to the above EMPs, this EIA-PER document also makes reference to the following additional EMP:

(a) Groundwater Management Plan (Cliffs 2014d).

This additional EMP is identified within this EIA-PER document to provide an overarching context as to the broader environmental management content of Cliffs' EMS. Whilst the above additional EMP is also proposed to be implemented for the Proposal, it is not intended that this additional EMP will become legally binding in approval of the Proposal under s45(5) the *Environmental Protection Act 1986* (WA) as it does not relate to the key environmental factors or key integrating factors the subject of this assessment, and additionally, is regulated under other legislation.

1.9 Principles of Environmental Protection

An objective of the *Environmental Protection Act 1986* (WA) is to protect the environment having regard to five 'Principles of Environmental Protection'. The Principles of Environmental Protection are expanded with supporting principles outlined by EPA (2004c). An assessment of how the Proposal aligns to the Principles of Environmental Protection is presented in Table 1-2.

PRINCIPLES OF ENVIRONMENTAL PROTECTION	PROPOSAL ALIGNMENT
(1) The Precautionary Principle: *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In the application of the precautionary principle, decisions should be guided by —* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*	Environmental surveys have been undertaken to determine the environmental values of the southern Koolyanobbing Range and its surrounds. The environmental surveys have included surveys for flora and vegetation (Maia 2013; Woodman 2014) and surveys for terrestrial and subterranean fauna (BCE 2009, c.2009; Bennelongia 2008, 2014; Biota 2014a, 2014b). These environmental surveys provide scientific certainty as to the environmental values present at the southern Koolyanobbing Range and the potential environmental effect of the Proposal. Where possible, the Proposal has been designed to avoid and/or minimise the environmental effect to the identified environmental values (refer Section 1.6 *Mitigation Hierarchy* and Section 1.7 *Consideration of Alternatives*).
(2) The Principle of Intergenerational Equity: *The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.*	The Proposal incorporates management actions to avoid, minimise and rehabilitate the environmental effect of the Proposal (refer Section 1.6 *Mitigation Hierarchy*). These management actions include avoidance and/or minimisation of recorded environmental values, and post-mining rehabilitation. These management actions seek to maintain and restore the health, diversity and productivity of the environment for the benefit of future generations.
(3) The Principle of Conservation of Biological Diversity and Ecological Integrity: *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	Environmental surveys have been undertaken to determine the environmental values of the southern Koolyanobbing Range and its surrounds (refer Principle 1, above). The results of the environmental surveys have been a fundamental consideration during mine planning in order to minimise the effect of the Proposal to the environmental values of the southern Koolyanobbing Range.
(4) Principles Relating to Improved Valuation, Pricing and Incentive Mechanisms: *(a) Environmental factors should be included in the valuation of assets and services.* *(b) The polluter pays principle — those who generate pollution and waste should bear the cost of containment, avoidance or abatement.* *(c) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.* *(d) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.*	The economic costs associated with the Proposal will be borne exclusively by Cliffs. The economic costs related to environmental management of the Proposal will include the costs associated with environmental personnel, implementation of EMPs, and mine closure. Funding for these economic costs will be obtained through sales of the extracted ore to Cliffs' international customers. The environmental effect of the Proposal has been minimised to the lowest level practicable whilst still achieving Cliffs' resource development goals. Further reductions to the environmental effect of the Proposal, if identified, will be implemented where practicable. Cliffs' commitment to continual improvement is reflected in Cliffs' Environmental Policy (Cliffs Natural Resources 2014, Appendix 1) and Cliffs' continued statutory compliance with the environmental approvals.
(5) The Principle of Waste Minimisation: *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	Mine planning has sought to minimise the mass of waste rock generated by the Proposal that will require excavation, transport and disposal to the Waste Rock Landform.

Table 1-2 Principles of Environmental Protection. The Principles of Environmental Protection, as outlined by s4A of the *Environmental Protection Act 1986* (WA), are identified in Column 1. An assessment of how the Proposal aligns to the Principles of Environmental Protection is provided in Column 2.

1.10 Environmental Effects, Management and Outcomes

1.10.1 Key Environmental Factors and Key Integrating Factors

EPA (2014a) has determined the key environmental factors and key integrating factors applicable to the assessment of the Proposal are:

(a) 'Flora and Vegetation' (key environmental factor);

(b) 'Terrestrial Fauna' (key environmental factor);

(c) 'Subterranean Fauna' (key environmental factor);

(d) 'Landforms' (key environmental factor);

(e) 'Rehabilitation and Decommissioning' (key integrating factor); and

(f) 'Offsets' (key integrating factor).

This document has been submitted for the purposes of EIA document under s40(2)(b) of the *Environmental Protection Act 1986* (WA) at the level of a PER in accordance with the *Environmental Impact Assessment Administrative Procedures 2012* (EPA 2012a).

A summary of the assessment and management of the key environmental factors and key integrating factors for the Proposal is provided in Table 1-3.

The assessment of each key environmental factor and key integrating factor is based on published literature and field surveys. The information from these sources is summarised in context with the Proposal. Further detail from this published literature and the field surveys can be obtained directly from those sources (refer to Section 7 *References*).

For each key environmental factor and key integrating factor assessed, consideration has been given to the relevant legislative frameworks, guidance documentation and the proposed EMPs through which the potential environmental effects of the Proposal can be managed.

For the key environmental factors of 'Flora and Vegetation' and 'Terrestrial Fauna' and the key integrating factor of 'Rehabilitation and Decommissioning' applicable to assessment of the Proposal as identified by EPA (2014a, 2014c), Cliffs considers the environmental effects of the Proposal can be appropriately controlled and managed through the preparation and implementation of a:

(a) Flora and Vegetation Management Plan;

(b) Fauna Management Plan; and

(c) Mine Closure Plan.

For the key integrating factor of 'Flora and Vegetation', Cliffs proposes to monitor for potential indirect environmental effects to the 'Rare Flora' taxon *Tetratheca erubescens* through the preparation and implementation of a:

(d) *Tetratheca erubescens* Monitoring Plan.

For the key integrating factor of 'Offsets', Cliffs proposes to offset the direct environmental effect to the 'Rare Flora' taxon *Tetratheca erubescens* through the implementation of:

(e) *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

Within this EIA-PER document, Cliffs makes environmental commitments to implement these plans/programs, with Cliffs' intention being that these commitments will become legally binding in approval of the Proposal by the Western Australian Minister for Environment under s45(5) the *Environmental Protection Act 1986* (WA). Cliffs' commitments to implement these plans/programs are summarised in Section 5 *Environmental Commitments*.

1.10.2 Other Factors

The EPA (2014a; 2014c; 2015a) factors not considered as applicable to the assessment of the Proposal have not been assessed in this EIA-PER document, however, Table 1-4 provides a broad assessment of these factors, and where relevant, a summary of the potential effect of the Proposal and identification of the proposed management approach.

Table 1-3 Summary of the Assessment and Management of Key Environmental Factors and Key Integrating Factors.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Theme: Land				
Flora and Vegetation	EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and community level* (EPA 2015a) EPA Guidance: o Guidance Statement #51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004a) o Position Statement #2: *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000) o Position Statement #3: *Terrestrial Biological Surveys as an element of Biodiversity Protection* (EPA 2002a)	The flora values of the southern Koolyanobbing Range include: o 1 flora taxon declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA); o 10 DPaW-classified 'priority' flora taxa; o 16 vegetation units; and o DPaW-classified 'priority ecological community'. (Maia 2013; Woodman 2014)	The Proposal will be implemented within an area of 211ha, of which approximately 194ha contains native vegetation that will be cleared. The Proposal coincides with the following flora values: o 1 flora taxon declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA); o 6 DPaW-classified 'priority' flora taxa; o 9 vegetation units; and o DPaW-classified 'priority ecological community'. The Proposal coincides with individuals of the 'Rare Flora' taxon *Tetratheca erubescens* (Maia 2013; Woodman 2014). The Proposal coincides with approximately 22% of the *Tetratheca erubescens* population, comprising 20% which will be directly removed by the Mine Pits and 2% which occur within a 10m set-back around the outer edge of the Mine Pits which may (or may not) be removed. The remaining approximately 78-80% of the *Tetratheca erubescens* population occur within non-impact areas of the southern Koolyanobbing Range. As outlined by Cliffs (2014b; Appendix 3), the effect of the Proposal to *Tetratheca erubescens* is not expected to change the threat category of "Vulnerable" currently applying under the criteria of the International Union for Conservation of Nature (IUCN) (2012). Based on environmental monitoring undertaken at Cliffs' approved mine operations on the related flora taxon *Tetratheca paynterae* ssp. *paynterae* (Cliffs 2014c) a significant indirect environmental effect to the retained *Tetratheca erubescens* population is not expected. Similarly, as outlined by BGPA (2014), an indirect effect to the genetics of the *Tetratheca erubescens* population is also not expected. The Proposal also coincides with individuals of the	Cliffs proposes to manage the environmental effect of the Proposal to flora values through the preparation and implementation of a: o Flora and Vegetation Management Plan which will include: o Internal site disturbance permit process to control land clearing to within approved areas; o Removal and stockpiling of rehabilitation materials (vegetation, topsoil and subsoil) during land clearing for subsequent use in progressive and post-mining rehabilitation works; o Dampening of cleared areas (daily, as required) using groundwater to minimise the potential for dust generation which could affect the health of adjacent vegetation; o Hygiene procedures to minimise the potential for introduction and spread of introduced flora; o Training of mine personnel in fire risks, fire prevention and fire control, including the provision of fire control equipment (fire extinguishers) within mine vehicles; o Daily visual monitoring of dust generation by mine personnel; o Annual monitoring of vegetation condition at specified locations positioned within 100m of mine operations and at reference sites for any effects of dust emissions and/or saline water use to vegetation;

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
			DPaW-classified 'priority' flora taxa *Beyeria rostellata* (P1), *Acacia dissona* var. *indoloria* (P3), *Hibbertia lepidocalyx* ssp. *tuberculata* (P3), *Lepidosperma ferricola* (P3), *Stenanthemum newbeyi* (P3) and *Banksia arborea* (P4) (Woodman 2014). Each of the DPaW-classified 'priority' flora taxa have distributions across the southern Koolyanobbing Range beyond the Proposal area, and across the broader region. Having regard to the number of individuals of each flora taxa coinciding with the Proposal, and of their broader regional distributions, the environmental effect of the Proposal to DPaW-classified 'priority' flora taxa is not expected to be environmentally significant. The Proposal can also be expected to coincide with a variety of other native flora taxa which are not of conservation significance as a result of their broad regional distributions. The environmental effect of the Proposal to these flora taxa is not expected to be environmentally significant having regard to their broad regional distributions. The Proposal coincides with 9 vegetation units (Woodman 2014), each having distributions across the southern Koolyanobbing Range beyond the Proposal area. Having regard to the spatial area of each vegetation unit which coincides with the Proposal, and of their broader distribution across the southern Koolyanobbing Range, the environmental effect of the Proposal to vegetation units is not expected to be environmentally significant. The Proposal coincides with part of the DPaW-classified 'priority ecological community' (PEC) '*Koolyanobbing Vegetation Complexes (Banded Iron Formation)*' (Woodman 2014). Having regard to the spatial area of the Proposal and the broad extent of the PEC, the environmental effect of the Proposal to the PEC is not expected to be environmentally significant.	o Annual monitoring of introduced flora in areas adjacent to mine operations to detect any new occurrences or spread of existing occurrences, and control (spraying) of introduced flora to minimise and/or eradicate known occurrences; o Recording of sightings by mine personnel of introduced fauna which could affect vegetation through grazing/trampling. o Incident reporting system to identify and communicate and environmental effects to flora values; and o Education and training of mine personnel on flora values (with a particular focus on Rare Flora), and flora monitoring / management. To monitor for potential indirect environmental effects to the *Tetratheca erubescens* population, Cliffs also proposes to prepare and implement a: o *Tetratheca erubescens* Monitoring and Management Plan which will include: o quarterly monitoring for plant health to determine any potential for short-term indirect environmental effects; o annual monitoring for plant health, age-structure, reproductive status, mortality and recruitment to detect any trends in the numbers and health of the population; and o objectives and trigger levels for the implementation of contingency actions in the event that a significant indirect effect to the *Tetratheca erubescens* population

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
				is detected. To provide context, flora management has been successfully implemented across Cliffs' approved Yilgarn Operations, including the Koolyanobbing Range mine operations, for more than a decade. Implementation of a Flora and Vegetation Management Plan and a *Tetratheca erubescens* Monitoring Plan is expected to ensure that the environmental effect of the Proposal to flora values is minimised, monitored and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to flora values, the local and regional distribution of the flora values, and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of flora values at the species, population or community level. Accordingly, the EPA's objective for the key environmental factor of 'Flora and Vegetation' can be met. To additionally note, the environmental effect of the Proposal to *Tetratheca erubescens* will also be subject to assessment and regulation by DPaW under the *Wildlife Conservation Act 1950* (WA).
Terrestrial Fauna	EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level* (EPA 2015a) EPA Guidance: o Guidance Statement #20: Sampling of Short-Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia	The terrestrial fauna values of the southern Koolyanobbing Range include: o 3 fauna taxa declared as 'Specially Protected Fauna' under the *Wildlife Conservation Act 1950* (WA); o 1 DPaW-classified 'priority' fauna taxon; and o A range of potential short-range endemic invertebrate	The Proposal coincides with the following terrestrial fauna values: o Habitat of 3 fauna taxa declared as 'Specially Protected Fauna' under the *Wildlife Conservation Act 1950* (WA) (nil effect to live individuals); o 1 DPaW-classified 'priority' fauna taxon; and o A range of potential short-range endemic invertebrate fauna taxa. The 'Specially Protected Fauna' taxa *Leipoa ocellata*, *Cacatua leadbeateri* and *Merops*	Cliffs proposes to manage the environmental effect of the Proposal to terrestrial fauna values through the preparation and implementation of a: o Fauna Management Plan which will include: o Internal site disturbance permit process to control land clearing (of fauna habitat) to within approved areas; o Removal and stockpiling of

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
	(EPA 2009) o Guidance Statement #56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b) o Position Statement #3: Terrestrial Biological Surveys as an element of Biodiversity Protection (EPA 2002a) o Technical Guide Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA & DPaW 2010)	fauna. (Biota 2012, 2014a, 2014b; BCE 2009, c.2009)	*ornatus* have been recorded within the Proposal area (Biota 2014a, BCE c.2009). As these fauna taxa are understood not to be resident (i.e. inactive nest mounds for *Leipoa ocellata* and fly-over sightings for *Cacatua leadbeateri* and *Merops ornatus*), no removal of live individuals is expected. The Proposal will remove habitat used by these fauna taxa. Having regard to the area of potential fauna habitat coinciding with the Proposal, and of the extent of potential fauna habitat for these taxa across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to the habitat of Specially Protected Fauna is not expected to be environmentally significant. The Proposal coincides with records of burrows for the DPaW-classified 'priority' fauna taxon *Aganippe castellum* (BCE 2009). An estimated 45,000 individuals of *Aganippe castellum* occur across the broader southern Koolyanobbing Range (BCE 2009). Having regard to the confined area of the Proposal and the recorded extent of *Aganippe castellum* burrows across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to the DPaW-classified 'priority' fauna taxon *Aganippe castellum* is not expected to be environmentally significant. The Proposal coincides with a number of potential short-range endemic invertebrate fauna taxa (Biota 2012, 2014b). Whilst several of the potential short-range endemic invertebrate fauna taxa were collected only from within the Proposal area, the extent of connected habitat across the southern Koolyanobbing Range indicates that these taxa are likely to have distributions across the southern Koolyanobbing Range beyond the Proposal area (Biota 2014b). The environmental effect of the Proposal to potential short-range endemic invertebrate fauna is not expected to be environmentally significant, having regard to the confined area of the Proposal and the extent of connected habitat across the southern Koolyanobbing Range.	rehabilitation materials (vegetation, topsoil and subsoil) during land clearing for subsequent use in progressive and post-mining rehabilitation works to restore fauna habitat; o Recording of sightings by mine personnel of introduced fauna which could affect native fauna. o Prohibition of pets within the mine operations; o If required, control of introduced fauna (trapping and/or culling) where any significant disturbance to fauna or fauna habitat is recorded; o Incident reporting system to identify and communicate and environmental effects to fauna values; and o Education and training of mine personnel on fauna values (with a particular focus on Specially Protected Fauna), and fauna management. To provide context, fauna management has been successfully implemented across Cliffs' approved Yilgarn Operations, including the Koolyanobbing Range mine operations, for more than a decade. Implementation of a Fauna Management Plan is expected to ensure that the potential environmental effect of the Proposal to terrestrial fauna is minimised and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to terrestrial fauna, the recorded distribution of terrestrial fauna and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
			The Proposal can also be also expected to coincide with a variety of other native terrestrial fauna taxa which are not of conservation significance (e.g. birds, reptiles, etc) as a result of their broad regional distributions. The environmental effect of the Proposal to these other terrestrial fauna taxa is not expected to be environmentally significant having regard to their broad regional distributions.	representation, diversity, viability or ecological function of terrestrial fauna at the species, population or assemblage level. Accordingly, the EPA's objective for the environmental factor of 'Terrestrial Fauna' can be met.
Subterranean Fauna	EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level* (EPA 2015a) EPA Guidance: o Guidance Statement #54a: Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia (EPA 2007a) o Environmental Assessment Guideline #20: Consideration of Subterranean Fauna in Environmental Impact Assessment in Western Australia (EPA 2013a)	Surveys of the southern Koolyanobbing Range for troglobitic subterranean fauna have identified 19 putative taxa, recorded both within and outside of the Proposal area (Bennelongia 2008, 2014). Surveys of the southern Koolyanobbing Range for stygobitic subterranean fauna have not been undertaken. Surveys for stygobitic subterranean fauna at Cliffs' Windarling Range and Mt Jackson Range mine operations did not identify any stygobitic subterranean fauna; believed to be a result of the high groundwater salinity and low dissolved oxygen concentrations (WRM 2008a, 2008b, 2009). For context, the groundwater salinity at the Koolyanobbing Range is an order of magnitude greater than at the Windarling Range and the Mt Jackson Range.	The Proposal coincides with land areas that provide habitat for troglobitic subterranean fauna. This habitat will be disturbed by the excavation of Mine Pits and the construction of an adjacent Waste Rock Landform. The potential effect to troglobitic subterranean fauna has been minimised through the design of the Proposal which minimises the extent of ground excavations and the mass of waste rock requiring disposal. As outlined by Bennelongia (2014), whilst a number of troglobitic subterranean fauna taxa were recorded only from within the area of the Proposal, based on the continuity of habitat across the southern Koolyanobbing Range, it is likely these taxa will have distributions that extend at least across the extent of southern Koolyanobbing Range. The Proposal does not coincide with potential habitat for stygobitic subterranean fauna, noting the Proposal occurs above the natural groundwater level. The Proposal will require only minimal volumes of groundwater abstraction (not dewatering) for dust suppression purposes, such that the groundwater abstraction is unlikely to result in a significant environmental effect to the habitat of stygobitic subterranean fauna (if present). Groundwater abstraction for the Proposal can be appropriately controlled in accordance with Groundwater Licence GWL15549 (DoW 2014) as regulated by DoW in accordance with the *Rights in Water and Irrigation Act 1914* (WA).	Cliffs proposes to manage the potential environmental effect of the Proposal to subterranean fauna through the implementation of: o Minimising ground excavations and land clearing; o Restricting mine operations to above the groundwater level; and o Groundwater abstraction being undertaken in accordance with Groundwater Licence GWL154459 (DoW 2014). Implementation of the above management actions is expected to ensure that the potential environmental effect of the Proposal to subterranean fauna is minimised and controlled to an acceptable level. In consideration of the potential environmental effect of the Proposal to subterranean fauna, the recorded and expected distribution of subterranean fauna, and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of subterranean fauna at the species, population or assemblage level. Accordingly, the EPA's objective for the environmental factor of 'Subterranean Fauna' can be met.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Landforms	EPA Objective: *To maintain the variety, integrity, ecological functions and environmental values of landforms* (EPA 2015a) EPA Guidance: o Guidance Statement #33: Environmental Guidance for Planning and Development (EPA 2008)	The Koolyanobbing Range is an ironstone formation range that extends approximately 30km in length and to 510mAHD in height, covering both the northern and southern Koolyanobbing Ranges. Mining and mineral exploration at the Koolyanobbing Range has a history spanning more than 60 years, with iron ore mining at the Koolyanobbing Range having commenced in 1950. Currently, mining is undertaken at the Koolyanobbing Range Deposits A, B, C, D and K.	The Proposal coincides with part of the southern Koolyanobbing Range. The Proposal area has been subject to several mineral exploration programs, with resulting land disturbance from the construction of access tracks and drilling pads. Mining has yet to be undertaken within the Proposal area. Consistent with the approved Koolyanobbing Range mine operations, the Proposal will modify part of the Koolyanobbing Range through the excavation of Mine Pits (depressions) and construction of an adjacent Waste Rock Landform (an elevated land mass). The effect of the Proposal to the Koolyanobbing Range landform has been minimised through the positioning of the majority of the Proposal area (i.e. 177ha for the Waste Rock landform and Support Infrastructure components) on the surrounding plains, with only a small area (i.e. 34ha for the Mine Pits) coinciding with the Koolyanobbing Range itself. The habitats forming the Koolyanobbing Range landform (e.g. soils, vegetation) which coincide with the Proposal area are considered to be well represented across the Koolyanobbing Range beyond the area of the Proposal. Following the completion of mining, the Proposal area will require rehabilitation as part of the mine closure process (refer 'Rehabilitation and Decommissioning', below). The areas of the Waste Rock Landform and the Support Infrastructure will be rehabilitated with native vegetation. The Mine Pits will remain as open voids, noting the consolidated rock substrate and steep sides will not be conducive to rehabilitation. The Proposal is not expected to be visible from any near residences or public view points. The Proposal will be visually screened on the southern side by the retained topography of the Koolyanobbing Range, with the Waste Rock Landform also assisting to provide visual screening of the Mine Pits from other directions.	In consideration of the potential effect of the Proposal to landform values, the local and regional distribution of such landform values, the Proposal is not expected to result in a significant detrimental effect to the variety, integrity, ecological function or environmental values of landforms and soils. Accordingly, the EPA's objective for the environmental factor of 'Landforms' can be met. The potential effect of the Proposal to the southern Koolyanobbing Range landform can be appropriately managed through contemporary mining processes and mining controls, which will include the implementation of land clearing controls, mine engineering design for safe and stable mining landforms, controlled blasting procedures, monitoring of wall stability during mining, and progressive and post-mining rehabilitation of disturbed areas. These contemporary mining processes and mining controls will assist to ensure the effects to the landform are contained to predictions within the defined Proposal area.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
			Whilst the Koolyanobbing Range (to 510mAHD) is a prominent landform in the local area, the Koolyanobbing Range is of lower elevation than many other ranges in the region, including the Windarling Range (to 570mAHD), Mt Jackson (610mAHD), Mt Manning (630mAHD), Die Hardy Ranges (640mAHD) and the Helena and Aurora Range (680mAHD). Having regard to the long history of mining at the Koolyanobbing Range, the broad spatial extent of the Koolyanobbing Range, and the confined extent of the Proposal (the majority of which is positioned off the range itself), the effect of the Proposal to landforms is not expected to be environmentally significant.	
THEME: Integrating Factors				
Rehabilitation and Decommissioning	EPA Objective: *To ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner* (EPA 2015a) EPA Guidance: o Guidelines for Preparing Mine Closure Plans (DMP & EPA 2015) o Guidance Statement #6: Rehabilitation of Terrestrial Ecosystems (EPA 2006a) o Environmental Protection Bulletin #19: EPA Involvement in Mine Closure (EPA 2013b)	The southern Koolyanobbing Range and its surrounds contain vegetation that provides habitat to a variety of flora and fauna taxa. Consistent with the land tenure of Tenements granted under the *Mining Act 1978* (WA) *and* a Pastoral Lease granted under the *Land Administration Act 1997* (WA), parts of the southern Koolyanobbing Range, including parts of the Proposal area, have previously been disturbed by a combination of mining operations, mineral exploration and agricultural grazing.	The Proposal area will require rehabilitation and closure to restore environmental values, and ensure post-mining landforms are safe and stable to enable continued pastoral land use. To provide context, the approved Koolyanobbing Range mine operations are subject to a Mine Closure Plan (Cliffs 2015a) prepared in accordance with the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*. Cliffs' approved Koolyanobbing Range mine operations have been able to demonstrate successful rehabilitation to date, with results comparing favourably with reference sites and the interim completion criteria. As the Proposal will form an operational extension to the approved Koolyanobbing Range mine operations, and the Proposal is not expected to alter the mine closure profile for the approved Koolyanobbing Range mine operations, it may be appropriate for the Proposal to be incorporated within the next revision of the Mine Closure Plan, currently scheduled for 2018. The Proposal area can be rehabilitated and closed consistent with the mine closure practices currently outlined within the Mine Closure Plan.	Cliffs proposes to manage the environmental effect of the Proposal during rehabilitation and closure through the preparation and implementation of a: o Mine Closure Plan which will include: o Stakeholder consultation, including continued consultation during Proposal implementation; o Mine closure objectives, including public safety, landform stability, infrastructure, soils, vegetation and sustainability; o Post-mining land use, to restore the land condition by rehabilitation with native vegetation suitable for an undefined use compatible with the land tenure of Unallocated Crown Land (or an alternate land use as may be applicable at that time); o Completion criteria, including public safety, landform stability, infrastructure, soils, vegetation and sustainability;

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
				o Monitoring of the mine closure actions to determine progress towards meeting the completion criteria; o Ongoing investigations to further inform mine closure for the Proposal; and o Financial provision to ensure that an appropriate level of funding is provided to enable mine closure to be completed. Implementation of the above management actions is expected to ensure that the Proposal area is appropriately closed and rehabilitated to an acceptable level. To provide context, the approved Koolyanobbing Range mine operations are subject to a Mine Closure Plan prepared in accordance with the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*. Cliffs' approved Koolyanobbing Range mine operations have been able to demonstrate successful rehabilitation to date, with results comparing favourably with reference sites and the interim completion criteria. In consideration of the environmental effect of the Proposal to rehabilitation and mine closure, and of the management actions proposed, it is expected that the Proposal can be rehabilitated and closed consistent with the closure criteria for post-mining pastoral land use. Accordingly, the EPA's objective for the environmental factor of 'Rehabilitation and Decommissioning' can be met. To note, mine closure for the Proposal will be subject to assessment and regulation by DMP under the *Mining Act 1978* (WA).

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL ENVIRONMENTAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Offsets	EPA Objective: *To counterbalance any significant residual environmental impacts or uncertainty through the application of offsets* (EPA 2015a) EPA Guidance: o *WA Environmental Offsets Policy* (Government of Western Australia 2011) o *WA Environmental Offsets Guidelines* (Government of Western Australia 2014) o Environmental Protection Bulletin #1: *Environmental Offsets* (EPA 2014d)	Not applicable	The Proposal coincides with the flora taxon *Tetratheca erubescens*, which has been declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA). The Proposal coincides with approximately 22% of the *Tetratheca erubescens* population; comprising 20% which will be directly removed by the Mine Pits and 2% which occur within a 10m set-back around the outer edge of the Mine Pits which may (or may not) be removed. The remaining approximately 78-80% of the *Tetratheca erubescens* population occur within non-impact areas of the southern Koolyanobbing Range. As outlined by Cliffs (2014b, Appendix 3), the effect of the Proposal to *Tetratheca erubescens* is not expected to change the threat category of 'Vulnerable' currently applying under the IUCN (2012) criteria. Whilst the effect to *Tetratheca erubescens* is not expected to change the threat category under the IUCN (2012) criteria, the effect may still be considered environmentally significant, and for which a consideration of environmental offsets may be applicable.	Cliffs proposes to counterbalance the environmental effect of the Proposal to *Tetratheca erubescens* through the application of environmental offsets as outlined within: o *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4). As outlined by the Environmental Offsets Plan, the environmental offsets comprise financial contributions to assist with: o Preparation of a Recovery Plan for *Tetratheca erubescens*; and o Implementation of restoration actions for *Tetratheca erubescens* (consistent with the objectives of a *Tetratheca erubescens* Recovery Plan). Alternatively, other potential offset arrangements could be considered and agreed between EPA and Cliffs, and in consultation with DPaW. The environmental offsets identified within the Environmental Offsets Plan are consistent with the existing offsets framework applied to Cliffs' Yilgarn Operations for 'Rare Flora' taxa (i.e. *Ricinocarpos brevis*). Consistent with the EPA's objective for the key integrating factor of 'Offsets', the environmental offsets outlined by the Environmental Offsets Plan are expected to counterbalance the significant residual environmental effects of the Proposal by contributing towards both research and management of *Tetratheca erubescens*.

Table 1-4 Summary of the Assessment and Management of Other Factors.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Theme: Sea				
Benthic Communities and Habitat	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable
Coastal Processes	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable
Marine Environmental Quality	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable
Marine Fauna	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable – the Proposal is not located in proximity to the marine environment.	Not applicable
Theme: Land				
Terrestrial Environmental Quality	EPA Objective: *To maintain the quality of land and soils so that the environment values, both ecological and social, are protected* (EPA 2015a) EPA Guidance: o N/A	The land and soil types of the southern Koolyanobbing Range area are reflected through the vegetation units present. The land and soil types of the southern Koolyanobbing Range can be broadly categorised into footslopes and adjacent plains (Vegetation Units 1-7), ironstone ridges (Vegetation Units 8-11), lower slopes and hills (Vegetation Units 12-15), and decaying laterised ironstone breakaways (Vegetation Unit 16) (Woodman 2014).	The Proposal area of 211ha coincides with a variety of land and soil types. Each of the land and soil types (as indicated by the vegetation units present) is distributed across the southern Koolyanobbing Range beyond the area of the Proposal; such that the land and soils are not restricted to the Proposal area. Consequently, the environmental values reflected in the land and soils are also not considered to be restricted. The environmental values of the land and soils within the Proposal area can be partly restored through progressive and post-mining rehabilitation works. The rehabilitation works will include the use of rehabilitation materials (topsoil, subsoil and vegetation) cleared from within the Proposal area.	Cliffs proposes to manage the environmental effect of the Proposal to terrestrial environmental quality through the preparation and implementation of a: o Flora and Vegetation Management Plan; o Fauna Management Plan; and o Mine Closure Plan. Implementation of the management actions to be addressed by these EMPs is expected to ensure that the potential environmental effect of the Proposal to terrestrial environmental quality is minimised and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to terrestrial environmental quality, and the management actions proposed, the Proposal is not expected to result in a significant detrimental effect to the quality of land or soils, or the ecological and social values which they support. Accordingly, the EPA's objective for the environmental factor of 'Terrestrial Environmental Quality' can be met.

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
Theme: Water				
Hydrological Processes	EPA Objective: *To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected* (EPA 2015a) EPA Guidance: o Position Statement #4: Environmental Protection of Wetlands (EPA 2004d)	The Proposal is located within the Internal Drainage Division of Western Australia. Surface drainage within the vicinity of the southern Koolyanobbing Range flows towards numerous salt lakes including Lake Seabrook and Lake Deborah, which are located approximately 1.5km south-east and 4km west of the Proposal area, respectively. Lake Seabrook and Lake Deborah are typically dry, containing surface water only following significant rainfall events. Groundwater at the southern Koolyanobbing Range is saline at approximately 200,000mg/L, lying at a depth of approximately 340mAHD (Rockwater 2011). The current beneficial use of groundwater at the southern Koolyanobbing Range is for mineral exploration and mining operations.	The Proposal will require the abstraction of groundwater for use in dust suppression and associated mining activities. As the Proposal will involve mining only above the natural groundwater level, groundwater dewatering will not be required. The potential environmental effect of the Proposal to groundwater hydrological processes is not expected to be environmentally significant given a low groundwater requirement. Cliffs has been granted Groundwater Licence GWL154459 by DoW under the *Rights in Water and Irrigation Act 1914* (WA) for groundwater abstraction associated with the Yilgarn Operations (DoW 2014), including the area of the Proposal. Groundwater Licence GWL154459 provides a sufficient allocation for the groundwater abstraction required by the Proposal. As a result of the separation distance from the Proposal and the physical nature of Lake Seabrook and Lake Deborah, the Proposal is not expected to have an environmental effect to surface water.	Cliffs proposes to manage the environmental effect of the Proposal to groundwater hydrological processes through: o Restricting mine operations to above the groundwater level; and o Groundwater abstraction being undertaken in accordance with Groundwater Licence GWL154459 granted to Cliffs by DoW under the *Rights in Water and Irrigation Act 1914* (WA) (DoW 2014) and Cliffs' Groundwater Management Plan (Cliffs 2014d). Implementation of the above management actions is expected to ensure that the potential environmental effect of the Proposal to hydrological processes is minimised and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to hydrological processes, the Proposal is not expected to result in a significant detrimental effect to the hydrological regimes of groundwater or surface water such that it would affect its existing and potential uses. Accordingly, the EPA's objective for the environmental factor of 'Hydrological Processes' can be met.
Inland Waters Environmental Quality	EPA Objective: *To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected* (EPA 2015a) EPA Guidance: o Position Statement #4: Environmental Protection of Wetlands (EPA 2004d)	The Proposal is located within the Internal Drainage Division of Western Australia. Surface drainage within the vicinity of the southern Koolyanobbing Range flows towards numerous salt lakes including Lake Seabrook and Lake Deborah, which are located approximately 1.5km south-east and 4km west of the Proposal area, respectively. Lake Seabrook and Lake Deborah are typically dry, containing surface water only following significant rainfall events.	The Proposal will require the abstraction of groundwater for use in dust suppression and associated mining activities. As the Proposal will involve mining only above the natural groundwater level, groundwater dewatering will not be required. The potential environmental effect of the Proposal to groundwater hydrological processes is not expected to be environmentally significant given a low groundwater requirement. Cliffs has been granted Groundwater Licence GWL154459 by DoW under the *Rights in Water and Irrigation Act 1914* (WA) for groundwater abstraction associated with the Yilgarn Operations (DoW 2014), including the area of	Cliffs proposes to manage the environmental effect of the Proposal to the environmental quality of inland waters through: o Restricting mine operations to above the groundwater level; and o Groundwater abstraction being undertaken in accordance with Groundwater Licence GWL154459 granted to Cliffs by DoW under the *Rights in Water and Irrigation Act 1914* (WA) (DoW 2014) and Cliffs' Groundwater Management Plan (Cliffs 2014d). Implementation of the above management actions is expected to ensure that the potential environmental effect of the Proposal to the

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
		Groundwater at the southern Koolyanobbing Range is saline at approximately 200,000mg/L, lying at a depth of approximately 340mAHD (Rockwater 2011). The current beneficial use of groundwater at the southern Koolyanobbing Range is for mineral exploration and mining operations.	the Proposal. Groundwater Licence GWL154459 provides a sufficient allocation for the groundwater abstraction required by the Proposal. As a result of the separation distance from the Proposal and the physical nature of Lake Seabrook and Lake Deborah, the Proposal is not expected to have an environmental effect to surface water.	environmental quality of inland waters is minimised and controlled to an acceptable level. In consideration of the environmental effect of the Proposal to the quality of inland waters, the Proposal is not expected to result in a significant detrimental effect to the quality of groundwater or surface water, or the ecological and social values which they support. Accordingly, the EPA's objective for the environmental factor of 'Inland Waters Environmental Quality' can be met.
Theme: Air				
Air Quality and Atmospheric Gasses	EPA Objective: *To maintain air quality for the protection of the environment and human health and amenity, and to minimise the emission of greenhouse and other atmospheric gases through the application of best practice* (EPA 2015a) EPA Guidance: o Guidance Statement #3: Separation Distance between Industrial and Sensitive Land Uses (EPA 2005) o Guidance Statement #12: Minimising Greenhouse Gas Emissions (EPA 2002b)	Dust emissions to air from mining operations can occur from activities including land clearing, drilling, blasting, excavation, loading and unloading of ore and waste rock, vehicle movements on unsealed roads, and from wind passing over cleared land areas. Dust has the potential to affect flora through shading, limiting gaseous transfer and/or increase leaf temperature. Gaseous emissions to air from mining operations may also occur through the use of hydrocarbon fuels in mining equipment and power generation facilities. There are no existing land uses or residential dwellings in the vicinity of the Proposal that could be affected by changes in air quality.	The Proposal can be expected to result in dust and gaseous emissions. Based on the emissions from the approved Koolyanobbing Range mine operations, the dust and gaseous emissions from the Proposal are expected to be localised, not environmentally significant, and with no regulatory limits or standards to be exceeded.	Cliffs proposes to manage the environmental effect of the Proposal from air emissions of dust through: o Application of groundwater to cleared areas to minimise the potential for dust generation. Implementation of the above management action is expected to ensure that the potential environmental effect of the Proposal to air quality is minimised and controlled to an acceptable level. No management actions are considered necessary or applicable to air emissions from use of hydrocarbon fuels. In consideration of the environmental effect of the Proposal to air quality, the Proposal is not expected to result in a significant detrimental effect to the air quality of the environment, or to human health or amenity. Accordingly, the EPA's objective for the environmental factor of 'Air Quality' can be met.
Theme: People				
Amenity	EPA Objective: *To ensure that impacts to amenity are reduced as low as reasonably practicable* (EPA 2015a)	The Proposal is not located in proximity to the areas of public occupation. The nearest occupied townsite is Koolyanobbing, located	Not applicable – the Proposal is not located in proximity to the areas of public occupation.	Not applicable

FACTOR	EPA OBJECTIVE & GUIDANCE	NATURAL & HUMAN ENVIRONMENT	POTENTIAL EFFECT	MANAGEMENT & PREDICTED OUTCOME
	EPA Guidance: o Guidance Statement #3: Separation Distance between Industrial and Sensitive land Uses (EPA 2005)	approximately 1.5km north-west of the Proposal and used exclusively by Cliffs to support its Yilgarn Operations (i.e. no public occupation). The nearest publicly occupied townsite is Southern Cross approximately 50km south-west of the Proposal.		
Heritage	EPA Objective: *To ensure that historical and cultural associations, and natural heritage, are not adversely affected* (EPA 2015a) EPA Guidance: o Guidance Statement #41: Assessment of Aboriginal Heritage (EPA 2004e)	The Yilgarn Region has a well documented history of both Aboriginal and European heritage, with the heritage values identified by surveys documented on Commonwealth, State and local heritage registers.	The Proposal does not coincide with any registered Aboriginal Heritage site within the meaning of s5 of s6 of the *Aboriginal Heritage Act 1972* (WA) (DAA 2014a, 2014b, 2014c, 2014d). To note, Cliffs has been granted s18 Consent under the *Aboriginal Heritage Act 1972* (WA) from the WA Minister for Aboriginal Affairs for part of Proposal area (WA Minister for Aboriginal Affairs 2003). The Proposal area does not coincide with any area of registered or determined Native Title under the *Native Title Act 1993* (C'th) (NNTT 2014a, 2014b). The Proposal area coincides with an unregistered application for Native Title under the *Native Title Act 1993* (C'th) for the Kaparn People (NNTT 2014a, 2014c). The Proposal does not coincide with any record of European heritage on the State Register of Heritage Places maintained by the Heritage Council of Western Australia (HCWA) under the *Heritage of Western Australia Act 1990* (WA) (HCWA 2014).	Cliffs proposes to manage the effect of the Proposal to heritage values through adherence to: o *Aboriginal Heritage Act 1972* (WA), including compliance with the s18 Consent (WA Minister for Aboriginal Affairs 2003); o *Native Title Act 1993* (C'th); and o *Heritage of Western Australia Act 1990* (WA). Implementation of the above management actions is expected to ensure that the potential effect of the Proposal to heritage values is minimised and controlled to an acceptable level. In consideration of the effect of the Proposal to heritage values, the Proposal is not expected to result in a significant detrimental effect to historical and cultural associations. Accordingly, the EPA's objective for the factor of 'Heritage' can be met.
Human Health	EPA Objective: *To ensure that human health is not adversely affected* (EPA 2015a) EPA Guidance: o Guidance Statement #3: Separation Distance between Industrial and Sensitive Land Uses (EPA 2005)	The Proposal is not located in proximity to the areas of public occupation. The nearest occupied townsite is Koolyanobbing, located approximately 1.5km north-west of the Proposal and used exclusively by Cliffs to support its Yilgarn Operations (i.e. no public occupation). The nearest publicly occupied townsite is Southern Cross approximately 50km south-west of the Proposal.	Not applicable – the Proposal is not located in proximity to the areas of public occupation.	Not applicable

1.11 Government Assessment and Approval Processes

The Proposal will be subject to assessment under various environmental and mining legislation of the State of Western Australia and the Commonwealth of Australia. A summary of these Government assessment and approvals processes is provided below.

1.11.1 *Environmental Protection Act 1986* (WA) (Part IV)

The *Environmental Protection Act 1986* (WA) is the principal environmental protection legislation in Western Australia, and for the purposes of Part IV of the Act, is managed by EPA and the Western Australian Minister for Environment. The *Environmental Protection Act 1986* (WA) identifies that a Proposal likely to have a significant effect on the environment requires assessment by EPA and approval of the Minister.

The Proposal was referred to EPA under s38(1) of the *Environmental Protection Act 1986* (WA) in July 2014 (Cliffs 2014a), with EPA determining in September 2014 that the Proposal should be subject to an Environmental Impact Assessment (EIA) under the *Environmental Protection Act 1986* (WA) at the level of Public Environmental Review (PER) (EPA 2014a, 2014b). As outlined by EPA (2014a, 2014c; 2015a; 2015b), the key environmental factors and key integrating factors applicable for assessment of the Proposal are:

(a) 'Flora and Vegetation' (key environmental factor);

(b) 'Terrestrial Fauna' (key environmental factor);

(c) 'Subterranean Fauna' (key environmental factor);

(d) 'Landforms' (key environmental factor);

(e) 'Rehabilitation and Decommissioning' (key integrating factor); and

(f) 'Offsets' (key integrating factor).

This EIA-PER document has been prepared by Cliffs in accordance with the requirements of EPA (2014a, 2014c) for the purposes of an environmental assessment of the Proposal under s40(2)(b) of the *Environmental Protection Act 1986* (WA).

Following consideration of this EIA-PER document, EPA will report to the Minister on the outcome of its assessment, including its recommendations as to whether the Proposal should be approved and the environmental conditions to be applied. The Minister will subsequently determine whether the Proposal is approved and the environmental conditions that apply.

It is anticipated that the Government assessment and approval processes under the *Environmental Protection Act 1986* (WA) will be completed by the end of Q2 2016.

An outline of the EIA-PER process is depicted in Figure 1-5.

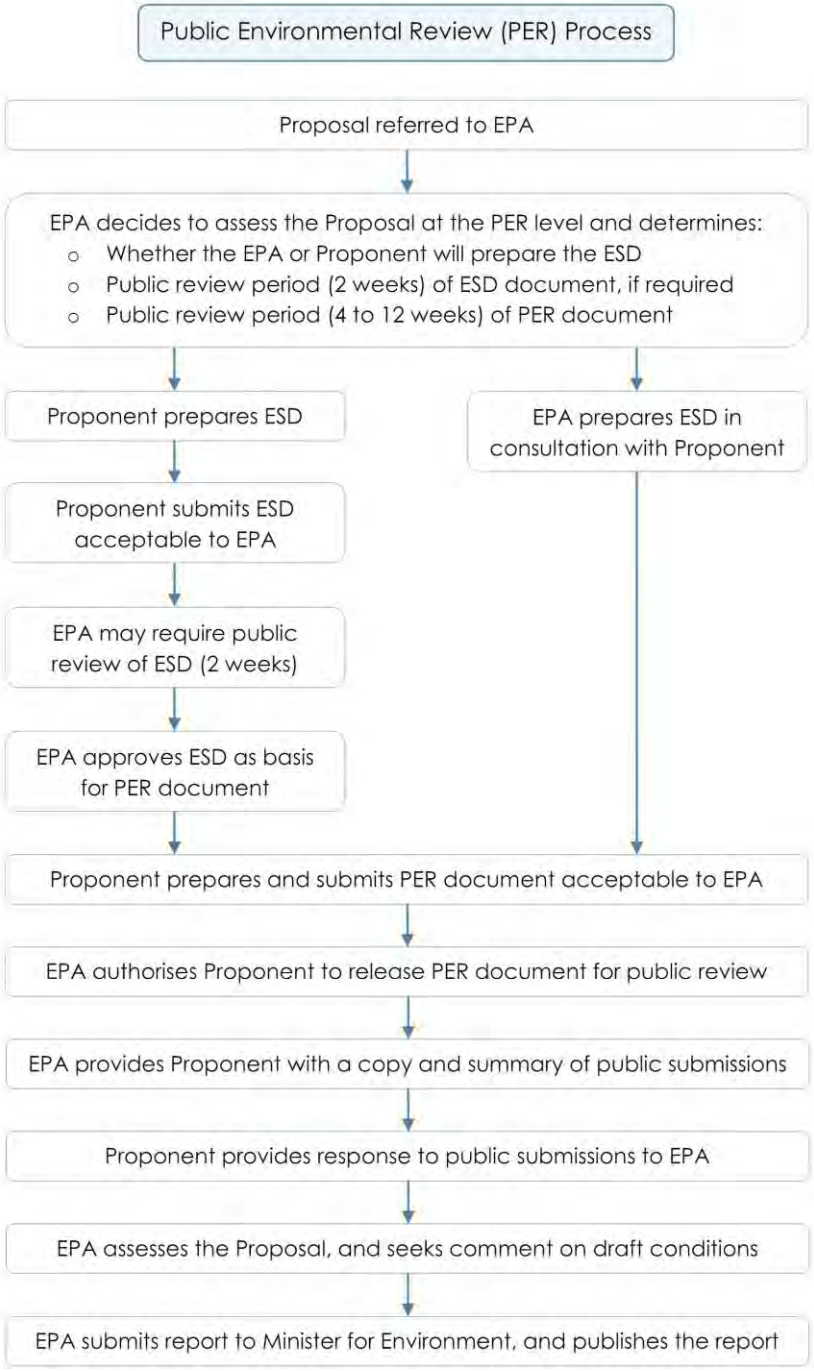

Figure 1-5 Environmental Impact Assessment (Public Environmental Review) process under the *Environmental Protection Act 1986* (WA). This document has been prepared as a submission of an EIA-PER document acceptable to EPA. Source: adapted from EPA (2014e).

1.11.2 *Environmental Protection Regulations 1987* (WA)

The *Environmental Protection Act 1986* (WA) requires specified activities to be undertaken in accordance with a Licence issued by the Department of Environmental Regulation (DER). Cliffs has been granted Licence 5850 (DER 2015) for the Koolyanobbing Range mine operations, which includes specified activities listed under the *Environmental Protection Regulations 1987* (WA) for 'Category 12' crushing and screening of materials and for 'Category 64' putrescible landfills.

To provide for the ability to undertake crushing and screening of gravel supplies and for waste disposal, Cliffs will seek an amendment to Licence 5850 from DER under s59 of the *Environmental Protection Act 1986* (WA) to allow for 'Category 12' and 'Category 64' activities within the Proposal area. The application to amend Licence 5850 under s59 of the *Environmental Protection Act 1986* (WA) is scheduled to be submitted to DER from Q4 2015.

The assessment and approval processes of DER under the *Environmental Protection Act 1986* (WA) / *Environmental Protection Regulations 1987* (WA) will be undertaken in parallel with the assessment and approvals process of EPA under the *Environmental Protection Act 1986* (WA).

1.11.3 *Environment Protection and Biodiversity Conservation Act 1999* (C'th)

The *Environment Protection and Biodiversity Conservation Act 1999* (C'th) is the principal Commonwealth environmental legislation, and is managed by the Commonwealth Department of the Environment (DoE). A Proposal that is likely to have a significant effect to a matter of national environmental significance (such as a 'Threatened Species' of flora or fauna), may be assessed by DoE, with a subsequent approval decision by the Commonwealth Minister for Environment (or as delegated to DoE).

The Proposal was referred to DoE under s68(2) of the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) in June 2014 (Cliffs 2014e).

In August 2014, DoE (2014a) determined that that Proposal did not require assessment or approval under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th).

1.11.4 *Wildlife Conservation Act 1950* (WA)

The *Wildlife Conservation Act 1950* (WA) provides for the conservation and management of specified flora and fauna taxa in Western Australia, and is regulated by DPaW. The *Wildlife Conservation Act 1950* (WA) requires that a Licence from the Minister for Environment (or as delegated to DPaW) must be held for the taking of any 'Rare Flora' taxa.

The Proposal will result in the taking of individuals of the 'Rare Flora' taxon *Tetratheca erubescens*. Cliffs will prepare and submit an application to DPaW for a Licence to take individuals of *Tetratheca erubescens*. The application for a Licence is scheduled to be submitted to DPaW from Q4 2015.

The assessment and approval processes under the *Wildlife Conservation Act 1950* (WA) will be undertaken in parallel with the assessment and approval processes under the *Environmental Protection Act 1986* (WA).

1.11.5 *Mining Act 1978* (WA)

The *Mining Act 1978* (WA) is the principal mining legislation in Western Australia, and is regulated by DMP. The purpose of the *Mining Act 1978* (WA) is to control mining land tenure (tenements), mineral exploration and mining operations.

The Proposal is located within land areas defined by Tenements M77/607-I, M77/989-I, M77/990-I and M77/1278-I under the *Mining Act 1978* (WA). Tenements M77/607-I, M77/989-I and M77/990-I have been granted to Cliffs, with the granting to Cliffs of Tenement M77/1278-I currently pending.

Prior to undertaking mining operations on mining land tenure, a Proponent is required to prepare a Mining Proposal in accordance with the DMP (2006) document *Guidelines for Mining Proposals in Western Australia*, with the DMP to subsequently assess the Mining Proposal and determine its approval on behalf of the Minister for Mines and Petroleum. Cliffs will prepare and submit a Mining Proposal to DMP in accordance with the *Mining Act 1978* (WA). The Mining Proposal is scheduled to be submitted to DMP from Q4 2015.

Prior to undertaking mining operations on mining land tenure, a Proponent is also required to prepare a Mine Closure Plan in accordance with the DMP & EPA (2015) document *Guidelines for Preparing Mine Closure Plans*, with DMP to subsequently assess the Mine Closure Plan and determine approval on behalf of the Minister for Mines and Petroleum.

To provide context, Cliffs has prepared a Mine Closure Plan for the Yilgarn Operations (Cliffs 2015a) consistent with the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*. The Mine Closure Plan (Cliffs 2015a) is currently under assessment by DMP, and will replace the previous revision of the Mine Closure Plan (Cliffs 2012) approved by DMP (DMP 2013) in accordance with the DMP and EPA (2011) document *Guidelines for Preparing Mine Closure Plans* (previous revision). As the Proposal will form an operational extension to the approved Koolyanobbing Range mine operations, and the Proposal is not expected to alter the mine closure profile for the approved Koolyanobbing Range mine operations, it may be appropriate for the Proposal to be incorporated within the next revision of the Mine Closure Plan, currently scheduled for 2018.

The assessment and approval processes under the *Mining Act 1978* (WA) will be undertaken in parallel with the EPA assessment and approvals processes under the *Environmental Protection Act 1986* (WA).

1.11.6 *Rights in Water and Irrigation Act 1914* (WA)

The *Rights in Water and Irrigation Act 1914* (WA) is the principal legislation regarding surface water and groundwater use in Western Australia, and is regulated by the Department of Water (DoW). The installation of groundwater wells and the abstraction of groundwater require a Licence from DoW under the *Rights in Water and Irrigation Act 1914* (WA).

Cliffs has been granted Groundwater Licence GWL154459 (DoW 2014) for abstraction of groundwater the Yilgarn Operations, including the area of the Proposal.

To provide for groundwater supplies for the Proposal, Cliffs will seek a Licence from DoW under s26D of the *Rights in Water and Irrigation Act 1914* (WA) for the installation of additional groundwater well(s) within the Proposal area. Following construction of the groundwater wells, Cliffs will subsequently seek approval under s5C of the *Rights in Water and Irrigation Act 1914* (WA) to amend Groundwater Licence GWL154459 to allow for groundwater abstraction from the additional groundwater well(s). The applications for

Licences under s26D and s5C of the *Rights in Water and Irrigation Act 1914* (WA) are scheduled to be submitted to DoW from Q3 2015.

The assessment and approval processes under the *Rights in Water and Irrigation Act 1914* (WA) will be undertaken in parallel with the assessment and approvals process under the *Environmental Protection Act 1986* (WA).

1.12 Related Approvals

The Proposal will operate as a southerly extension to Cliffs' approved Koolyanobbing Range mine operations. A number of related environmental and mining approvals may be relevant for consideration, as summarised below.

1.12.1 Mining Proposal 1303 under the *Mining Act 1978* (WA)

Mining Proposal 1303[1] (Cliffs 1993) was approved by DMP under the *Mining Act 1978* to undertake mining operations at various ore deposits at the Koolyanobbing Range, as a redevelopment of the mining operations that had previously been undertaken at the Koolyanobbing Range since 1950. Subsequent addendums to Mining Proposal 1303 have since been approved by DMP to allow for expansions to the Koolyanobbing Range mine operations to its current form.

As the Proposal will operate as a southerly extension to Cliffs' approved Koolyanobbing Range mine operations, Mining Proposal 1303 and its associated addendums are considered to be related approvals. The existing infrastructure and facilities at the Koolyanobbing Range mine operations (refer to Section 1.5 *Existing Facilities*) approved under Mining Proposal 1303 and its associated addendums will be used to the extent necessary to support the Proposal. No change to the infrastructure approved and operated under Mining Proposal 1303 and its associated addendums is required for the Proposal.

1.12.2 Licence 5850 under the *Environmental Protection Act 1978* (WA)

The *Environmental Protection Act 1986* (WA) requires specified activities to be undertaken in accordance with a Licence issued by DER. Cliffs has been granted Licence 5850 (DER 2015) for the Koolyanobbing Range mine operations, which include specified activities for crushing and screening of materials, putrescible landfills and a sewage facility.

As the Proposal will operate as a southerly extension to Cliffs' approved Koolyanobbing Range mine operations, Licence 5850 is considered to be a related approval. The existing components Koolyanobbing Range mine operations approved under Licence 5850 will be used to the extent necessary to support the Proposal. In particular, the ore from the Proposal may be crushed and screened within the infrastructure authorised under the Licence 5850 approval. Similarly, putrescible and inert solid and liquid wastes generated from the Proposal may be disposed of to the putrescible landfills and the sewage facility authorised under the Licence 5850 approval. No change to the infrastructure approved and operated under the Licence 5850 is required for the Proposal.

[1] Mining Proposal 1303 was previously referred to as a 'Notice of Intent'.

1.12.3 Groundwater Licence GWL154459 under the *Rights in Water and Irrigation Act 1914* (WA)

Groundwater abstraction for Cliffs' Koolyanobbing Range mine operations is undertaken in accordance with Groundwater Licence GWL154459 issued by DoW under the *Rights in Water and Irrigation Act 1914* (WA) (DoW 2014).

Groundwater Licence GWL154459 is a related environmental approval as it includes approval for groundwater abstraction and groundwater use within the Proposal area. The existing components Koolyanobbing Range mine operations approved under Groundwater Licence GWL154459 will be used to the extent necessary to support the Proposal. No change to the infrastructure approved and currently operated under the Groundwater Licence GWL154459 is required for the Proposal.

1.12.4 Consent under the *Aboriginal Heritage Act 1972* (WA)

Cliffs' Yilgarn Operations have been granted s18 Consent (approval) by the WA Minister for Indigenous Affairs (2003) under the *Aboriginal Heritage Act 1972* (WA), with the s18 Consent covering part of the Proposal area.

Whilst the Proposal does not coincide with any registered Aboriginal Heritage site within the meaning of s5 of s6 of the *Aboriginal Heritage Act 1972* (WA) (DAA 2014a, 2014b, 2014c, 2014d), the s18 Consent is a related approval as it authorises the use of the land for mining purposes. No change to the s18 Consent is required for the Proposal.

2 Natural and Human Environments

The natural and human environments of the Yilgarn region have been described extensively in various environmental and planning documents. Section 2 *Natural and Human Environments* provides a summary on the existing natural and human environments relevant to the Proposal area and the broader southern Koolyanobbing Range.

2.1 Climate

The climate of the southern Koolyanobbing Range is characterised by hot, dry summers and mild, wet winters. Maximum mean temperatures (>30°C) occur between December and March, with minimum mean temperatures (<10°C) occurring between May to October (BoM 2014a). Rainfall is low with an annual average of approximately 300mm/y occurring on approximately 45 days of rainfall occurring throughout the year, with evaporation being approximately 8 times rainfall (BoM 2014a, 2014b).

2.2 Geology and Topography

The southern Koolyanobbing Range forms part of the Yilgarn Craton, which covers an area of approximately 62,000,000ha, representing approximately 24% of the area of Western Australia (Gibson *et al.* 2007). The southern Koolyanobbing Range also forms part of the Marda-Diemals greenstone belt, being the largest greenstone belt in the Southern Cross Terrane in the central Yilgarn Craton (Chen *et al.* 2003).

The majority of the Yilgarn region is gently undulating lateritic duricrust and elevated sandplains averaging approximately 335mAHD to 400mAHD. Low ironstone ridges rise above these areas, and include Mt Finnerty (to 490mAHD), Perrinvale (500mAHD), Cashmere Downs (500mAHD), Koolyanobbing Range (510mAHD), Mt Watts (520mAHD), Mt Richardson (540mAHD), Mt Mason (540mAHD), Windarling Range (560mAHD), Mt Jackson Range (615mAHD), Mt Manning Range (640mAHD), Die Hardy Range (640mAHD) and the Helena and Aurora Range (680mAHD).

The iron ore deposits of the southern Koolyanobbing Range were first identified by Harry Dowd in 1887, with this work then leading to various investigations over more than a century. Broadly, the iron ore deposits of the southern Koolyanobbing Range consist of varying proportions of hematite, limonite and magnetite mineralisation. Mining of the iron ore deposits of the southern Koolyanobbing Range commenced in 1950.

Further detail of the landform values of the southern Koolyanobbing Range are provided in Section 3.3 *Landforms*.

2.3 Flora

The southern Koolyanobbing Range is located in the Southern Cross Interim Biogeographic Regionalisation of Australia (IBRA) subregion, within the Coolgardie Botanical District of the South-western Interzone (Beard 1990 in Woodman 2014).

Flora surveys undertaken across the southern Koolyanobbing Range (Woodman 2014) have identified a variety of flora taxa, including 1 flora taxon declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA) and 10 DPaW-classified 'priority' flora taxa. A total of 16 vegetation units have also been identified across the southern Koolyanobbing Range. A DPaW-classified

'Priority Ecological Community' has also been mapped across the extent of both the northern and southern Koolyanobbing Ranges.

Further detail of the flora values of the southern Koolyanobbing Range are provided in Section 3.1 *Flora*.

2.4 Fauna

Fauna surveys undertaken across the southern Koolyanobbing Range (BCE 2009, c.2009; Biota 2012, 2014a, 2014b) have identified a variety of the vertebrate fauna taxa, comprising avifauna (birds), reptiles, mammals and amphibians. The vertebrate fauna includes 4 taxa declared as 'Specially Protected Fauna' under the *Wildlife Conservation Act 1950* (WA). A variety of invertebrate fauna taxa of terrestrial and subterranean origins have also been identified, which includes 1 DPaW-classified 'priority' fauna taxon.

Further detail of the fauna values of the southern Koolyanobbing Range are provided in Section 3.2 *Fauna*.

2.5 Hydrology and Hydrogeology

The Proposal area is located within the Internal Drainage Division of Western Australia. Surface drainage within the Internal Drainage Division flows to the numerous salt lakes including Lake Seabrook and Lake Deborah, located approximately 1.5km south-east and 4km west of the Proposal area, respectively. Lake Seabrook and Lake Deborah are typically dry, containing surface water only following significant rainfall events.

Groundwater at the southern Koolyanobbing Range is saline at approximately 200,000mg/L, lying at an elevation of approximately 340mAHD (Rockwater 2011).

The approved Koolyanobbing Range mine operations include groundwater dewatering to enable dry-floor mining at several ore deposits situated below the natural groundwater level. The abstracted groundwater is temporarily held in surface water dams for use in dust suppression activities, as well as discharged via pipeline to part of Lake Deborah.

2.6 Land Tenure

The Proposal is located within part Tenements M77/607-I, M77/989-I, M77/990-I and M77/1278-I under the *Mining Act 1978* (WA). These tenements form part of the broader suite of tenements held by Cliffs at the southern Koolyanobbing Range. Mining and mineral exploration has occurred at the southern Koolyanobbing Range since 1950.

The tenements overlie Unallocated Crown Land as defined by the *Land Administration Act 1997* (WA), vested with the Department of Lands (DoL). In July 2015, the land tenure reverted to Unallocated Crown Land following the expiry of the Brontie Pastoral Lease held by the Della Bosca family of Southern Cross. The Brontie Pastoral Lease covered a spatial area of approximately 80,000ha, on which low intensity grazing occurred since its establishment in 1967. The area of the southern Koolyanobbing Range within the former Brontie Pastoral Lease was not recently in active use for pastoral activities (pers. com. W Della Bosca to S Hawkins, September 2014).

The Proposal is not located within any conservation area proclaimed under the *Land Administration Act 1997* (WA). The nearest conservation area is located approximately 35km north of the Proposal, being the 'Class C' reserve Helena and Aurora Range Conservation Park, which covers an area of approximately 135,000ha. The area of the former Jaurdi Pastoral Lease, covering approximately 290,000ha and located approximately 7km east of the Proposal, has been 'proposed' as a Conservation Park ('Class C') (WA Minister for Environment and WA Minister for Mines and Petroleum 2010).

2.7 Demography

The Proposal is located within the Shire of Yilgarn. The Shire of Yilgarn encompasses an area of approximately 3 million hectares and is centred on the town of Southern Cross, situated approximately 340km east-north-east of Perth and 50km south-west of the Proposal. The Shire of Yilgarn has a population of approximately 1,600 people (ABS 2013). Mining and agriculture are the key areas of local employment within the Shire of Yilgarn, accounting for approximately 20% and 18% of employment, respectively (ABS 2013).

2.8 Heritage

The DAA maintains a register of Aboriginal heritage sites and places in accordance with the *Aboriginal Heritage Act 1972* (WA). The Shire of Yilgarn contains 34 registered sites of Aboriginal heritage under the *Aboriginal Heritage Act 1972* (WA) (DAA 2014e). The Proposal does not coincide with any registered site of Aboriginal heritage (DAA 2014a, 2014b, 2014c, 2014d). The nearest registered site of Aboriginal heritage is located approximately 1km from the Proposal.

Native Title applications and determinations are maintained by the National Native Title Tribunal (NNTT) and the Federal Court of Australia in accordance with the *Native Title Act 1993* (C'th). The Proposal does not coincide with any area of registered or determined Native Title under the *Native Title Act 1993* (C'th) (NNTT 2014a, 2014b). The Proposal area coincides with an unregistered application for Native Title for the Kaparn People, which to date has not met the registration test requirements of s190B of the *Native Title Act 1993* (C'th) (NNTT 2014a, 2014c).

The Heritage Council of Western Australia (HCWA) maintains a State Register of Heritage Places under the *Heritage of Western Australia Act 1990* (WA). The Shire of Yilgarn contains 11 sites of European heritage listed under the *Heritage of Western Australia Act 1990* (WA) (HCWA 2014). The Proposal does not coincide with any site of European heritage under the *Heritage of Western Australia Act 1990* (WA) (HCWA 2014).

2.9 Mining History

The discovery of iron ore at the southern Koolyanobbing Range is attributed to Henry Dowd who visited the area in 1887. The iron ore deposits were later mapped and sampled by Blatchford in 2016 and Hobson in 1945 for the Geological Survey of Western Australia (as part of the current Department of Mines and Petroleum) (Cliffs 1993).

Mining at the southern Koolyanobbing Range originally commenced in 1950 at the A Deposit, with the mined ore used to produce pig iron at Wundowie, located approximately 50km north-east of Perth, for the Wundowie Iron and Steel Industry (Cliffs 1993).

In 1960, Broken Hill Proprietary (BHP) obtained the mining leases for the southern Koolyanobbing Range, with mining operations recommencing in 1965 at the 'A Deposit', 'D Deposit' and 'K Deposit'. These larger mining operations led to the establishment of the Koolyanobbing townsite in 1965, which included approximately 80 houses as well as community facilities including a community hall, primary school, swimming pool and a local store (Cliffs 1993). The mined ore was railed to the Kwinana blast furnace, located approximately 35km south of Perth. In 1982, the Kwinana blast furnace closed, with the Koolyanobbing Range mine operations closing shortly afterwards in 1983. Between 1965 and 1983, a total of approximately 25 million tonnes of ore was mined from the southern Koolyanobbing Range (BHP 1983 in Cliffs 1993; Cliffs 1993)

In 1992, Cliffs (formerly as Portman Resources NL) were granted the mining leases for the southern Koolyanobbing Range following advertising by the State Government for interest in redeveloping the Koolyanobbing Range mine operations (Cliffs 1993). In 1994, mining of the 'A Deposit', 'D Deposit' and 'K Deposit' recommenced, and with the Koolyanobbing townsite area then re-occupied for the exclusive use of Cliffs' mining operations. In 2003, Cliffs further expanded its Koolyanobbing Range mine operations to develop the 'B Deposit' and 'C Deposit'. Since 1994, a total of approximately 50Mt of ore has been mined by Cliffs from the southern Koolyanobbing Range (Cliffs unpublished data), having a gross economic value of more than A$4billion.

The Koolyanobbing Range mine operations now form the hub for Cliffs' broader Yilgarn Operations, with the operations extended to include active mining operations at the Windarling Range and the Mt Jackson Range (which commenced in 2004), and the Deception Deposit (to be developed) (refer to Figure 1-2). The Yilgarn Operations currently produce approximately 11Mtpa of iron ore having a gross economic value of more than A$900million per year, with the Yilgarn Operations currently scheduled to continue until approximately 2020.

3 Environmental Impact Assessment

Section 3 *Environmental Impact Assessment* provides an assessment of the key environmental factors and key integrating factors identified by EPA (2014a, 2014c) as applicable to assessment of the Proposal, being:

(a) 'Flora and Vegetation' (key environmental factor);

(b) 'Terrestrial Fauna' (key environmental factor);

(c) 'Subterranean Fauna' (key environmental factor);

(d) 'Landforms' (key environmental factor);

(e) 'Rehabilitation and Decommissioning' (key integrating factor); and

(f) 'Offsets' (key integrating factor).

Section 3.1 *Flora* provides an assessment of the environmental effect of the Proposal relevant to the key environmental factor of 'Flora and Vegetation'.

Section 3.2 *Fauna* provides an assessment of the environmental effect of the Proposal relevant to the key environmental factors of 'Terrestrial Fauna' and 'Subterranean Fauna'.

Section 3.3 *Landforms* provides an assessment of the environmental effect of the Proposal relevant to the key environmental factor of 'Landforms'.

Section 3.4 *Mine Closure* provides an assessment of the environmental effect of the Proposal relevant to the key integrating factor of 'Rehabilitation and Decommissioning'.

Section 3.5 *Offsets* provides an assessment of the application of environmental offsets relevant to the key integrating factor of 'Offsets'.

The assessment of each key environmental factor and key integrating factor is based on a range of surveys and investigations that have been undertaken by appropriately qualified and reputable consultants for their study field, and provides an overview of the outcomes of those investigations in context with the Proposal. Further detail from the surveys and investigations for the Proposal can be sourced directly from the relevant survey and investigation reports (refer Section 7 *References*).

3.1 Flora

3.1.1 Context

The southern Koolyanobbing Range and its surrounds contain a variety of native flora taxa and vegetation units. A portion of the flora taxa and vegetation units at the southern Koolyanobbing Range will require clearing to enable implementation of the Proposal. Section 3.1 *Flora* provides an assessment of the effect of the Proposal to flora values.

3.1.2 EPA Objective

The EPA's objective for the key environmental factor of 'Flora and Vegetation' is:

> *"To maintain representation, diversity, viability and ecological function at the species, population and community level"* (EPA 2015a).

3.1.3 Legislation and Guidelines

Legislation, guidelines, standards and approvals relevant to the key environmental factor of 'Flora and Vegetation' with regard to the Proposal include:

(a) *Environmental Protection Act 1986* (WA)

(b) *Wildlife Conservation Act 1950* (WA)

(c) *Environment Protection and Biodiversity Conservation Act 1999* (C'th)

(d) EPA Guidance Statement 51: *Guidance for the Assessment of Environmental Factors – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004a)

(e) EPA Position Statement 2: *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000)

(f) EPA Position Statement 3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2002a)

(g) *EPBC Act List of Threatened Flora* (DoE 2014b)

(h) *EPBC Act List of Threatened Ecological Communities* (DoE 2014c)

(i) *Wildlife Conservation (Rare Flora) Notice 2014* (WA Minister for Environment 2014b)

(j) *FloraBase* list of DPaW-classified 'priority' flora taxa (DPaW 2014a)

(k) *Conservation Codes for Western Australian Flora and Fauna* (DPaW 2013a)

(l) *Priority Ecological Communities for Western Australia* (DPaW 2014b)

3.1.4 Assessment

Legislative Framework for Flora Protection

All native flora in Western Australia is protected under the *Environmental Protection Act 1986* (WA) by virtue of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (WA). Specific flora species may be afforded special protection under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as listed 'Threatened Species' of flora, with similar protection also available under the *Wildlife Conservation Act 1950* (WA) for flora taxa declared as

'Rare Flora'. The *Environment Protection and Biodiversity Conservation Act 1999* (C'th) may also afford special protection to vegetation units as 'Threatened Ecological Communities'.

A description[1] of the classifications used in flora protection are provided below:

'Threatened Species' -
Threatened Species of flora may be declared by the Commonwealth Minister for Environment for protection under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a matter of national environmental significance for it being extinct, facing a risk of extinction, or in need of a conservation program to prevent the species from a risk of extinction. Threatened Species are allocated a category of 'extinct', 'extinct in the wild', 'critically endangered', 'endangered', 'vulnerable' or 'conservation dependent', which is generally in accordance with the criteria of IUCN (2012). The listed Threatened Species of flora are outlined by DoE (2014b).

'Rare Flora' -
Rare Flora may be declared by the Western Australian Minister for the Environment and protected under the *Wildlife Conservation Act 1950* (WA) if it is likely to become extinct, or is rare, or otherwise in need of special protection. 'Rare Flora' are allocated a category of 'extant taxa' or 'taxa presumed to be extinct', with the assessment process for the extant taxa considering having consideration of criteria of IUCN (2012) for the categories of 'critically endangered', 'endangered' or 'vulnerable' (DPaW 2013a). The flora taxa declared as 'Rare Flora' are outlined by WA Minister for Environment (2014b).

'Priority Flora' -
Priority flora is a classification system developed by DPaW for flora taxa which are known from one, a few or several occurrences, which may or may not be under threat, or may otherwise be rare. Five priority categories are used, with Priority 1 (P1) being of the highest conservation significance, or identification as a priority for surveying and determining the conservation significance based on the current knowledge of perceived threat (DPaW 2013a). As priority flora are identified and determined by DPaW (i.e. not through legislation), priority flora are not subject to any specific legal protection. The flora taxa listed as DPaW-classified priority flora taxa are outlined by DPaW (2014a).

'Threatened Ecological Community' -
A Threatened Ecological Community (TEC) may be declared by the Commonwealth Minister for Environment for protection under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a matter of national environmental significance for vegetation units that occur in a particular type of habitat that is facing a high, very high or extremely high risk of extinction in the wild in the medium-term, near or immediate future. Threatened Ecological Communities are allocated a classification of 'vulnerable', 'endangered' or 'critically endangered'. The listed Threatened Ecological Communities are outlined by DoE (2014c). Threatened Ecological Communities declared under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) are also deemed to be protected under the *Environmental Protection Act 1986* (WA).

'Priority Ecological Community' -
Priority Ecological Community (PEC) is a classification system developed by DPaW for a naturally occurring vegetation unit that occurs in a particular type of habitat that is known from a few to many occurrences, which may or may not be managed for conservation,

[1] Descriptions are consolidated from review of the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Wildlife Conservation Act 1950* (WA), and flora literature published by DPaW and DoE.

and which may or may not be under threat. Five priority categories are used, with Priority 1 (P1) being of the highest conservation significance and/or a priority for surveying and determining the conservation significance based on the current knowledge of perceived threat. As PECs are identified and determined by DPaW (i.e. not through legislation), PECs are not subject to any specific legal protection. The listed DPaW-classified PECs are outlined by DPaW (2014b).

Flora of the southern Koolyanobbing Range

The southern Koolyanobbing Range is located in the Southern Cross Interim Biogeographic Regionalisation of Australia (IBRA) subregion, within the Coolgardie Botanical District of the South-western Interzone (Beard 1990 in Woodman 2014).

Flora surveys undertaken in the area of the southern Koolyanobbing Range (Woodman 2014) identified approximately 250 flora taxa occurring within 16 vegetation units.

The flora taxa of the southern Koolyanobbing Range includes 1 flora taxon declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA) and 10[1] DPaW-classified 'priority' flora taxa, being:

(a) *Tetratheca erubescens* (Rare Flora);
(b) *Beyeria rostellata* (P1);
(c) *Acacia haematites* (P1)[2];
(d) *Acacia dissona* var. *indoloria* (P3);
(e) *Austrostipa blackii* (P3);
(f) *Hibbertia lepidocalyx* ssp. *tuberculata* (P3);
(g) *Lepidium genistoides* (P3);
(h) *Lepidosperma ferricola* (P3);
(i) *Stenanthemum newbeyi* (P3);
(j) *Styphelia* sp. Bullfinch (P3); and
(k) *Banksia arborea* (P4).

The flora surveys also noted a record of a DPaW-classified 'Priority Ecological Community' occurring across the spatial extent of both the northern and southern Koolyanobbing Ranges (Woodman 2014; DPaW 2013b, 2014b).

No 'Threatened Species' of flora or 'Threatened Ecological Communities' listed under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) were recorded by the flora surveys (Woodman 2014).

The recorded locations of conservation significant flora taxa at the southern Koolyanobbing Range are identified at Figures 3-1 to 3-4. The recorded locations of vegetation units and the DPaW-classified PEC are identified at Figures 3-5 to 3-6.

[1] *Spartothamnella* sp. Helena & Aurora Range (formerly P3) was identified by Woodman (2014). Subsequent assessment of *Spartothamnella* sp. Helena & Aurora Range records by the Western Australian Herbarium (DPaW 2014c) has defined previous records as *Spartothamnella canescens*, which is not of conservation significance.

[2] *Acacia haematites* (P1) was referred to as *Acacia* aff. *acuaria* in Woodman (2014), and following, was subject to taxonomic assessment and naming by Mr Bruce Maslin of the Western Australian Herbarium (DPaW).

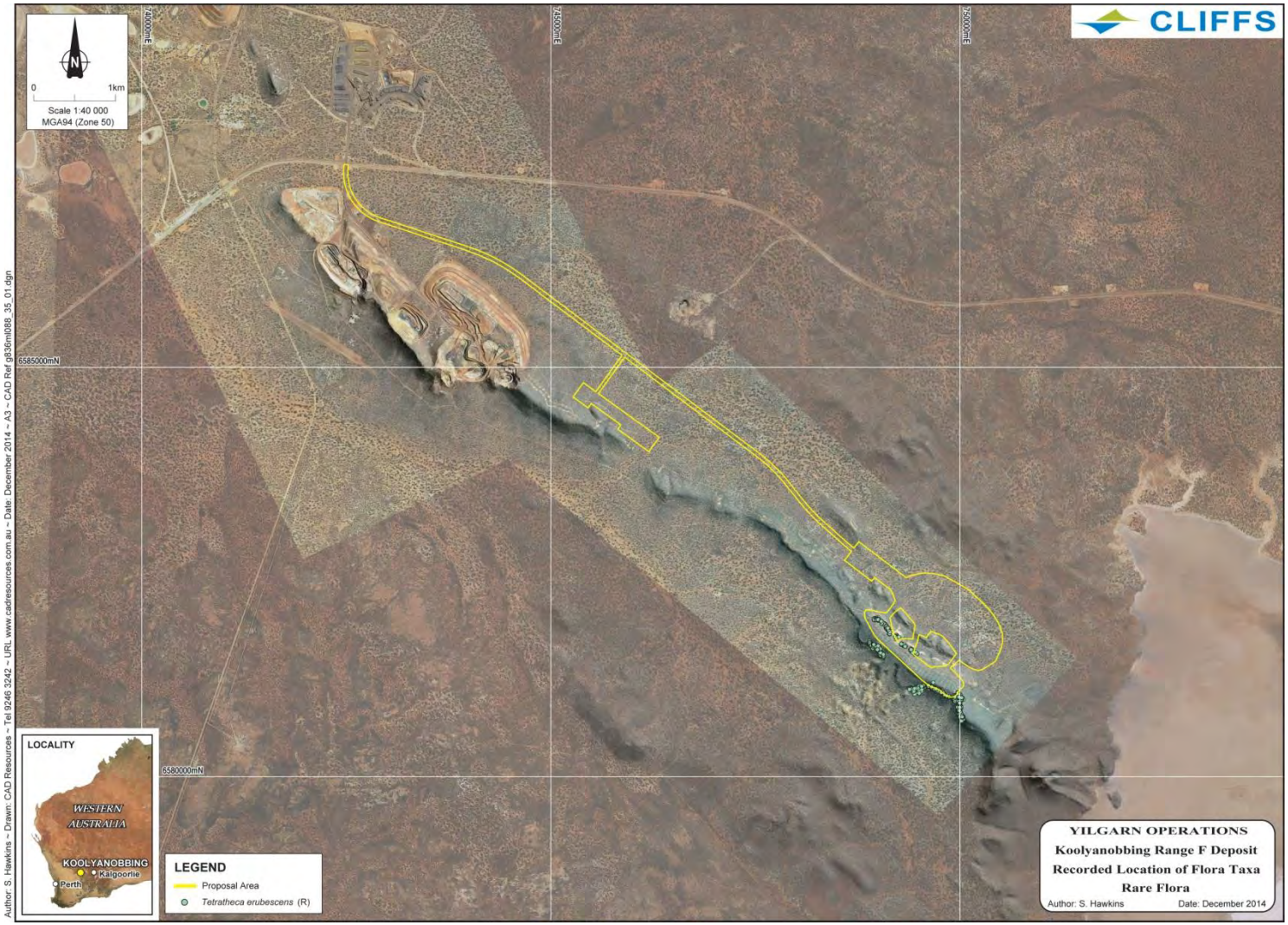

Figure 3-1a Recorded locations of Rare Flora Taxa. The location of the Proposal is identified in yellow. The recorded locations of the 'Rare Flora' (R) taxon *Tetratheca erubescens* in the vicinity of the Proposal are identified. Data Sources: Maia (2013), Woodman (unpublished) and Cliffs (unpublished).

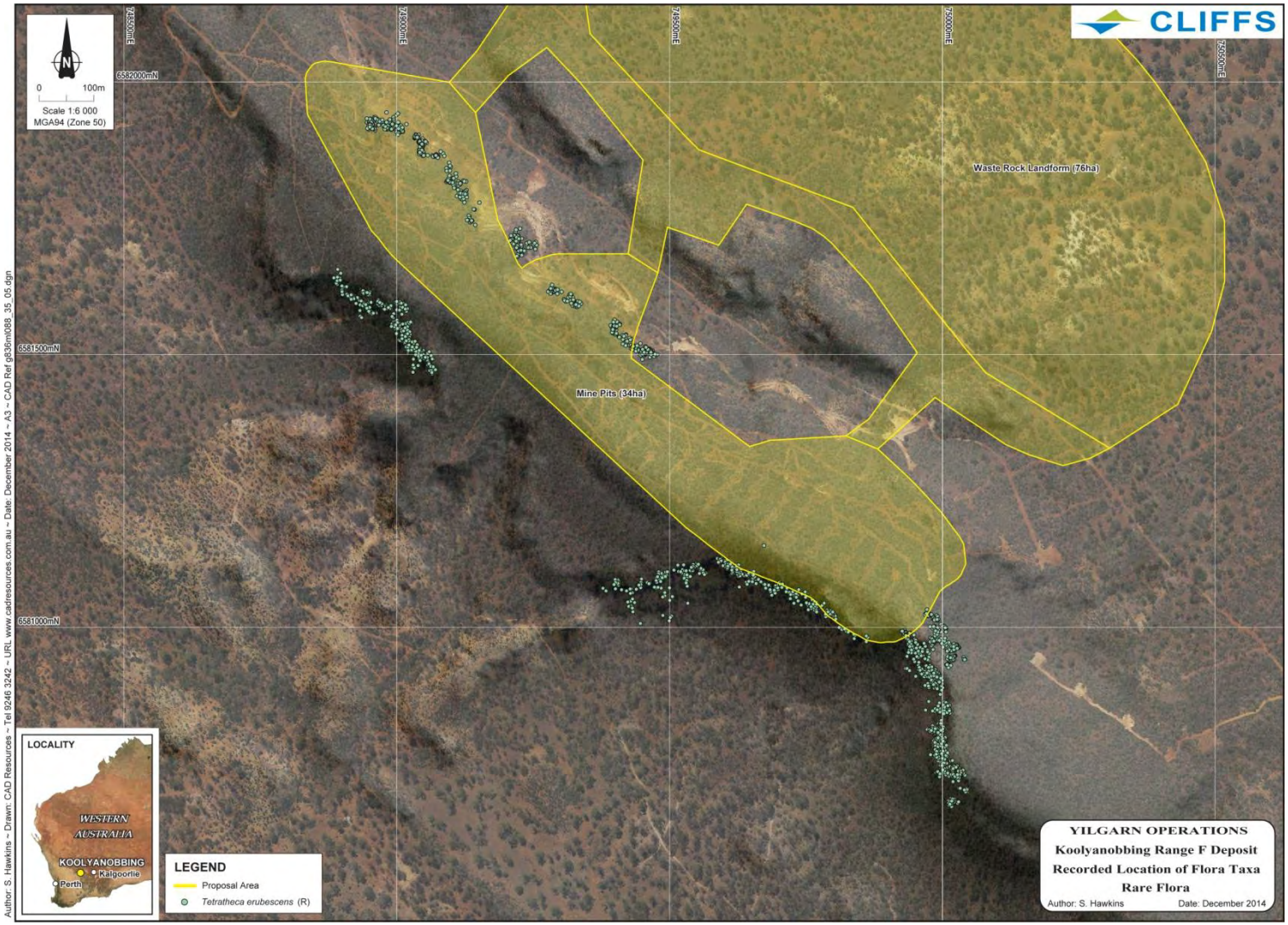

Figure 3-1b Recorded locations of Rare Flora Taxa. The location of the Proposal is identified in yellow. The recorded locations of the 'Rare Flora' (R) taxon *Tetratheca erubescens* in the vicinity of the Proposal are identified. Data Sources: Maia (2013), Woodman (unpublished) and Cliffs (unpublished).

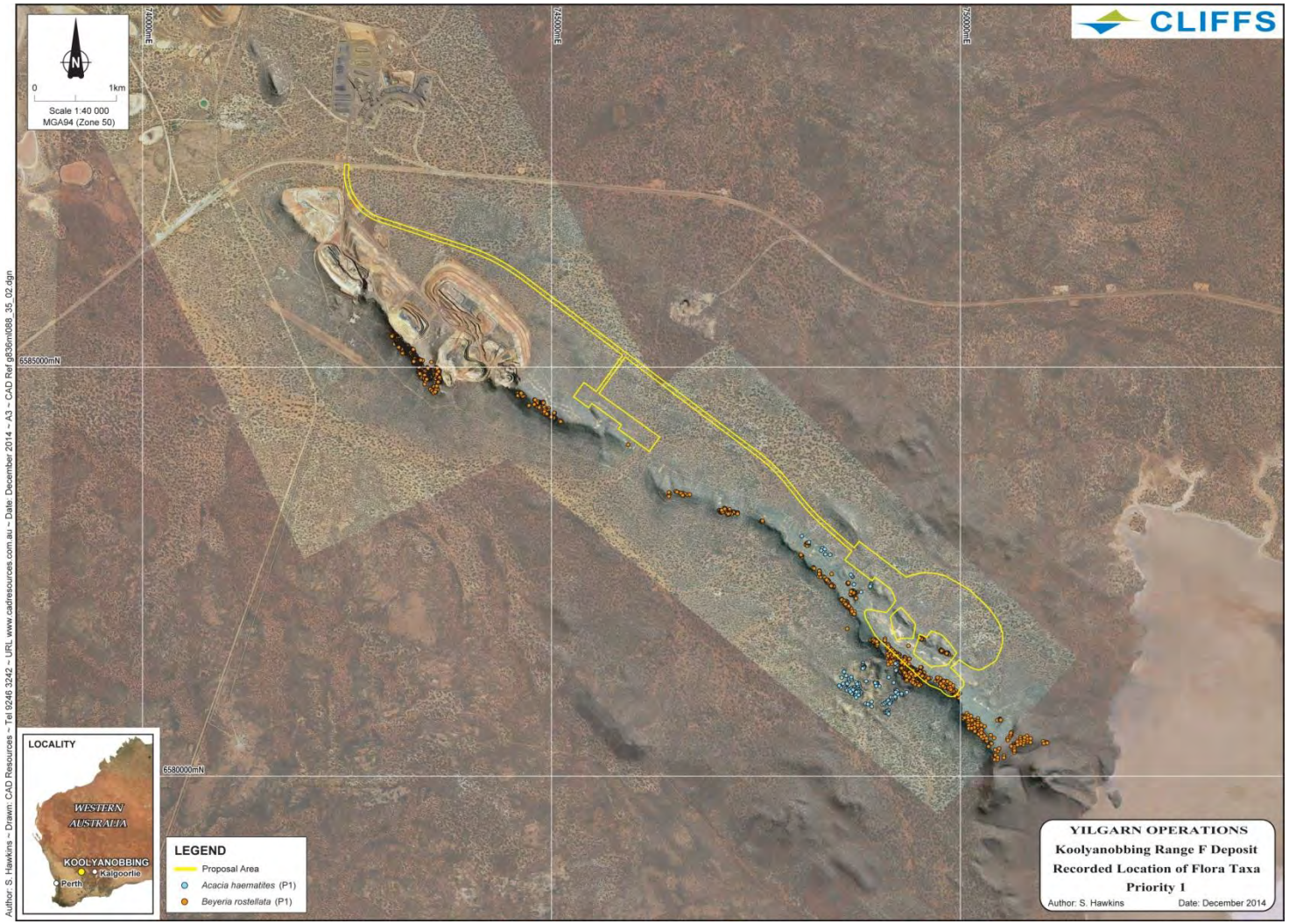

Figure 3-2 Recorded locations of DPaW-classified 'Priority 1' Flora Taxa. The location of the Proposal is identified in yellow. The recorded locations of the Department of Parks and Wildlife-classified 'Priority 1' flora taxa in the vicinity of the Proposal are identified. Data Source: Woodman (2014).

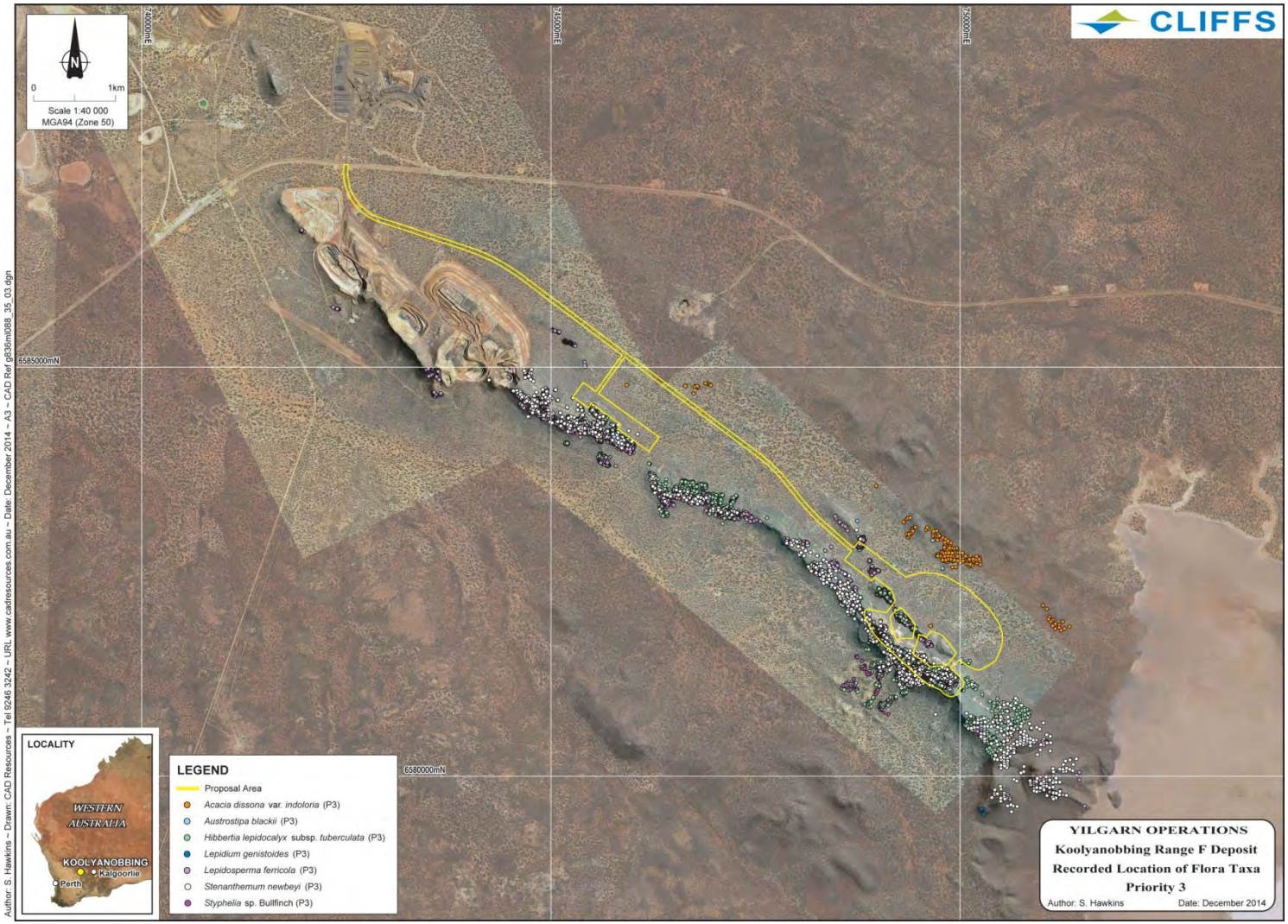

Figure 3-3 Recorded locations of DPaW-classified 'Priority 3' Flora Taxa. The location of the Proposal is identified in yellow. The recorded locations of the Department of Parks and Wildlife-classified 'Priority 3' flora taxa in the vicinity of the Proposal are identified. Data Source: Woodman (2014).

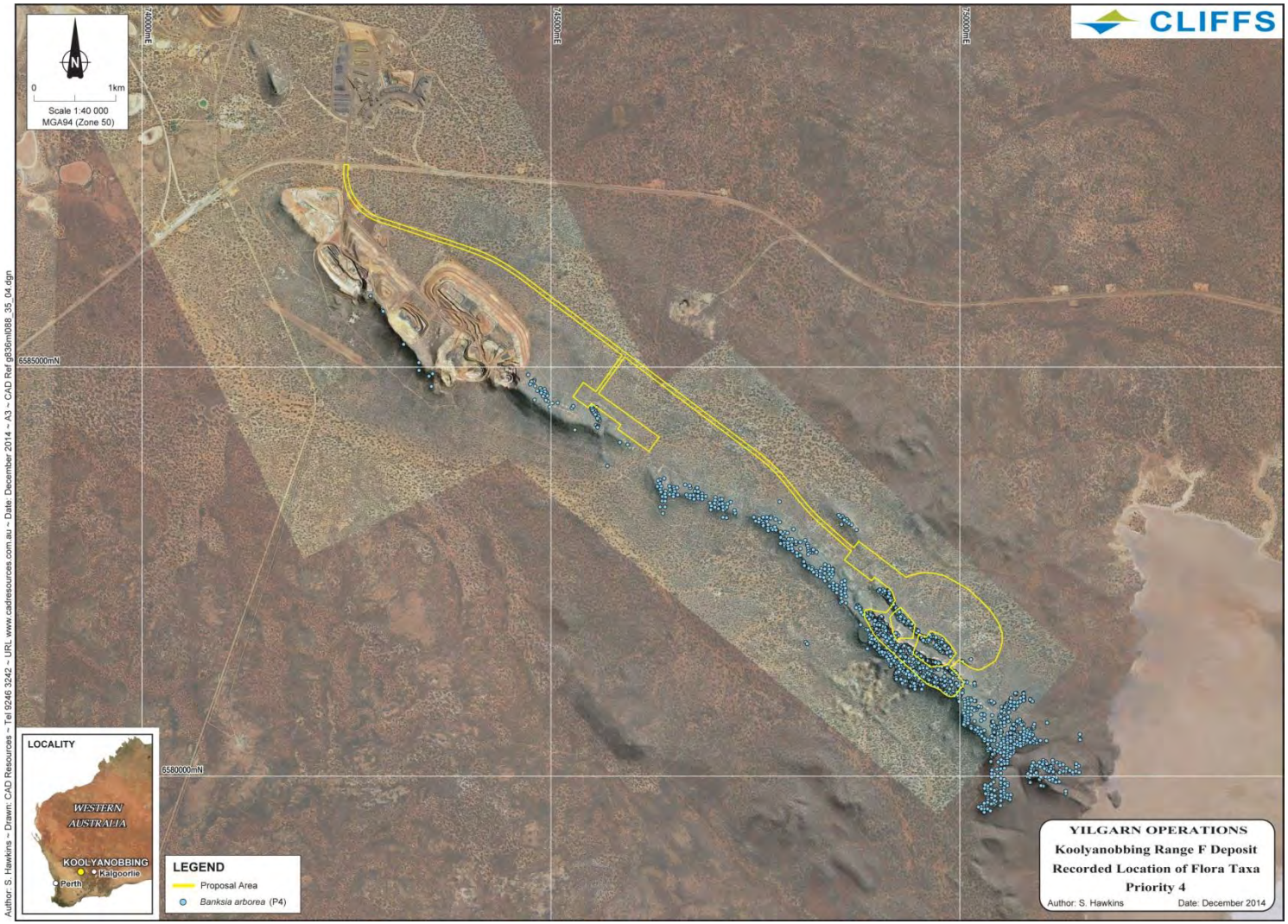

Figure 3-4 Recorded locations of DPaW-classified 'Priority 4' Flora Taxa. The location of the Proposal is identified in yellow. The recorded locations of the Department of Parks and Wildlife-classified 'Priority 4' flora taxa in the vicinity of the Proposal are identified. Data Source: Woodman (2014).

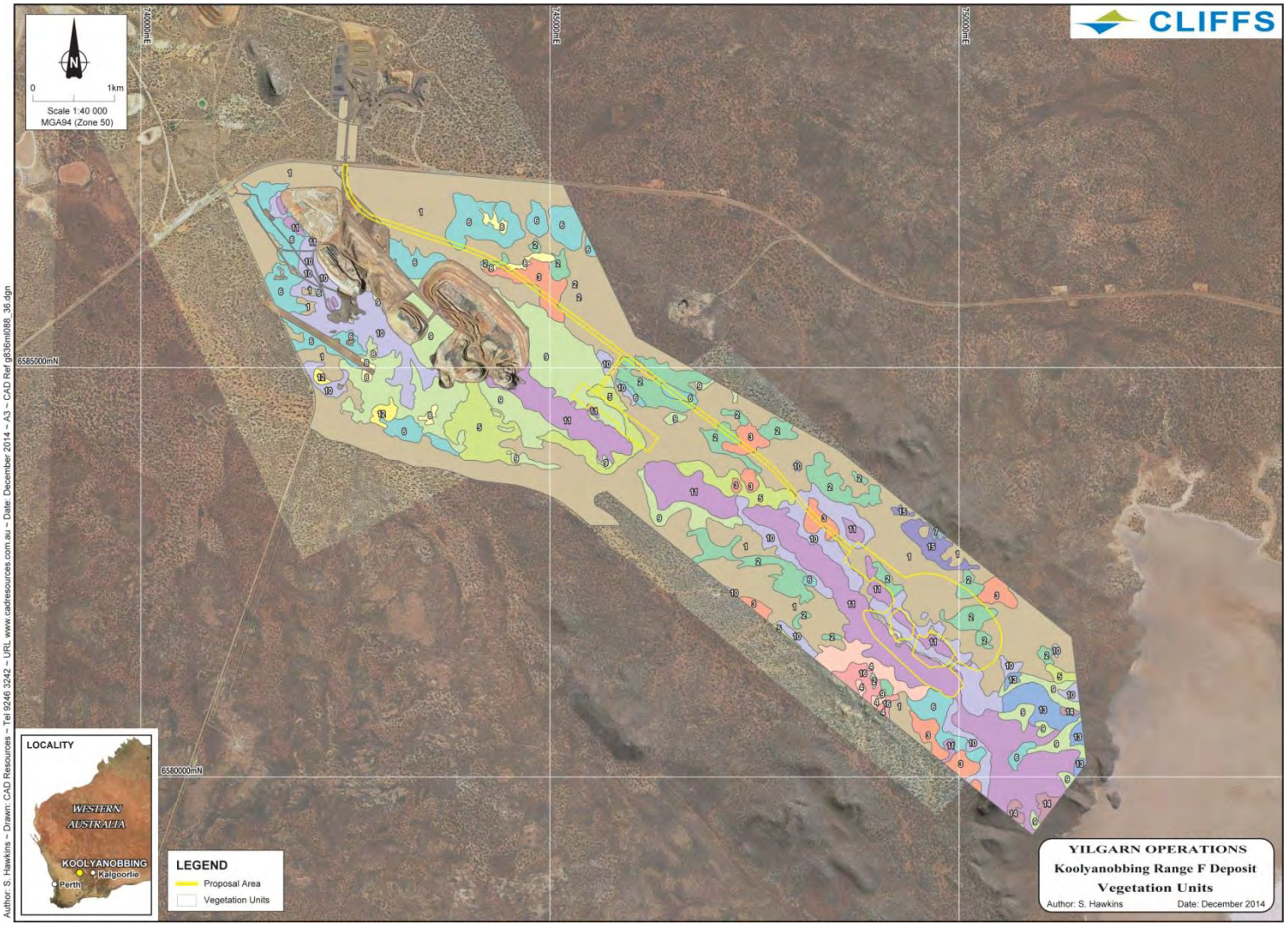

Figure 3-5a Recorded locations of Vegetation Units. The location of the Proposal is identified in yellow. The recorded locations of Vegetation Units in the vicinity of the Proposal are identified. Data Source: Woodman (2014).

Figure 3-5b Recorded locations of Vegetation Units (Legend). A description of the Vegetation Units recorded is provided. Data Source: Woodman (2014).

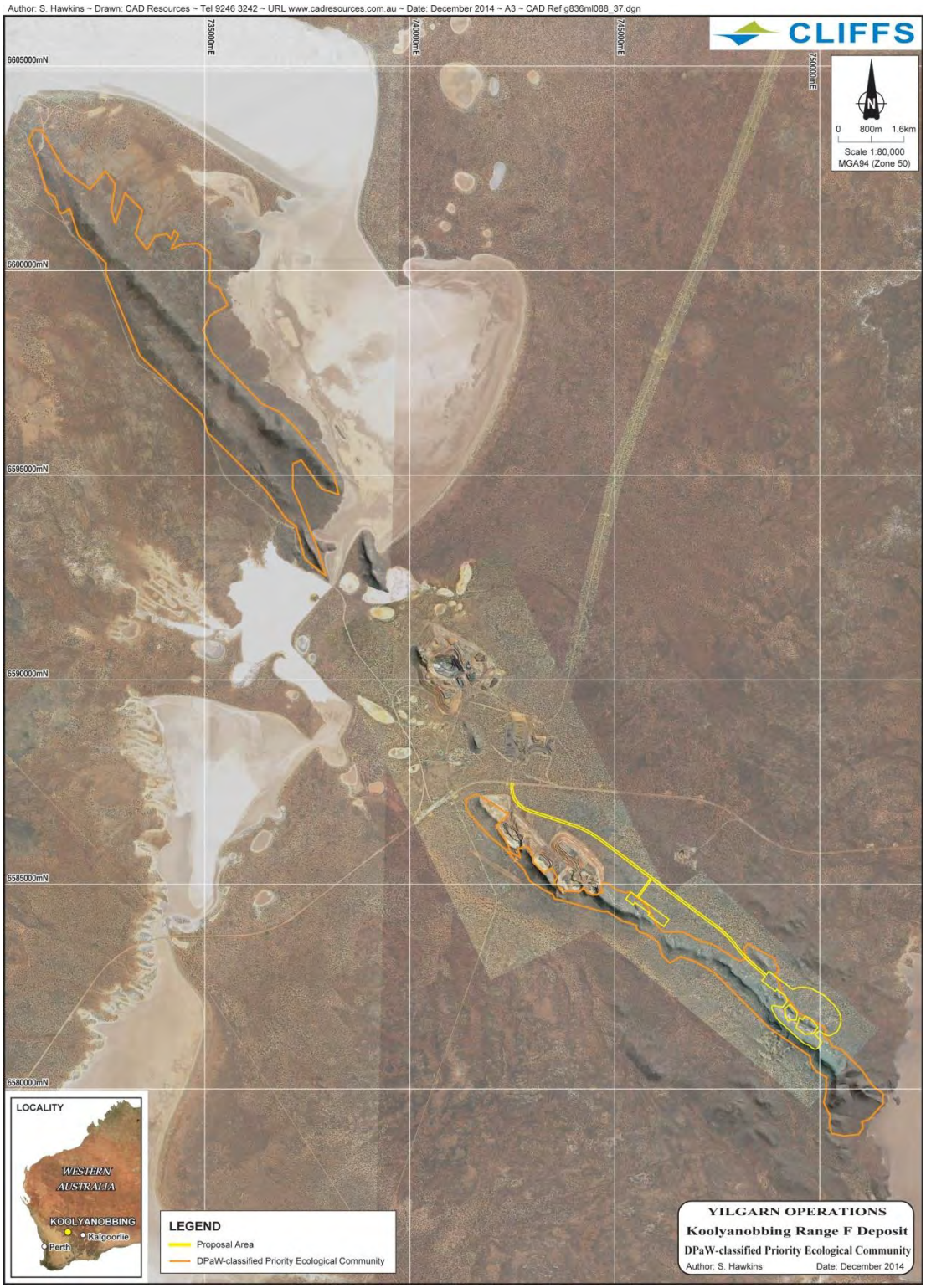

Figure 3-6 Location of DPaW-classified 'Priority Ecological Community'. The location of the Proposal is identified in yellow. The spatial extent (approximately 2,500ha) of the Department of Parks and Wildlife-classified 'Priority Ecological Community' is identified. Data Source: Woodman (2014), DPaW (2013b).

Mitigation Hierarchy

As outlined by Section 1.6 *Mitigation* Hierarchy and Section 1.7 *Consideration of Alternatives*, the Mitigation Hierarchy has been considered to minimise the potential environmental effects of the Proposal to flora values, as summarised below:

Avoid

As many of the recorded environmental values occur broadly across the length of the southern Koolyanobbing Range, there has been limited availability to actively avoid flora values, with minimisation then being the key measure (refer to *Minimise* below). Whilst noting this, the Proposal design has resulted in avoidance of a variety of recorded flora values, which include:

(a) DPaW-classified 'priority' flora taxa *Acacia haematites* (P1), *Austrostipa blackii* (P3), *Lepidium genistoides* (P3) and *Styphelia* sp. Bullfinch (P3); and

(b) Vegetation Units 4, 7, 12, 13, 14, 15, and 16.

Minimise

During mine planning, Cliffs has considered various mine planning layouts that seek to minimise the environmental effect of the Proposal. Principally, these considerations have related to minimising the environmental effect to the flora values of:

(a) *Tetratheca erubescens* (Rare Flora).

Cliffs has modified the optimal economic design of the Mine Pits so as to achieve a significant reduction in the environmental effect to *Tetratheca erubescens*. The optimal economic design (which is not proposed) would result in the removal of up to approximately 47% of the *Tetratheca erubescens* population. By comparison, the proposed design will remove up to 22% of the *Tetratheca erubescens* population (refer to Section 3.1 *Flora*). Whilst this design modification has resulted in a reduction in the recoverable ore resource, Cliffs has undertaken such modifications in recognition of the restricted size and distribution of the *Tetratheca erubescens* population, and with a view towards achieving an appropriate balance between resource recovery and the environmental effects. To provide context, the effect of the Proposal of up to 22% of the *Tetratheca erubescens* population has been minimised to fall within the impact benchmarks established by previous assessment and approvals processes under the *Environmental Protection Act 1986* (WA), *Wildlife Conservation Act 1950* (WA) and the *Mining Act 1978* (WA). For example, the environmental effect of the Proposal is less than the approved effect for Cliffs' Windarling Range mine operations to the related 'Rare Flora' taxon *Tetratheca paynterae* ssp. *paynterae* of 30% removal, and to the 'Rare Flora' taxon *Ricinocarpos brevis* of 37% removal (WA Minister for Environment 2003, 2012, 2014a; DPaW 2003, 2011, 2012; DMP 2003, 2012).

With regards to minimising the environmental effect to other flora values, Cliffs has also considered various mine planning layouts. The optimal mine design has been modified through minimising the spatial extent of the Mine Pits (as an artefact of the process described above for *Tetratheca erubescens*) and by positioning of the Support Infrastructure and the Waste Rock Landform beyond the elevated ridge areas. The modified mine planning layout has resulted in a minimisation of the potential effect to a variety of recorded flora values, which include:

(a) DPaW-classified 'priority' flora taxa *Beyeria rostellata* (P1), *Hibbertia lepidocalyx* ssp. *tuberculata* (P3), *Lepidosperma ferricola* (P3), *Stenanthemum newbeyi* (P3) and *Banksia arborea* (P4);

(b) Vegetation Units 2, 4, 6, 9, 10 and 11; and

(c) DPaW-classified PEC.

Whilst many of the design modifications result in greater operational cost to Cliffs (for example, due to longer haulage distances for ore and waste rock than optimal), Cliffs has adopted these design modifications to minimise the effect to the recorded flora values.

Rehabilitate

At mine closure, following removal of infrastructure, the areas of the Waste Rock Landform and the Support Infrastructure will be rehabilitated with native vegetation of local provenance (noting that rehabilitation of the Mine Pits area will not be possible, as outlined by Section 1.4.1 *Mine Pits*). The rehabilitation works will include on-contour ripping of compacted areas and the respreading of rehabilitation materials (vegetation, topsoil and subsoil) that were removed and stockpiled during initial mine development. The rehabilitation works will be undertaken to meet defined rehabilitation completion criteria.

The rehabilitation works will seek to restore many of the flora values of the Proposal area. For context, a number of flora taxa recorded from the Proposal area have successfully established in rehabilitation works within Cliffs' Yilgarn Operations; thereby providing a degree of confidence as to Cliffs' ability to restore flora values.

An assessment of the proposed rehabilitation of environmental values for the Proposal are described in Section 3.4 *Mine Closure*.

Offset

The key integrating factor of 'Offsets' may be applicable to the environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens*. Whilst the effect to *Tetratheca erubescens* is not expected to change the threat category under the IUCN (2012) criteria (as outlined by Cliffs 2014b, Appendix 3), the effect may still be considered environmentally significant, and for which a consideration of environmental offsets may be applicable.

The strategy for the management of 'Rare Flora' within Western Australia is through the preparation and implementation of Recovery Plans to identify and coordinate flora management, with this process managed by DPaW. Currently, no Recovery Plan exists for *Tetratheca erubescens*. The absence of a Recovery Plan for *Tetratheca erubescens* presents a clear gap in the current management of this taxon, and accordingly, provides an opportunity for Cliffs to contribute to this work through an environmental offset.

Accordingly, Cliffs proposes to offset the effect of the Proposal to *Tetratheca erubescens* by providing financial contributions to assist DPaW with the preparation and implementation of a Recovery Plan for *Tetratheca erubescens*. The proposed environmental offset for the preparation and implementation of a *Tetratheca erubescens* Recovery Plan is described within:

(a) *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

Conceptually, the actions required to prepare and implement a *Tetratheca erubescens* Recovery Plan would include:

(i) Drafting of the *Tetratheca erubescens* Recovery Plan, including identification of existing knowledge (e.g. population information, genetics) and the research priorities considered necessary for restoration; and

(ii) Implementation of the *Tetratheca erubescens* Recovery Plan, focusing initially on the research priorities considered necessary for restoration, and secondly, on implementing on-ground management for restoration (taking into account the outcomes from the research priorities).

This proposed environmental offset aligns to the WA Environmental Offsets Policy (Government of Western Australia 2011) in that it would include a combination of defined research to provide knowledge, and following, on-ground management following the research outcomes (i.e. adaptive management approach). The proposed environmental offset also aligns to DPaW Policy Statement 44 *Wildlife Management Programs* (DPaW 1992), in that DPaW would retain responsibility for the management of 'Rare Flora', and with Cliffs providing resources as a non-Government funding source.

The proposed environmental offset for the preparation and implementation of a *Tetratheca erubescens* Recovery Plan is further described within Section 3.5 *Offsets*, and within the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

With regard to the key environmental factor of 'Flora and Vegetation', as outlined by the assessment of the environmental effect of the Proposal within Section 3.1 *Flora*, Cliffs does not consider there are any other significant residual environmental effects of the Proposal to flora values for which a consideration of environmental offsets would be necessary.

Assessment of Flora

Of the recorded flora values of the southern Koolyanobbing Range, the Proposal coincides with records of:

(a) *Tetratheca erubescens* (Rare Flora);
(b) *Beyeria rostellata* (P1);
(c) *Acacia dissona* var. *indoloria* (P3);
(d) *Hibbertia lepidocalyx* ssp. *tuberculata* (P3);
(e) *Lepidosperma ferricola* (P3);
(f) *Stenanthemum newbeyi* (P3);
(g) *Banksia arborea* (P4).
(h) 9 vegetation units; and
(i) DPaW-classified PEC.

To note with regards to the interpretation of the results for DPaW-classified 'priority' flora taxa, as the flora surveys have focused on the Proposal area (with conversely, a lesser focus on areas beyond the Proposal area), the distribution mapping and population counts for the DPaW-classified 'priority' flora taxa bias towards a greater concentration and proportion occurring within the Proposal area (with conversely, a lesser concentration and proportion identified beyond of the Proposal area). This bias also arises for the regional flora surveys that assist to provide contextual information as to the regional distribution of the DPaW-classified 'priority' flora taxa.

An assessment of the environmental effect of the Proposal to flora values is provided below:

***Tetratheca erubescens* (Rare Flora)**

As outlined by Bull (2007), *Tetratheca erubescens* is a low, tangled shrub growing to 0.5m height and 1.5m width, glaucous to greyish-green in overall appearance, decumbent (draping) to erect with woody stock, with the flowers coloured white with pink flecks to entirely mauve. *Tetratheca erubescens* occupies small rock crevices containing red sandy loam soils on steep ironstone ridge faces and upper rocky slopes. The habitat of

Tetratheca erubescens has been subject to assessment by the Botanic Gardens and Parks Authority (BGPA) (2015). *Tetratheca erubescens* has been recorded only from the southern Koolyanobbing Range (Figure 3-1).

Initial surveys of the *Tetratheca erubescens* population in 2004 estimated a total population of approximately 3,500 individuals (Western Botanical 2004). As a result of *Tetratheca erubescens* being restricted to the southern Koolyanobbing Range, it was recommended that *Tetratheca erubescens* be considered for listing as a DPaW-classified 'priority' flora taxa or as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA).

Tetratheca erubescens was declared as 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA) in June 2006 (WA Minister for Environment 2006). The declaration of *Tetratheca erubescens* as 'Rare Flora' was based upon an assessment by DPaW (2004) using the criteria of IUCN (2001); which is used internationally as the standard for assessing the conservation status of flora and fauna taxa. The DPaW (2004) assessment identified *Tetratheca erubescens* as meeting the category of 'Vulnerable' due to its restricted area of occupancy (<2km^2) and low number of locations (1 location).

The regional distribution of *Tetratheca erubescens* in Western Australia, and images of *Tetratheca erubescens* form, flowers and seed pod are provided in Figure 3-7. Images identifying typical habitat of *Tetratheca erubescens* are provided in Figure 3-8.

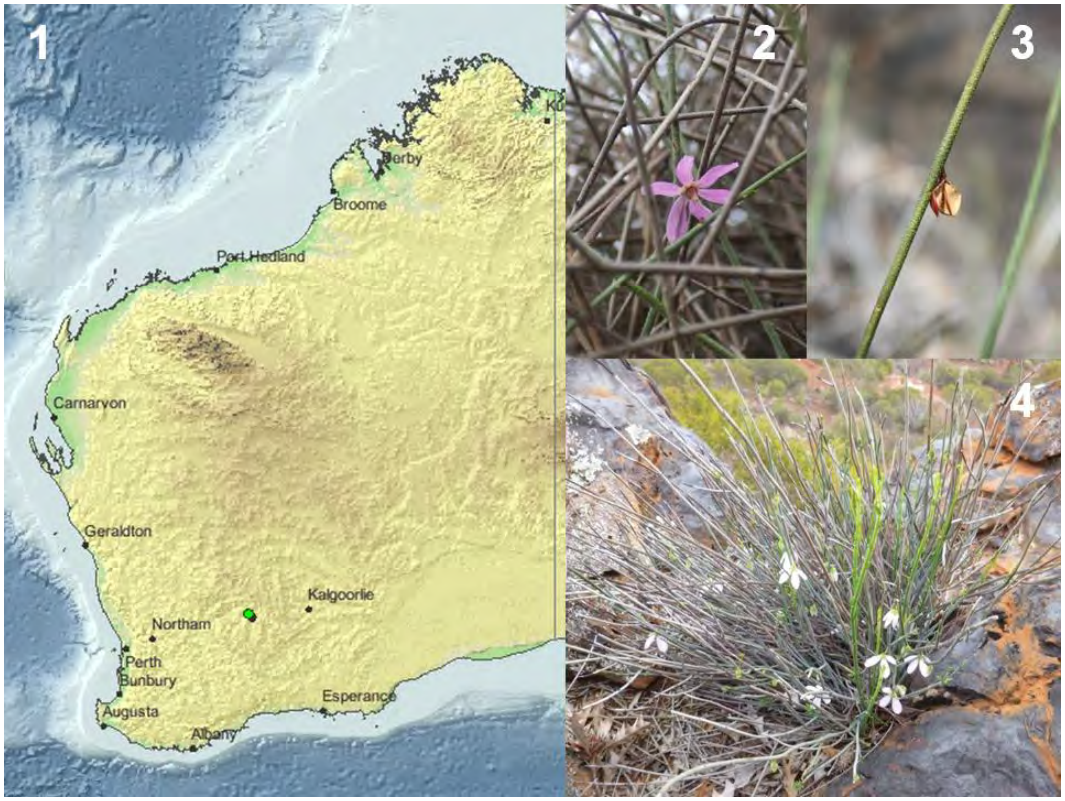

Figure 3-7 ***Tetratheca erubescens*** **(R) Regional Location and Images.** Image 1: The regional distribution of *Tetratheca erubescens* is identified by the green circle (adapted from DPaW 2014d). Image 2: *Tetratheca erubescens* flower in mauve (Globe Environments 2014 unpublished). Image 3: *Tetratheca erubescens* seed pod (Globe Environments 2014 unpublished). Image 4: *Tetratheca erubescens* 'erect' form, showing new growth (green) with white flowers, with retained dead material (grey) also visible (Woodman 2014).

Based on the results of the *Tetratheca erubescens* census outlined in Maia (2013), and subsequent opportunistic records collected by Cliffs (2014 unpublished data) and Woodman (2014 unpublished data), a total population of 6,333 *Tetratheca erubescens* individuals have been recorded at the southern Koolyanobbing Range. As identified by Figure 3-1, *Tetratheca erubescens* was recorded both within and outside of the Proposal area.

The Proposal area for the Mine Pits coincides with part of the *Tetratheca erubescens* population. As the ore resource is fixed (and as such, the location of the Mine Pits is fixed), removal of part of the *Tetratheca erubescens* population by the Proposal is unavoidable. The Mine Pits have been modified as far as practicable to minimise the environmental effect of the Proposal to *Tetratheca erubescens,* with a view towards achieving an appropriate balance between resource development and its environmental effects.

The Mine Pits are expected to directly remove 1,235 individuals (20%) of the *Tetratheca erubescens* population. A further 148 individuals (2%) of *Tetratheca erubescens* occur within a 10m set-back around the outer edge of the Mine Pits that may (or may not) be removed, with the rationale for this set-back as outlined by Section 1.4.1 *Mine Pits*. The Proposal may therefore result in a total potential removal of up to 1,383 individuals (22%) of the *Tetratheca erubescens* population of 6,333 individuals.

Figure 3-8 *Tetratheca erubescens* (R) Habitat. Image 1: *Tetratheca erubescens* habitat, with approximately 24 individuals identified by yellow arrows, with individuals showing the 'erect' form (Globe Environments 2009 unpublished). Image 2: *Tetratheca erubescens* habitat, with approximately 9 individuals identified by yellow arrows, with individuals in the lower part of the image depicting the 'decumbent' (draping) form (Globe Environments 2014 unpublished).

The environmental effect of the Proposal to up to 22% of the *Tetratheca erubescens* population falls within the benchmarks for 'Rare Flora' established by previous assessment and approval processes under the *Environmental Protection Act 1986* (WA) and the *Wildlife Conservation Act 1950* (WA). For example, the environmental effect of the Proposal of 22% is less than the 30% removal approved for the related 'Rare Flora' taxon *Tetratheca paynterae* ssp. *paynterae*, and similarly, less than the 37% removal approved for the 'Rare Flora' taxon *Ricinocarpos brevis*, both which occur at Cliffs' Windarling Range mine operations (WA Minister for Environment 2003, 2012, 2014a).

Cliffs (2014b, Appendix 3) has assessed the environmental effect of the Proposal to *Tetratheca erubescens* using the IUCN (2012) criteria, which are used internationally as the standard for assessing the conservation status of flora and fauna taxa, including by DPaW in its assessment of 'Rare Flora' under the *Wildlife Conservation Act 1950* (WA) (as outlined by DPaW (2004), using the then IUCN (2001) criteria). As outlined by the Cliffs (2014b) assessment, the environmental effect of the Proposal is not expected to change the threatened taxa category of 'Vulnerable' currently applying to *Tetratheca erubescens* under the IUCN (2012) criteria.

Whilst the environmental effect of the Proposal to *Tetratheca erubescens* is not expected to change the current threat category ranking under the IUCN (2012) criteria, the environmental effect to the *Tetratheca erubescens* population of up to 22% may still be considered environmentally significant. The EPA (2015a) key integrating factor of 'Offsets' may therefore be applicable to the Proposal. An assessment of the key integrating factor of 'Offsets' is provided in Section 3.5 *Offsets*.

Consideration has been given to the potential for an environmental effect of the Proposal to the genetic variation and spatial structuring of the *Tetratheca erubescens* population. As outlined by BGPA (2014), the Proposal is expected to have a negligible effect to genetic variation and spatial genetic structuring of the *Tetratheca erubescens* population. As suggested by BGPA (2014), whilst the effect to the genetic variation of *Tetratheca erubescens* is expected to be negligible, security of this genetic variation could be further ensured through the collection of seed material and/or live individuals for subsequent translocation beyond the Proposal area.

Consideration of the potential for an indirect environmental effect of the Proposal to *Tetratheca erubescens* has also been considered. Environmental monitoring undertaken at Cliffs' existing Windarling Range mine operations on the related flora taxon *Tetratheca paynterae* ssp. *paynterae* has demonstrated that the population remains healthy and viable after approximately 10 years of mine operations (monitoring data 2003 (pre-mining) to 2013), with the key outcomes identified including the maintenance of population health, flowering/fruiting continuing, and germination of new individuals within the population (Cliffs 2014c). Review of the monitoring results for dust by Matsuki *et al.* (2015) confirms the mine operations have not resulted in a significant effect to *Tetratheca paynterae* ssp. *paynterae*. The Cliffs (2014c) monitoring comprises measuring plant condition, age-structure, reproductive status, mortality and recruitment within 7 randomly selected quadrats at varying distances from the mine operations, comprising more than 1,100 monitored individuals (representing a subset of approximately 20% of the total extant population of 5,400 individuals). The monitoring program has been developed and revised over time, in consultation with DPaW and external consultants (Data Analysis Australia 2011), to ensure it is capable of statistically detecting any changes in the population. The long-term monitoring of *Tetratheca paynterae* ssp. *paynterae* provides a sound basis on which to conclude that that the Proposal is unlikely to result in a significant

indirect environmental effect to the *Tetratheca erubescens* individuals to be retained at the southern Koolyanobbing Range.

Based on the assessment information above, Cliffs considers that the EPA's objectives for the key environmental factor of 'Flora and Vegetation' can be met, in that the Proposal is not expected to result in a significant detrimental environmental effect to the representation, diversity, viability or ecological function of the *Tetratheca erubescens* population.

As outlined above, an assessment of the applicability of the key integrating factor of 'Offsets' to the flora taxon *Tetratheca erubescens* is provided in Section 3.5 *Offsets.*

***Beyeria rostellata* (P1)**

Beyeria rostellata is a spindly, resinous or viscid shrub to 1.8m high which occurs on ironstone hills (DPaW 2012g cited in Woodman 2014). The regional distribution and images of *Beyeria rostellata* are presented in Figure 3-9.

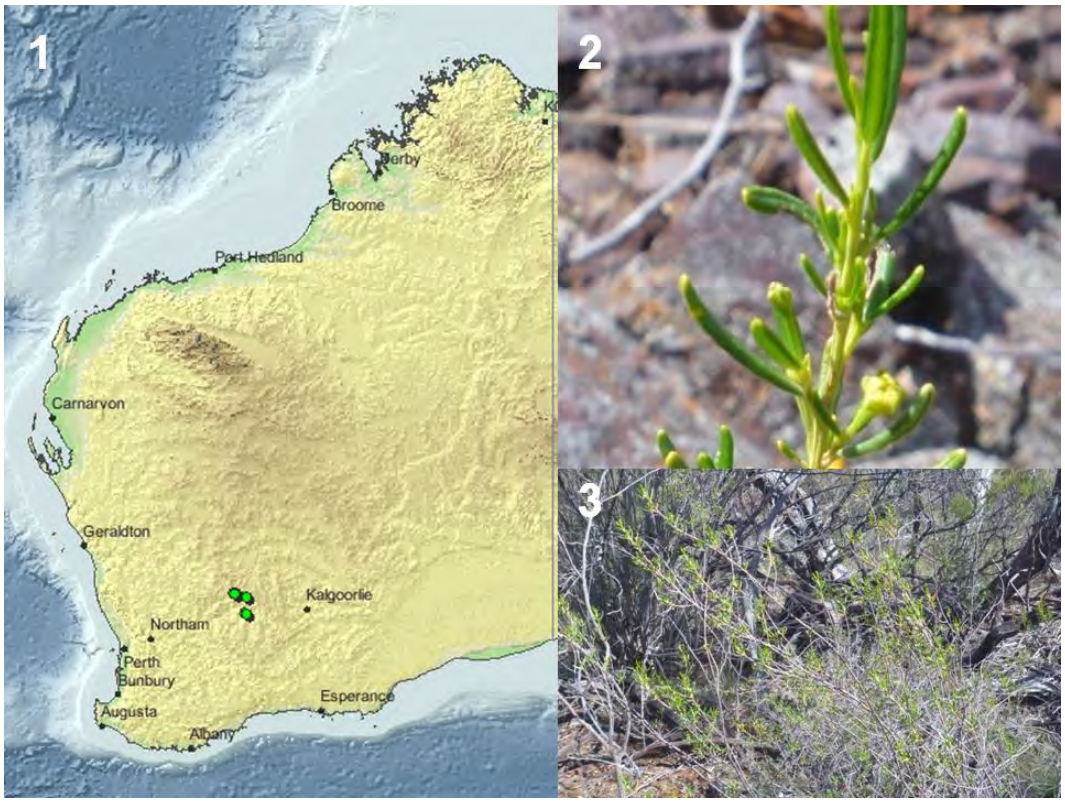

Figure 3-9 *Beyeria rostellata* (P1) Regional Distribution and Images. Image 1: The regional distribution of *Beyeria rostellata* is identified by green circles (adapted from DPaW 2014e). Image 2: *Beyeria rostellata* leaves and stem (Woodman 2014). Image 3: *Beyeria rostellata* form (Woodman 2014).

DPaW (2014e) identifies *Beyeria rostellata* as having a linear distribution of approximately 80km, extending from the Koolyanobbing Range in the south to the Mt Jackson Range in the north, with a population also occurring at the Helena and Aurora Range. The population of *Beyeria rostellata* across all recorded locations has previously been estimated at approximately 60,000 individuals (Western Botanical 2009). Records held by

Cliffs (unpublished data) indicate that approximately 7,200 individuals of *Beyeria rostellata* have previously been removed from the regional population.

As identified by Figure 3-2, *Beyeria rostellata* was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area. The recorded population of *Beyeria rostellata* at the southern Koolyanobbing Range is approximately 16,400 individuals. Records held by Cliffs (unpublished data) indicate approximately 2,800 individuals of *Beyeria rostellata* have previously been removed from the southern Koolyanobbing Range (as part of the 7,200 individuals identified above). The Proposal coincides with approximately 1,700 individuals of *Beyeria rostellata*.

In consideration of the number of individuals of *Beyeria rostellata* that coincide with the Proposal, and having regard to its population size and distribution across the southern Koolyanobbing Range and the broader region, the environmental effect of the Proposal to *Beyeria rostellata* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Beyeria rostellata*.

Acacia dissona var. *indoloria* (P3)

Acacia dissona var. *indoloria* is a shrub to 2m high with yellow flowers that generally occurs on plains and calcareous ridges on brown or red sandy loam or clay loam (DPaW 2014a cited in Woodman 2014). The regional distribution and images of *Acacia dissona* var. *indoloria* are presented in Figure 3-10.

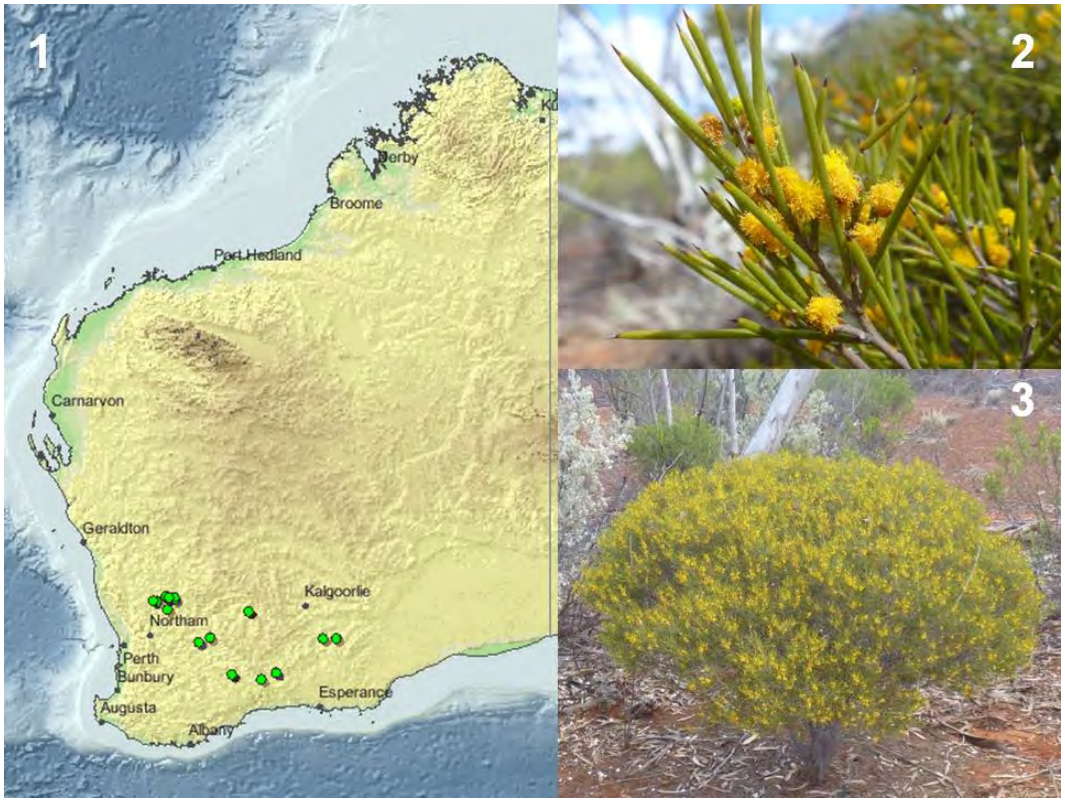

Figure 3-10 *Acacia dissona* var. *indoloria* (P3) Regional Distribution and Images. Image 1: The regional distribution of *Acacia dissona* var. *indoloria* is identified by green circles (adapted from DPaW 2014f). Image 2: *Acacia dissona* var. *indoloria* leaves and flowers (Woodman 2014). Image 3: *Acacia dissona* var. *indoloria* form (Woodman 2014).

DPaW (2014f) identifies *Acacia dissona* var. *indoloria* as having a linear distribution of approximately 550km, extending from east of Kalgoorlie to north of Northam.

As identified by Figure 3-3, *Acacia dissona* var. *indoloria* was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area. The recorded population of *Acacia dissona* var. *indoloria* at the southern Koolyanobbing Range is approximately 800 individuals. The Proposal coincides with 1 individual of *Acacia dissona* var. *indoloria*.

In consideration of the number of individuals of *Acacia dissona* var. *indoloria* that coincide with the Proposal, and having regard to its population size and distribution across the southern Koolyanobbing Range and the broader region, the environmental effect of the Proposal to *Acacia dissona* var. *indoloria* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Acacia dissona* var. *indoloria*.

***Hibbertia lepidocalyx* ssp. *tuberculata* (P3)**

Hibbertia lepidocalyx ssp. *tuberculata* is an erect shrub to 0.8m high with yellow flowers occurring on ironstone ridges and valley slopes on yellow-orange loam with ironstone gravel (DPaW 2014b cited in Woodman 2014). The regional distribution and images of *Hibbertia lepidocalyx* ssp. *tuberculata* are presented in Figure 3-11.

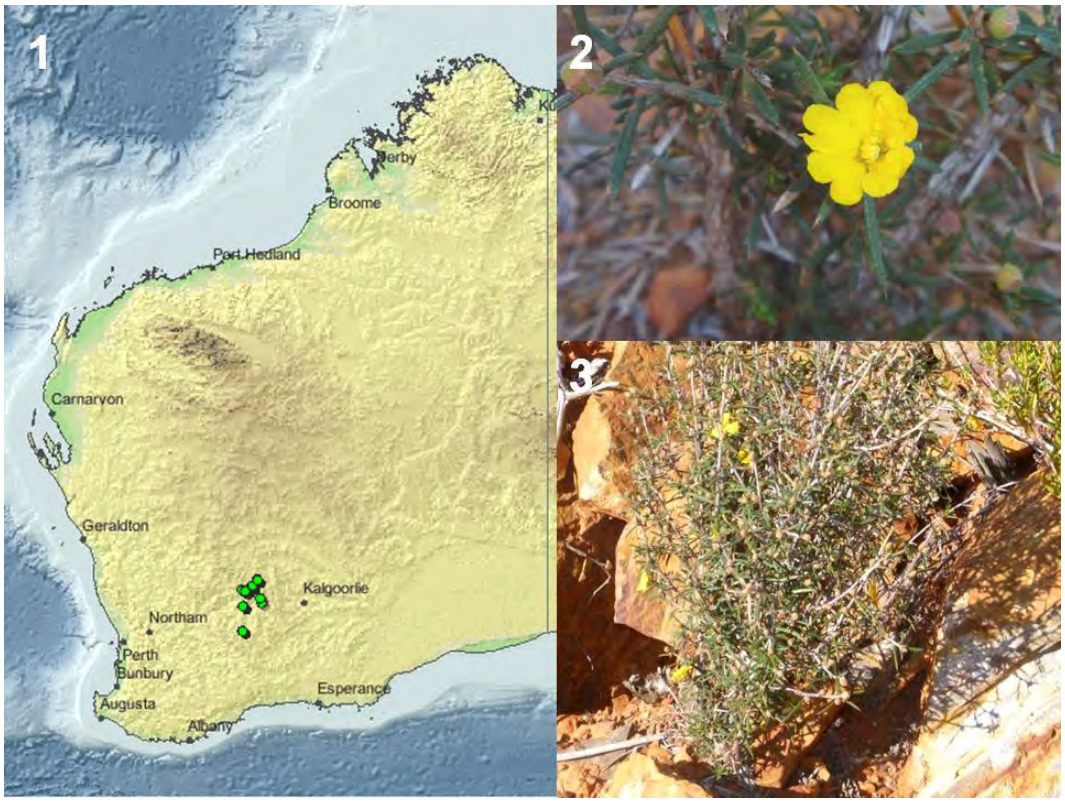

Figure 3-11 *Hibbertia lepidocalyx* ssp. *tuberculata* (P3) Regional distribution and Images. Image 1: The regional distribution of *Hibbertia lepidocalyx* ssp. *tuberculata* is identified by green circles (adapted from DPaW 2014g). Image 2: *Hibbertia lepidocalyx* ssp. *tuberculata* leaves and flower (Woodman 2014). Image 3: *Hibbertia lepidocalyx* ssp. *tuberculata* form (Woodman 2014).

DPaW (2014g) identifies *Hibbertia lepidocalyx* ssp. *tuberculata* as having a linear distribution of approximately 180km, extending from south of Southern Cross to towards the Mt Manning Range. *Hibbertia lepidocalyx* ssp. *tuberculata* has also been recorded in the areas of the Helena and Aurora Range, Mt Jackson Range, Perrinvale Range and the Mt Finnerty Range (Western Botanical 2012a; Ecologia 2013; DPaW 2014g). Records held by Cliffs (unpublished data) indicate more than 90,000 individuals of *Hibbertia lepidocalyx* ssp. *tuberculata* have been recorded regionally.

As identified by Figure 3-3, *Hibbertia lepidocalyx* ssp. *tuberculata* was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area. The recorded population of *Hibbertia lepidocalyx* ssp. *tuberculata* at the southern Koolyanobbing Range is approximately 44,100 individuals. Records held by Cliffs (unpublished data) indicate approximately 1,100 individuals have been previously removed from the southern Koolyanobbing Range. The Proposal coincides with approximately 5,500 individuals of *Hibbertia lepidocalyx* ssp. *tuberculata*.

In consideration of the number of individuals of *Hibbertia lepidocalyx* ssp. *tuberculata* that coincide with the Proposal, and having regard to its population size and distribution across the southern Koolyanobbing Range and the broader region, the environmental effect of the Proposal to *Hibbertia lepidocalyx* ssp. *tuberculata* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Hibbertia lepidocalyx* ssp. *tuberculata*.

***Lepidosperma ferricola* (P3)**

Lepidosperma ferricola is a fine-leaved sedge to 1m high occurring on ironstone ridges, scree slopes and drainage lines (DPaW 2014b cited in Woodman 2014). The regional distribution and an image of *Lepidosperma ferricola* are presented in Figure 3-12.

DPaW (2014h) identifies *Lepidosperma ferricola* as having a linear distribution of approximately 100km, extending from the Koolyanobbing Range in the south to the Die Hardy Range in the north. *Lepidosperma ferricola* has also been recorded at the Helena and Aurora Range, Mt Jackson Range and the Die Hardy Range, as well as from the northern Koolyanobbing Range. Records held by Cliffs (unpublished data) indicate more than 100,000 individuals of *Lepidosperma ferricola* have been recorded regionally.

As identified by Figure 3-3, *Lepidosperma ferricola* was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area. The recorded population of *Lepidosperma ferricola* at the southern Koolyanobbing Range is approximately 63,600 individuals. Records held by Cliffs (unpublished data) indicate approximately 8,300 individuals of *Lepidosperma ferricola* have previously been removed from the southern Koolyanobbing Range. The Proposal coincides with approximately 2,100 individuals of *Lepidosperma ferricola*.

In consideration of the number of individuals of *Lepidosperma ferricola* which coincide with the Proposal, and having regard to its population size and distribution across the southern Koolyanobbing Range and the broader region, the environmental effect of the Proposal to *Lepidosperma ferricola* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Lepidosperma ferricola*.

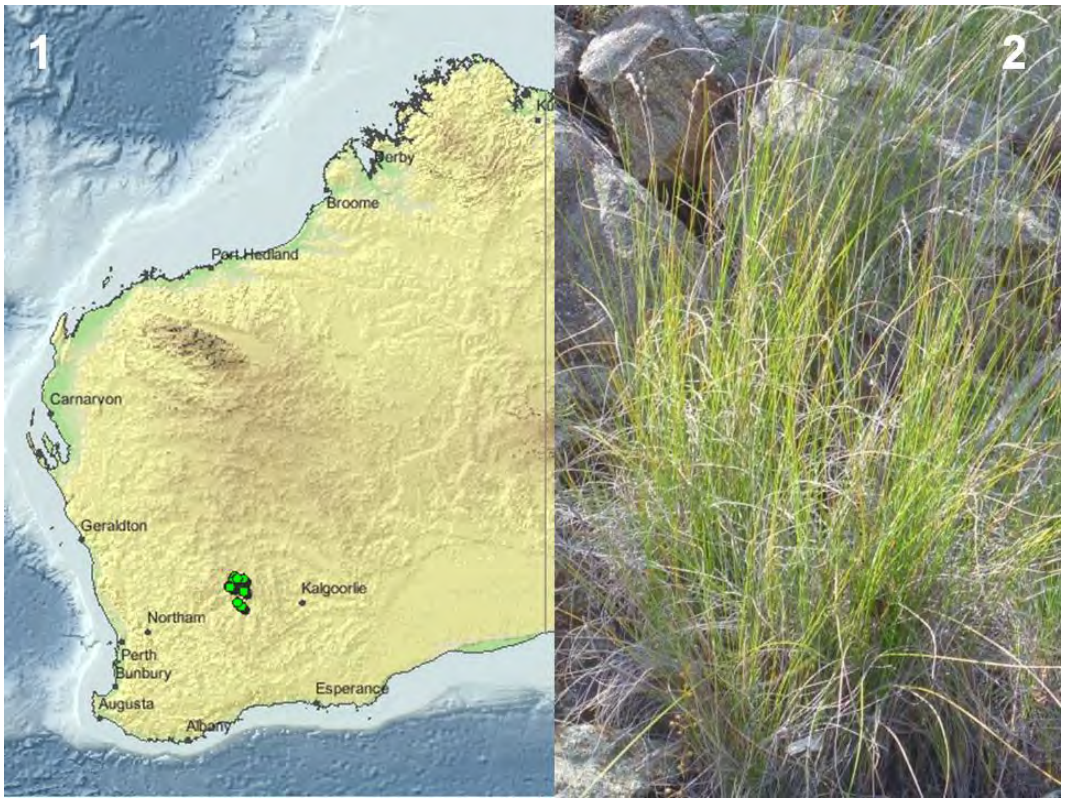

Figure 3-12 *Lepidosperma ferricola* (P3) Regional Distribution and Image. Image 1: The regional distribution of *Lepidosperma ferricola* is identified by green circles (adapted from DPaW 2014h). Image 2: *Lepidosperma ferricola* form (Woodman 2014).

Stenanthemum newbeyi (P3)

Stenanthemum newbeyi is an erect or spreading shrub to 1.6m high occurring on ironstone slopes or lateritic ridges on clayey sand, clay or loam over laterite or ironstone (DPaW 2014a cited in Woodman 2014). The regional distribution and images of *Stenanthemum newbeyi* are presented in Figure 3-13.

DPaW (2014i) identifies *Stenanthemum newbeyi* as having a linear distribution of approximately 100km, extending from the Koolyanobbing Range in the south to the Die Hardy Range in the north. *Stenanthemum newbeyi* has also been recorded at the Mt Jackson Range, Helena and Aurora Range and the Mt Manning Range, as well as from the northern Koolyanobbing Range. Records held by Cliffs (unpublished data) identify more than 120,000 records of *Stenanthemum newbeyi* within the broader region. Records held by Cliffs (unpublished data) indicate approximately 3,100 individuals of *Stenanthemum newbeyi* have previously been removed from the regional population.

As identified by Figure 3-3, *Stenanthemum newbeyi* was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area. The recorded population of *Stenanthemum newbeyi* at the southern Koolyanobbing Range is approximately 18,600 individuals. Records held by Cliffs (unpublished data) indicate approximately 600 individuals of *Stenanthemum newbeyi* have previously been removed from the southern Koolyanobbing Range (as part of the 3,100 individuals identified above). The Proposal coincides with approximately 5,800 individuals of *Stenanthemum newbeyi*.

In consideration of the number of individuals of *Stenanthemum newbeyi* that coincide with the Proposal, and having regard to its population size and distribution across the southern Koolyanobbing Range and the broader region, the environmental effect of the Proposal

to *Stenanthemum newbeyi* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Stenanthemum newbeyi*.

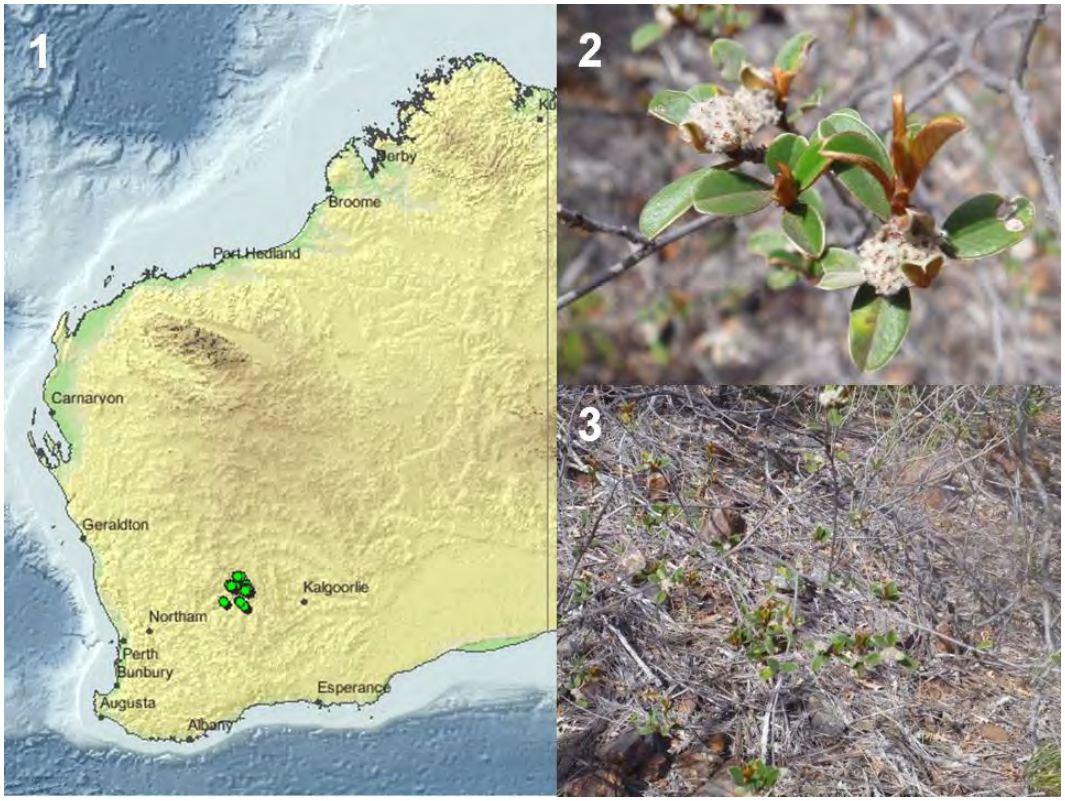

Figure 3-13 ***Stenanthemum newbeyi*** **(P3) Regional Distribution and Images.** Image 1: The regional distribution of *Stenanthemum newbeyi* is identified by green circles (adapted from DPaW 2014i). Image 2: *Stenanthemum newbeyi* flowers and leaves (Woodman 2014). Image 3: *Stenanthemum newbeyi* form (Woodman 2014).

Banksia arborea (P4)

Banksia arborea is a tree or large shrub to 8m high with yellow flowers occurring on ironstone hills on stony loam soils (DPaW 2014b cited in Woodman 2014; Western Botanical 2012b). The regional distribution and images of *Banksia arborea* are presented in Figure 3-14.

DPaW (2014j) identifies *Banksia arborea* as having a linear distribution of approximately 150km[1], extending from the Koolyanobbing Range in the south to the Perrinvale Range to the north. *Banksia arborea* has also been recorded at the Helena and Aurora Range, Die Hardy Range, Mt Elvire, Mt Finnerty Range, Mt Jackson Range, Mt Manning Range, Windarling Range and the Yorkadine Range (Western Botanical 2012b; DPaW 2014j). Records held by Cliffs (unpublished data) identify approximately 29,000 records of *Banksia arborea* within the broader region. Records held by Cliffs (unpublished data) indicate

[1] The record of *Banksia arborea* near Northam identified by DPaW (2014j) may not have been confirmed, and accordingly, has not been included in the linear regional distribution calculation of 150km. If this record of *Banksia arborea* is confirmed, the linear regional distribution would increase to approximately 460km.

approximately 800 individuals have previously been removed from the regional population. To note, *Banksia arborea* has also been recorded in mining rehabilitation sites (waste rock landforms and exploration disturbances) at various sites across Cliffs' Yilgarn Operations (pers. com. J Shepherdson of Cliffs, June 2014).

As identified by Figure 3-4, *Banksia arborea* was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area. The recorded population of *Banksia arborea* at the southern Koolyanobbing Range is approximately 5,500 individuals. Records held by Cliffs (unpublished data) indicate 25 individuals of *Banksia arborea* have previously been removed from the southern Koolyanobbing Range. The Proposal coincides with approximately 1,000 individuals of *Banksia arborea*.

In consideration of the number of individuals of *Banksia arborea* that coincide with the Proposal, and having regard to its distribution across the southern Koolyanobbing Range and the broader region, the environmental effect of the Proposal to *Banksia arborea* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Banksia arborea*.

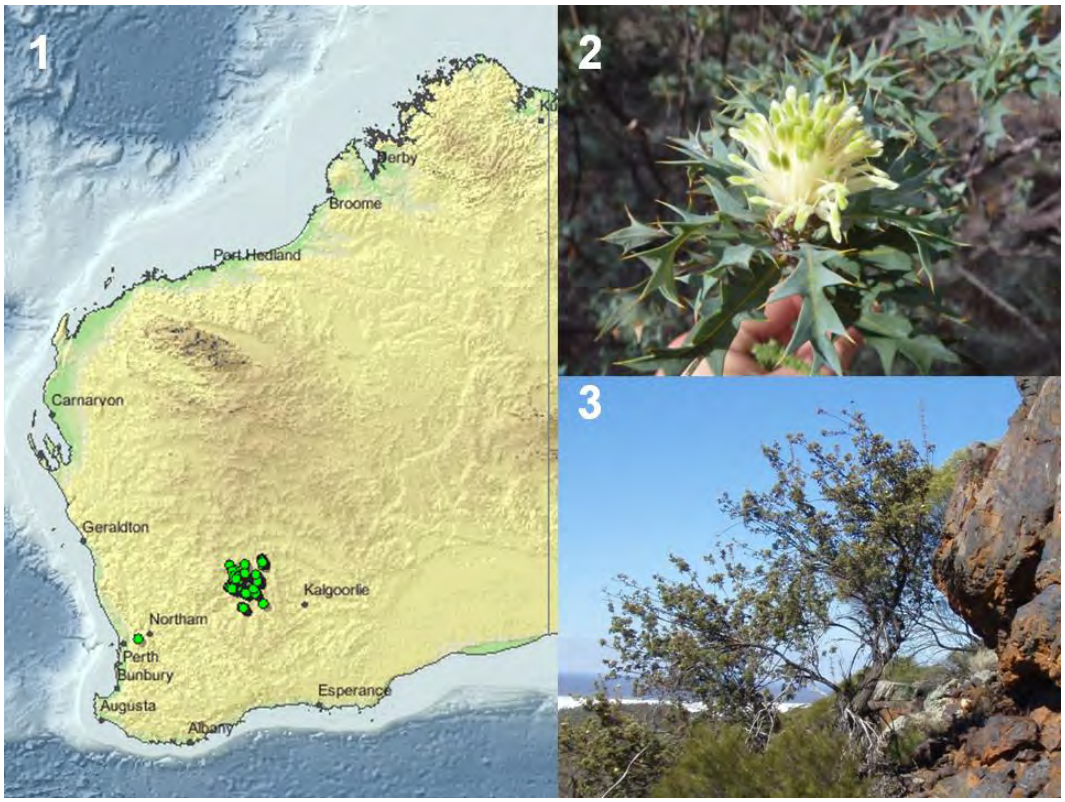

Figure 3-14 ***Banksia arborea*** **(P4) Regional distribution and Images.** Image 1: The regional distribution of *Banksia arborea* is identified by green circles (adapted from DPaW 2014j). Image 2: *Banksia arborea* flowers and leaves (Woodman 2014). Image 3: *Banksia arborea* form (Globe Environments 2009 unpublished).

Table 3-1 provides a summary of the flora taxa coinciding with the Proposal, as well as the distribution of each taxa across the southern Koolyanobbing Range and the broader region.

Table 3-1 Flora Taxa. The flora taxa coinciding with the Proposal area are identified. Records of the number of individuals of each flora taxa recorded within the Proposal area, across the southern Koolyanobbing Range and regionally are identified. Contextual information on the regional distribution of each flora taxa is also provided. Notes: [1] The Mine Pits are expected to directly remove 1,235 individuals of the *Tetratheca erubescens* population, with a further 148 individuals within a 10m set-back around the outer edge of the Mine Pits that may (or may not) be removed (refer Section 1.4.1 *Mine Pits*). Data Sources: DPaW (2014e, 2014f, 2014g, 2014h, 2014i, 2014j), Cliffs (2014b, unpublished data), Ecologia (2013), Western Botanical (2009, 2012a, 2012b), Woodman (2014).

FLORA TAXA	REGIONAL DISTRIBUTION (No.)	SOUTHERN KOOLYANOBBING RANGE (No.)	PROPOSAL AREA (No.)	CONTEXT
Tetratheca erubescens (Rare Flora)	6,333	6,333	1,383[1]	*Tetratheca erubescens* is restricted to the southern Koolyanobbing Range. As outlined by the Cliffs (2014b) assessment, the environmental effect of the Proposal is not expected to change the threatened taxa category of 'Vulnerable' currently applying to *Tetratheca erubescens* under the IUCN (2012) criteria.
Beyeria rostellata (P1)	60,000	16,400	1,700	*Beyeria rostellata* has a linear distribution of approximately 80km, extending from the Koolyanobbing Range in the south to the Mt Jackson Range in the north, with a population also occurring at the Helena and Aurora Range.
Acacia dissona var. *indoloria* (P3)	Not recorded	800	1	*Acacia dissona* var. *indoloria* has a linear distribution of approximately 550km, extending from east of Kalgoorlie to north of Northam.
Hibbertia lepidocalyx ssp. *tuberculata* (P3)	>90,000	44,100	5,500	*Hibbertia lepidocalyx* ssp. *tuberculata* has a linear distribution of approximately 180km, extending from south of Southern Cross to towards the Mt Manning Range. *Hibbertia lepidocalyx* ssp. *tuberculata* has also been recorded in the areas of the Helena and Aurora Range, Mt Jackson Range, Perrinvale Range and the Mt Finnerty Range.
Lepidosperma ferricola (P3)	>100,000	63,600	2,100	*Lepidosperma ferricola* has a linear distribution of approximately 100km, extending from the Koolyanobbing Range in the south to the Die Hardy Range in the north. *Lepidosperma ferricola* has also been recorded at the Helena and Aurora Range, Mt Jackson Range and the Die Hardy Range, as well as from the northern Koolyanobbing Range.
Stenanthemum newbeyi (P3)	>120,000	18,600	5,800	*Stenanthemum newbeyi* has a linear distribution of approximately 100km, extending from the Koolyanobbing Range in the south to the Die Hardy Range in the north. *Stenanthemum newbeyi* has also been recorded at the Mt Jackson Range, Helena and Aurora Range and the Mt Manning Range, as well as from the northern Koolyanobbing Range.
Banksia arborea (P4)	>29,000	5,500	1,000	*Banksia arborea* has a linear distribution of approximately 150km, extending from the Koolyanobbing Range in the south to the Perrinvale Range to the north. *Banksia arborea* has also been recorded at the Helena and Aurora Range, Die Hardy Range, Mt Elvire, Mt Finnerty Range, Mt Jackson Range, Mt Manning Range, Windarling Range and the Yorkadine Range.

Other Native Flora Taxa

Flora surveys undertaken in the area of the southern Koolyanobbing Range identified approximately 250 flora taxa (Woodman 2014). Accordingly, the Proposal can also be expected to remove a variety of other flora taxa which are not of listed conservation significance.

Generally, such other flora taxa are not of conservation significance due to their population sizes and broad regional distributions. In this context, the environmental effect of the Proposal to other flora taxa is not expected to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of the other flora taxa.

Introduced Flora

Flora surveys undertaken in the area of the southern Koolyanobbing Range identified 12 introduced flora taxa (Woodman 2014). None of the introduced flora taxa are Declared Pests under the *Biosecurity and Agriculture Management Act 2007* (WA) or listed as a Weed of National Significance (Australian Weeds Committee 2012).

The presence of introduced flora taxa is considered most likely from a combination of introduction and spread primarily from pastoral and mining pursuits (both which have occurred at the southern Koolyanobbing Range for around half a century), with a lesser contribution from other sources such as by wind, birds and irregular visitors to the area.

Introduced flora can be effectively managed through standard mine hygiene processes, which can commonly include weed spraying and procedures to control vehicle and personnel movements within weed infested areas. In this context, the environmental effect of the Proposal to introduced flora taxa is not expected to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the environment from introduced flora.

Potential Indirect Effects

The potential for indirect effects to native flora taxa located beyond the Proposal area, such as from dust or changed hydrology, also requires consideration.

As outlined above, environmental monitoring undertaken at Cliffs' existing Windarling Range mine operations on the flora taxon *Tetratheca paynterae* ssp. *paynterae* has demonstrated that the population remains healthy and viable after approximately 10 years of mine operations (monitoring data 2003 (pre-mining) to 2013), with the key outcomes identified including the maintenance of population health, flowering/fruiting continuing, and germination of new individuals within the population (Cliffs 2014c). Whilst such monitoring has recorded the presence of dust on flora in proximity to the mine operations, the environmental effects of such dust deposition do not appear to result in a significant environmental effect; even at locations in close proximity to the mine operations. As such, it is considered unlikely that the Proposal will result in a significant indirect environmental effect to native flora taxa located beyond the Proposal area from dust.

The potential for the Proposal to result in a significant environmental effect to native flora from changed hydrology is considered to be limited; primarily from the low rainfall of the region (refer to Section 2.1 *Climate*) resulting in only limited surface water flows. The

Proposal infrastructure has been designed to control surface water drainage; such that significant uncontrolled surface water discharges from the Proposal are not anticipated. Any potential effect of the Proposal to surface water drainage is therefore expected to be localised.

Following from the above, it is expected that the EPA's objectives for the key environmental factor of 'Flora and Vegetation' can be met, noting the Proposal is not expected to result in a significant detrimental indirect effect to the representation, diversity, viability or ecological function of native flora taxa.

Assessment of Vegetation

The Proposal will be implemented within an area of 211ha, comprising approximately 194ha of land which contains native vegetation, and 17ha of previously cleared land.

As identified by Figure 3-5, 16 vegetation units have been recorded across the southern Koolyanobbing Range. The Proposal coincides with 9 vegetation units, all of which have distributions across the southern Koolyanobbing Range beyond the area of the Proposal. As identified by Table 3-2, the Proposal coincides with ≤10% of the mapped area for 8 vegetation units (vegetation units 1, 3, 5, 6, 8, 9, 10, 11), and <20% by area for the remaining 1 vegetation unit (vegetation unit 2). Whilst noting the greater removal of 1 vegetation unit, the >80% of this vegetation unit to be retained will cover a spatial area of approximately 140ha, with this vegetation unit positioned on the plains surrounding the southern Koolyanobbing Range (i.e. not restricted to ridges of the southern Koolyanobbing Range).

Having regard to the proportional area of each vegetation unit coinciding with the Proposal, and the distribution of each vegetation unit across the southern Koolyanobbing Range, the environmental effect of the Proposal to vegetation units is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of vegetation units.

The approved Koolyanobbing Range mine operations cover a spatial area of approximately 790ha, with the broader Yilgarn Operations covering a spatial area of approximately 2,650ha. The Proposal will have the effect of increasing the total area of native vegetation clearing at the Koolyanobbing Range by approximately 27%, which equates to an area increase of approximately 8% across the broader Yilgarn Operations.

As identified by Figure 3-6, the Proposal coincides with part of the DPaW-classified PEC '*Koolyanobbing vegetation complexes (banded ironstone formation)*'. This DPaW-classified PEC does not correlate to any defined environmental values (e.g. vegetation unit boundaries), and as such, the significance of any environmental effect of the Proposal to the PEC can only be considered in terms of the proportion of the land area of the Proposal that coincides with the DPaW-classified PEC. The Proposal coincides with approximately 69ha (3%) of the approximately 2,500ha DPaW-classified PEC. The approved Koolyanobbing Range mine operations coincide with approximately 25ha (1%) of the DPaW-classified PEC.

Having regard to the broad extent of the DPaW-classified PEC across both the southern and northern Koolyanobbing Range, the Proposal is not expected to result in a significant effect to the DPaW-classified PEC. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of the PEC.

Table 3-2 Vegetation Units. The Vegetation Units coinciding with the Proposal area are identified. The spatial area of each Vegetation Unit mapped across the southern Koolyanobbing Range and the spatial area within the Proposal area are also identified. Data Source: Woodman (2014).

VEGETATION UNIT	SOUTHERN KOOLYANOBBING RANGE AREA (ha)	PROPOSAL AREA (ha)
Vegetation Unit 1: Mid woodland of mixed species including *Eucalyptus salmonophloia, Eucalyptus corrugata, Eucalyptus salubris, Eucalyptus longicornis* and *Eucalyptus vittata* over tall to mid sparse shrubland dominated by *Atriplex nummularia, Exocarpos aphyllus, Eremophila scoparia, Scaevola spinescens* and *Senna artemisioides* subsp. *filifolia* over low sparse shrubland dominated by *Atriplex vesicaria, Maireana trichoptera, Olearia muelleri, Sclerolaena diacantha* and *Rhagodia drummondii* on red, brown, orange or red-brown clay, clay loam and sandy loam with dolerite, quartz and ironstone stones on plains, flats and low rises.	1,028ha	94ha (9%)
Vegetation Unit 2: Mid to low woodland dominated by *Eucalyptus ravida* and *Eucalyptus celastroides* subsp. *celastroides* over tall to mid sparse shrubland dominated by *Atriplex nummularia* and *Eremophila scoparia* over low sparse shrubland dominated by *Atriplex vesicaria, Sclerolaena diacantha, Maireana trichoptera, Maireana georgei* and *Rhagodia drummondii* on red, brown, orange or red-brown clay with dolerite, quartz and ironstone stones on plains and flats.	166ha	27ha (16%)
Vegetation Unit 3: Mid woodland dominated by *Eucalyptus longicornis* and *Eucalyptus vittata* over low open mallee woodland dominated by *Eucalyptus celastroides* subsp. *celastroides* over tall to mid sparse shrubland dominated by *Atriplex nummularia, Eremophila scoparia, Exocarpos aphyllus, Eremophila interstans* subsp. *interstans* and *Halgania andromedifolia* over low sparse shrubland dominated by *Atriplex vesicaria* and *Olearia muelleri* on red, brown, orange or red-brown clay with dolerite and quartz stones on low rises.	91ha	6ha (7%)
Vegetation Unit 5: Mid to low woodland of *Eucalyptus vittata* over mid sparse shrubland dominated by *Atriplex nummularia, Eremophila oppositifolia* subsp. *angustifolia* and *Eremophila caperata* over low sparse shrubland of mixed species including *Olearia muelleri, Acacia erinacea, Maireana georgei* and *Ptilotus obovatus* var. *obovatus* on red or red-brown clay with ironstone and quartz stones on lower slopes of ranges and low rises.	112ha	7ha (6%)
Vegetation Unit 6: Mid to low mallee woodland of *Eucalyptus corrugata* and/or *Eucalyptus vittata* over tall to mid open shrubland dominated by *Exocarpos aphyllus, Senna artemisioides* subsp. *filifolia* and *Eremophila interstans* subsp. *interstans* over low sparse shrubland dominated by *Olearia muelleri, Acacia erinacea, Dodonaea stenozyga* , and *Ptilotus obovatus* var. *obovatus* on brown or red-brown clay loam with dolerite stones and occasionally dolerite outcropping on lower slopes of ranges and low rises.	194ha	3ha (1%)

VEGETATION UNIT	SOUTHERN KOOLYANOBBING RANGE AREA (ha)	PROPOSAL AREA (ha)
Vegetation Unit 8: Low isolated mallees of *Eucalyptus longissima* or *Eucalyptus loxophleba* subsp. *lissophloia* over tall shrubland dominated by *Acacia* sp. narrow phyllode (B.R. Maslin 7831) and occasionally *Acacia tetragonophylla* over mid open shrubland dominated by *Dodonaea inaequifolia* and *Scaevola spinescens* over low isolated shrubs of mixed species on red or red-brown clay with ironstone stones on low rises.	16ha	<1ha (2%)
Vegetation Unit 9: Low open mallee woodland dominated by *Eucalyptus loxophleba* subsp. *lissophloia* over tall open to sparse shrubland of mixed species dominated by *Acacia* sp. Mt Jackson (B. Ryan 176), *Acacia* sp. narrow phyllode (B.R. Maslin 7831), *Acacia tetragonophylla* and *Allocasuarina acutivalvis* subsp. *acutivalvis* over mid open shrubland dominated by *Scaevola spinescens, Eremophila oppositifolia* subsp. *angustifolia, Grevillea zygoloba, Dodonaea inaequifolia* and *Philotheca brucei* subsp. *brucei* over low sparse shrubland dominated by *Dodonaea microzyga* var. *acrolobata, Olearia pimelioides, Prostanthera semiteres* subsp. *semiteres* and *Olearia muelleri* on red, red-brown, orange-brown or brown clay or clay-loam with ironstone stones, occasionally with banded ironstone outcropping, on mid to lower slopes of ranges and low rises.	277ha	10ha (4%)
Vegetation Unit 10: Tall open shrubland dominated by *Acacia* sp. Mt Jackson (B. Ryan 176), *Acacia tetragonophylla* and occasionally *Santalum spicatum* over mid open shrubland dominated by *Dodonaea inaequifolia, Scaevola spinescens, Philotheca brucei* subsp. *brucei* and *Eremophila clarkei* over low sparse shrubland dominated by *Ptilotus obovatus* var. *obovatus, Olearia pimelioides* and *Rhagodia drummondii* on red, red-brown or brown clay or clay-loam with ironstone stones, often with banded ironstone outcropping, on mid to lower slopes of ranges.	235ha	18ha (8%)
Vegetation Unit 11: Low isolated trees and mallees of *Eucalyptus longissima, Banksia arborea* and *Brachychiton gregorii* over tall shrubland to open shrubland dominated by *Acacia* sp. Mt Jackson (B. Ryan 176) and *Allocasuarina eriochlamys* subsp. *eriochlamys* or *Allocasuarina acutivalvis* subsp. *acutivalvis* over mid open to sparse shrubland dominated by *Philotheca brucei* subsp. *brucei, Grevillea zygoloba, Eremophila clarkei, Scaevola spinescens* and *Leucopogon* sp. Clyde Hill (M.A. Burgman 1207) over low sparse shrubland of mixed species including *Olearia humilis, Prostanthera althoferi* subsp. *althoferi, Hibbertia exasperata* and *Dianella revoluta* var. *divaricata* on red, red-brown or brown clay or clay-loam with ironstone stones, usually with banded ironstone outcropping, on the crests and slopes of ranges.	318ha	28ha (9%)
Cleared land	-	17ha

3.1.5 Environmental Management

Cliffs' mine operations are undertaken in accordance with an Environmental Policy (Cliffs Natural Resources 2014, Appendix 1), which outlines Cliffs' overarching objectives of environmental protection and continual improvement in environmental performance.

The Environmental Policy is implemented through Cliffs' EMS, which includes EMPs for the management of key environmental aspects. Cliffs' EMS for its Yilgarn Operations is certified and maintained to international standard AS/NZS ISO 14001:2004 (NCSI 2013, Appendix 2).

Cliffs' EMS contains a series of EMPs to ensure the potential environmental effects of mine operations are controlled and monitored to an acceptable standard. These EMPs address the management of a range of environmental aspects, including flora and vegetation. The management actions contained within the EMPs have been refined over a period of approximately 10 years, incorporating review and advice from both State and Commonwealth environmental and mining authorities as part of the various government assessment and approvals processes.

Compliance with the EMS and EMPs is regularly audited both internally and by independent third parties in order to ensure compliance, and to identify any changes that may improve the environmental outcomes. The regular auditing of the EMS and EMPs is consistent with Cliffs' Environmental Policy for evaluation of performance against environmental targets. Cliffs has a strong environmental compliance record, with Cliffs' remaining in compliance with all conditions of environmental and mining approvals granted under the *Environmental Protection Act 1986* (WA), *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Mining Act 1978* (WA) and the *Wildlife Conservation Act 1950* (WA).

For the key environmental factors of 'Flora and Vegetation', Cliffs considers the environmental effects of the Proposal can be appropriately controlled and managed through the preparation and implementation of a:

(a) Flora and Vegetation Management Plan.

The specific management aspects and controls to be addressed within the proposed Flora and Vegetation Management Plan are outlined by Table 3-3.

The preparation of the Flora and Vegetation Management Plan will be informed by Cliffs' experience in managing flora at the approved Yilgarn Operations, particularly at the Windarling Range where the 'Rare Flora' taxa *Tetratheca paynterae* ssp. *paynterae* and *Ricinocarpos brevis* occur in close proximity to the mine operations. The long-term flora monitoring undertaken to date, in particular for *Tetratheca paynterae* ssp. *paynterae,* provide a sound basis on which to conclude that the potential environmental effects to 'Rare Flora' can be appropriately managed.

The management objective for the Flora and Vegetation Management Plan will be to avoid or minimise environmental effects on conservation significant flora and vegetation which may result from Cliffs' activities. The performance indicator for implementation of the Flora and Vegetation Management Plan will be to achieve no significant environmental effect on the health and abundance of conservation significant flora outside of the approved mining area as a result of Cliffs' mine operations.

For the key integrating factor of 'Flora and Vegetation', Cliffs also proposes to monitor for potential indirect environmental effects to the 'Rare Flora' taxon *Tetratheca erubescens* through the preparation and implementation of a:

(b) *Tetratheca erubescens* Monitoring Plan.

The *Tetratheca erubescens* Monitoring Plan will comprise:

(i) Quarterly monitoring for plant health to determine any potential for short-term indirect environmental effects; and

(ii) Annual monitoring for plant health, age-structure, reproductive status, mortality and recruitment. The monitoring plan will be developed to ensure that the sampling effort provides statistically robust, quantitative information, as necessary to detect any trends in the numbers and health of the population.

The key management controls to be included within the proposed *Tetratheca erubescens* Monitoring Plan are outlined by Table 3-3.

The *Tetratheca erubescens* Monitoring Plan is expected to be generally consistent with the monitoring approach for *Tetratheca paynterae* ssp. *paynterae* at the Windarling Range, as described above.

The Monitoring Plan will seek to verify that the objective of no significant indirect effect of the mine operations to *Tetratheca erubescens* occurs, and include trigger criteria for contingency actions in an event that a significant indirect effect is detected.

Should the annual or quarterly monitoring results detect any significant environmental effects to the *Tetratheca erubescens* population, Cliffs will report such effects to EPA, investigate the cause(s) of the effects, and implement contingency actions if appropriate. It is proposed that the specific trigger criteria for reporting, investigation and contingency actions will be:

(i) Annual monitoring indicates a decline ≥15% in health condition relative to the previous year; and/or

(ii) Annual monitoring indicates a mortality ≥10% of the population since the previous year; and rainfall is >150mm between annual sampling dates (i.e. not drought conditions);

(iii) Annual monitoring indicates a pattern of decline in health condition or mortality over time (>2 years); and

(iv) Annual or quarterly monitoring indicates evidence of a spatial pattern of effects related to proximity to the mine operations.

The trigger criteria were developed with reference to the >10 years of monitoring data for the related flora taxon *Tetratheca paynterae* ssp. *paynterae*, with a view towards setting the criteria outside of the expected natural fluctuations in population health (e.g. changes in health due to variation in annual rainfall).

Contingency actions to be implemented will be dependent on the nature of the cause of any detrimental effects, however conceptually may include additional management controls and/or restrictions or modifications to the mine operations

Table 3-3 Flora Aspects, Indicators and Management Controls.

ASPECT	SPECIFIC INDICATORS	MANAGEMENT CONTROLS
Rare Flora monitoring	Monitoring of the 'Rare Flora' taxon *Tetratheca erubescens*	o Quarterly monitoring for plant health to determine any potential for short-term indirect environmental effects; o Annual monitoring for plant health, age-structure, reproductive status, mortality and recruitment. The monitoring plan will be developed to ensure that the sampling effort provides statistically robust, quantitative information, as necessary to detect any trends in the numbers and health of the population; o Trigger criteria for reporting, investigation and contingency actions will be: o Annual monitoring indicates a decline ≥30% in health condition relative to the previous year; and/or o Annual monitoring indicates a mortality ≥15% of the population since the previous year; and rainfall is >150mm between annual sampling dates (i.e. not drought conditions); and o Annual or quarterly monitoring indicates evidence of a spatial pattern of effects related to proximity to the mine operations. o Contingency actions to be implemented dependent on the nature of the cause of any detrimental effects, and may include additional management controls, and/or restrictions or modifications to the mine operations .
Land clearing	Damage or loss of flora due to physical disturbance.	o Education and training of mine personnel on the flora values present within the mining area and on flora management, with a particular focus on Rare Flora. o Internal site disturbance permit process to control land clearing to within only approved/exempt areas. o Clearing procedures outlining the removal and stockpiling (to 3m height) of rehabilitation materials (vegetation, topsoil and subsoil) (including from areas containing 'Rare Flora' and DPaW-classified 'priority' flora taxa) for subsequent use in progressive and post-mining rehabilitation works. o Incident reporting system to identify and communicate any environmental effects to flora values.
Saline water	Loss of flora due to contact with saline water.	o Education and training of mine personnel on the appropriate methods for the use of saline groundwater in dust suppression. o Mine planning of surface water drainage through containment and control measures (e.g. sumps, table drains, bunding, shut off valves). o Annual monitoring of vegetation condition at specified locations (to be determined) positioned within 100m of mine operations and at reference sites for any effects of saline groundwater use. o Daily inspection of saline water equipment (pipelines and water carts) to detect any potential for leak/discharge to areas of native vegetation. o Incident reporting system to identify and communicate any inadvertent environmental effects to flora values.
Altered surface water flow	Loss of flora due to altered surface water flow.	o Mine planning of surface water drainage through containment and control measures (e.g. sumps, table drains, bunding, shut off valves).

ASPECT	SPECIFIC INDICATORS	MANAGEMENT CONTROLS
Fire	Damage or loss of flora due to fire.	o Education and training of mine personnel on fire risks, fire prevention and fire control. o Fire control equipment (fire extinguishers) within mine vehicles. o Incident reporting system to identify and communicate any environmental effects to flora values.
Dust	Loss or decline in condition of conservation significant flora* due to smothering by dust.	o Education and training of mine personnel on dust risks (to flora) and dust controls. o Dampening of cleared areas (daily, as required) using groundwater to minimise the potential for dust generation which could affect flora health. o Daily visual monitoring of dust generation by mine personnel, with additional dampening of areas using groundwater to be undertaken where dust is visible. o Annual monitoring of vegetation condition at specified locations (to be determined) positioned within 100m of mine operations and at reference sites for any effects of dust. o Incident reporting system to identify and communicate any environmental effects to flora values.
Introduced flora	New occurrences of introduced flora in the vicinity of conservation significant native flora.	o Education and training of mine personnel on appropriate hygiene procedures to minimise the introduction and spread of introduced flora. o Annual monitoring of introduced flora in areas adjacent to mine operations to detect any new occurrences or spread of existing occurrences, with data managed through a register. o If required, control (spraying) of introduced flora to minimise and/or eradicate known occurrences.
Introduced fauna	Damage or loss of conservation significant flora due to grazing or trampling by introduced fauna.	o Annual monitoring of vegetation condition at specified locations (to be determined) positioned within 100m of mine operations and at reference sites for any effects of introduced fauna. o Recording of sightings by mine personnel of introduced fauna in the vicinity of the mine operations. o Prohibition of pets within the mine operations. o If required, control of introduced fauna (trapping and/or culling) where significant disturbance to flora through grazing/trampling is recorded.

3.1.6 Environmental Commitments

Cliffs makes the following commitments for management of the environmental effects of the Proposal for the key environmental factor of 'Flora and Vegetation':

(1) Flora and Vegetation Management Plan

Cliffs will manage the environmental effects of the Proposal to flora values through the preparation and implementation of a Flora and Vegetation Management Plan.

(2) *Tetratheca erubescens* Monitoring Plan

Cliffs will monitor for potential indirect environmental effects of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens* through the preparation and implementation of a *Tetratheca erubescens* Monitoring Plan.

A consolidation of Cliffs' commitments for the Proposal is contained in Section 5 *Environmental Commitments*.

3.1.7 Conclusion

As outlined by EPA (2014a, 2014c), the key environmental factors applicable to the assessment of the Proposal include:

(a) 'Flora and Vegetation'

The environmental effects of the Proposal to the key environmental factor of 'Flora and Vegetation' are not expected to be environmentally significant, and can be appropriately managed through the preparation and implementation of a Flora and Vegetation Management Plan and a *Tetratheca erubescens* Monitoring Plan. The EPA's objectives for the key environmental factor of 'Flora and Vegetation' can therefore be met, noting the Proposal is not generally expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of the recorded flora values.

Whilst the Proposal is not expected to increase the threatened taxa category ranking for *Tetratheca erubescens* under the IUCN (2012) criteria (Cliffs 2014b, Appendix 3), the environmental effect of the Proposal to *Tetratheca erubescens* may be considered a significant residual environmental effect; thereby leading to a need to consider of the applicability of environmental offsets as prescribed within relevant Government guidance documents (Government of Western Australia 2011, 2014; EPA 2014c; DPaW 2014o). Consideration of the application of the key integrating factor of 'Offsets' for the effect of the proposal to *Tetratheca erubescens* is provided in Section 3.5 *Offsets*.

3.2 Fauna

3.2.1 Context

The southern Koolyanobbing Range and its surrounds contain a variety of native fauna taxa. A portion of the habitat for native fauna at the southern Koolyanobbing Range will require clearing to enable implementation of the Proposal. Section 3.2 *Fauna* provides an assessment of the effect of the Proposal to fauna values.

3.2.2 EPA Objective

The EPA's objective for the key environmental factor of 'Terrestrial Fauna' is:

> *"To maintain representation, diversity, viability and ecological function at the species, population and assemblage level"* (EPA 2015a).

The EPA's objective for the key environmental factor of 'Subterranean Fauna' is:

> *"To maintain representation, diversity, viability and ecological function at the species, population and assemblage level"* (EPA 2015a).

3.2.3 Legislation and Guidelines

Legislation, guidelines, standards and approvals relevant to the key environmental factors of 'Terrestrial Fauna' and 'Subterranean Fauna' with regard to the Proposal include:

(a) *Environmental Protection Act 1986* (WA)

(b) *Wildlife Conservation Act 1950* (WA)

(c) *Environment Protection and Biodiversity Conservation Act 1999* (C'th)

(d) *Convention on the Conservation of Migratory Species of Wild Animals 1979* (Government of Australia 1979)

(e) *Japan - Australia Migratory Bird Agreement 1974* (Government of Australia and Government of Japan 1974)

(f) *China - Australia Migratory Bird Agreement 1986* (Government of Australia and Government of the People's Republic of China 1988)

(g) *Republic of Korea - Australia Migratory Bird Agreement 2007* (Government of Australia and Government of the Republic of Korea 2007)

(h) EPA Guidance Statement 20: *Sampling of Short-Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia* (EPA 2009)

(i) EPA Guidance Statement 54a: *Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia* (EPA 2007a)

(j) EPA Guidance Statement 56: *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004b)

(k) EPA Position Statement 3: *Terrestrial Biological Surveys as an element of Biodiversity Protection* (EPA 2002a)

(l) EPA Environmental Assessment Guideline 12: *Consideration of Subterranean Fauna in Environmental Impact Assessment in Western Australia* (EPA 2013a)

(m) *Technical Guide Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA & DPaW 2010)

(n) *EPBC Act List of Threatened Fauna* (DoE 2014d)

(o) *EPBC Migratory Species Lists* (DoE 2014e)

(p) *Wildlife Conservation (Specially Protected Fauna) Notice 2014* (WA Minister for Environment 2014c)

(q) List of Specially Protected Fauna and Priority Fauna (DPaW 2013c)

(r) *Conservation Codes for Western Australian Flora and Fauna* (DPaW 2013a)

3.2.4 Assessment

Legislative Framework for Fauna Protection

All vertebrate native fauna in Western Australia is protected under the *Wildlife Conservation Act 1950* (WA). Specific fauna species may additionally be afforded special protection under the *Wildlife Conservation Act 1950* (WA) through a declaration as 'Specially Protected Fauna', with a similar special protection also available under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a listed 'Threatened Species' of fauna. A description[1] of the classifications used in fauna protection are provided below:

'Threatened Species' -
Threatened Species of fauna may be declared by the Commonwealth Minister for Environment for protection under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a matter of national environmental significance for being extinct, facing a risk of extinction, or in need of a conservation program to prevent the species from a risk of extinction. Threatened Species are allocated a category of 'extinct', 'extinct in the wild', 'critically endangered', 'endangered', 'vulnerable' or 'conservation dependent', which is generally in accordance with the criteria of IUCN (2012). The listed Threatened Species of fauna are outlined by DoE (2014d).

'Specially Protected Fauna' -
Specially Protected Fauna may be declared by the Western Australian Minister for the Environment and protected under the *Wildlife Conservation Act 1950* (WA) if it is likely to become extinct, or is rare, or otherwise in need of special protection. Specially Protected Fauna are allocated a category of 'Fauna that is rare or likely to become extinct', 'Fauna presumed to be extinct', 'Migratory birds protected under an international agreement' or 'Other specially protected fauna' (WA Minister for Environment 2014c), with the assessment process for the extant taxa having consideration of criteria of IUCN (2012) for the categories of 'critically endangered', 'endangered' and 'vulnerable' (DPaW 2013a). The list of declared Specially Protected Fauna are outlined by WA Minister for Environment (2014c).

'Migratory Species' -
Migratory Species may be declared by the Commonwealth Minister for Environment for protection under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a matter of national environmental significance for being a migratory species listed under the *Convention on the Conservation of Migratory Species of Wild Animals 1979* (also commonly referred to as the Bonn Convention), *Japan - Australia Migratory Bird Agreement 1974*, *China - Australia Migratory Bird Agreement 1986* or the *Republic of*

[1] Descriptions are consolidated from review of the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Wildlife Conservation Act 1950* (WA), and flora literature published by DPaW and DoE.

Korea - Australia Migratory Bird Agreement *2007* (Government of Australia 1979; Government of Australia and Government of Japan 1974; (Government of Australia and Government of the People's Republic of China 1988; Government of Australia and Government of the Republic of Korea 2007). As outlined above under 'Specially Protected Fauna', Migratory Species may also be declared by the Western Australian Minister for Environment as Specially Protected Fauna under the *Wildlife Conservation Act 1950* (WA) due to it being a Migratory Species. The listed Migratory Species of fauna are outlined by DoE (2014e).

'Priority Fauna' -
Priority fauna is a classification system developed by DPaW for fauna taxa which are known from one, a few or several locations, which may or may not be under threat, or may otherwise be rare. Five priority categories are used, with Priority 1 (P1) being of the highest conservation significance, or identification as a priority for surveying and determining the conservation significance based on the current knowledge of perceived threat (DPaW 2013a). As priority fauna are identified and determined by DPaW (i.e. not through legislation), priority fauna are not subject to any specific legal protection. The list of DPaW-classified priority fauna taxa are outlined by DPaW (2013c).

Fauna of the southern Koolyanobbing Range

Fauna surveys undertaken in the area of the southern Koolyanobbing Range (BCE 2009, c.2009; Bennelongia 2008, 2014; Biota 2012, 2014a, 2014b) have recorded approximately 150 fauna taxa comprising vertebrate fauna, terrestrial invertebrate fauna, and troglobitic subterranean fauna.

The fauna taxa of the southern Koolyanobbing Range includes 4 'Specially Protected Fauna' under the *Wildlife Conservation Act 1950* (WA) (WA Minister for Environment 2014c) (of which 2 fauna taxa are also classified as either a 'Threatened Species' or 'Migratory Species' under *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as per DoE (2014d, 2014e)) and 1[1] DPaW-classified 'priority' fauna taxon (DPaW 2013c), being:

(a) *Leipoa ocellata* (Specially Protected Fauna / Threatened Species);

(b) *Merops ornatus* (Specially Protected Fauna / Migratory Species);

(c) *Falco peregrinus* (Specially Protected Fauna);

(d) *Cacatua leadbeateri* (Specially Protected Fauna); and

(e) *Aganippe castellum* (Priority 4).

The recorded locations of the fauna values at the southern Koolyanobbing Range are identified at Figures 3-15 to 3-18.

[1] Whilst potential records of records *Oreoica gutturalis gutturalis* (Priority 4) and *Pomatostomus superciliosus ashbyi* (Priority 4) were identified by Biota (2014a) and BCE (c.2009), as outlined Biota (2014a), based on the recorded species' ranges, these records are more likely to be of the subspecies *Oreoica gutturalis pallescens* and *Pomatostomus superciliosus superciliosus*; neither which are of recorded conservation significance.

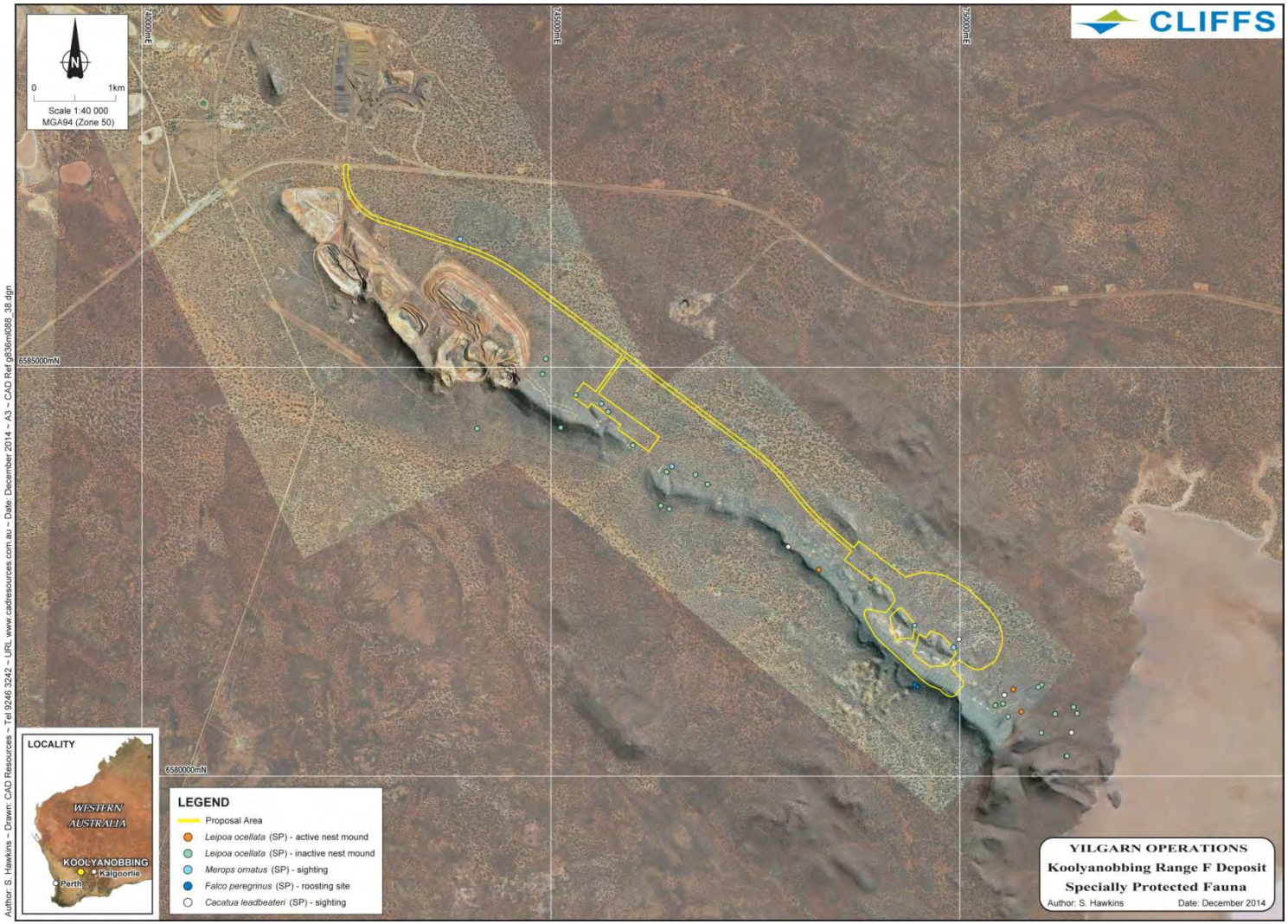

Figure 3-15 Recorded locations of Specially Protected Fauna Taxa. The location of the Proposal is identified in yellow. The recorded locations of the Specially Protected Fauna (SP) taxa in the vicinity of the Proposal are identified. Data Sources: Biota (2014a), BCE (c.2009), Cliffs unpublished data.

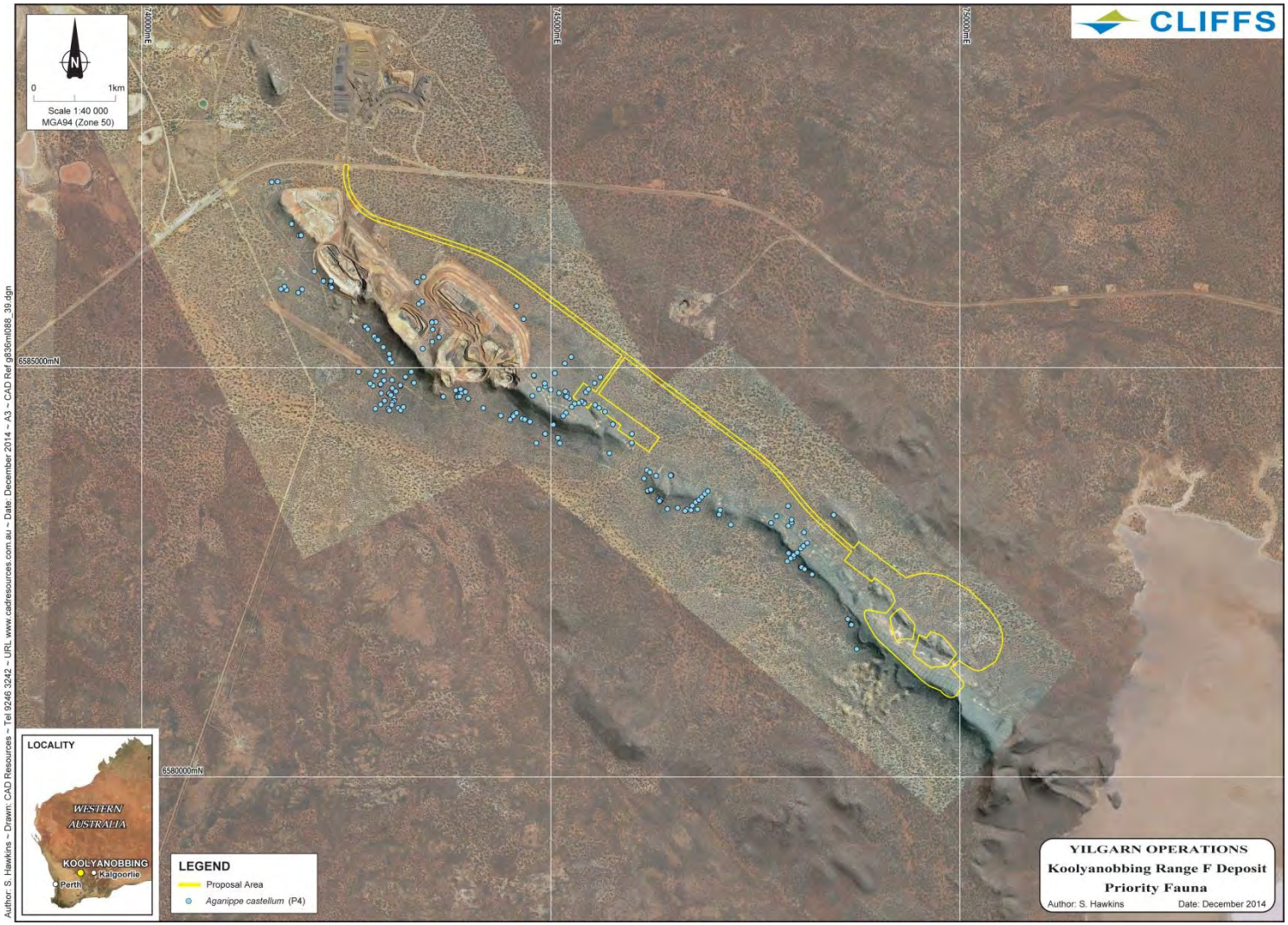

Figure 3-16 Recorded locations of DPaW-classified 'Priority 4' Fauna Taxa. The location of the Proposal is identified in yellow. The recorded locations of the Department of Parks and Wildlife-classified 'Priority 4' (P4) fauna taxa in the vicinity of the Proposal are identified. Data Source: BCE (2009).

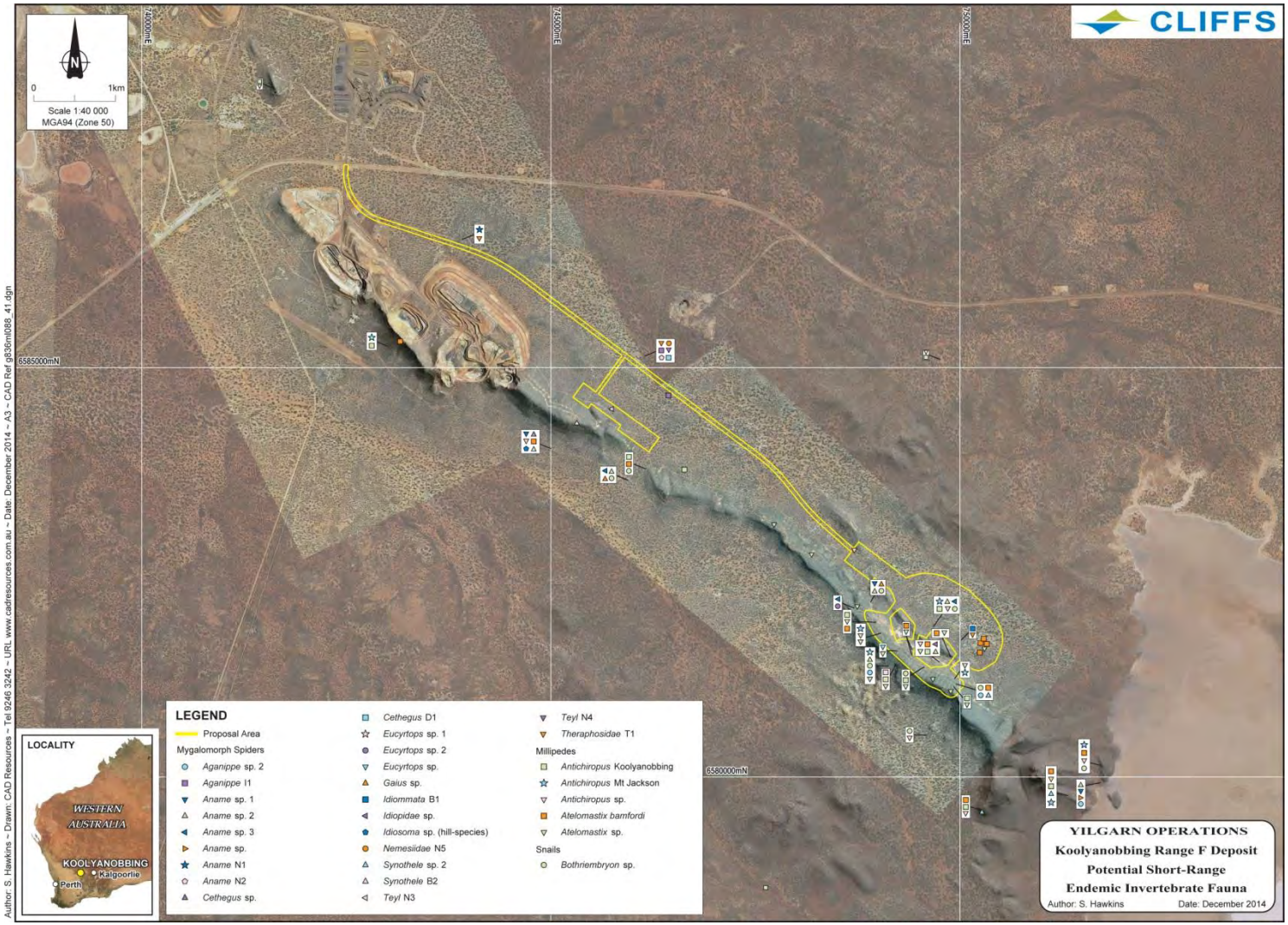

Figure 3-17 Recorded locations of potential Short-Range Endemic Invertebrate Fauna Taxa. The location of the Proposal is identified in yellow. The recorded locations of potential short-range endemic invertebrate fauna taxa in the vicinity of the Proposal are identified. Data Sources: Biota (2012, 2014b).

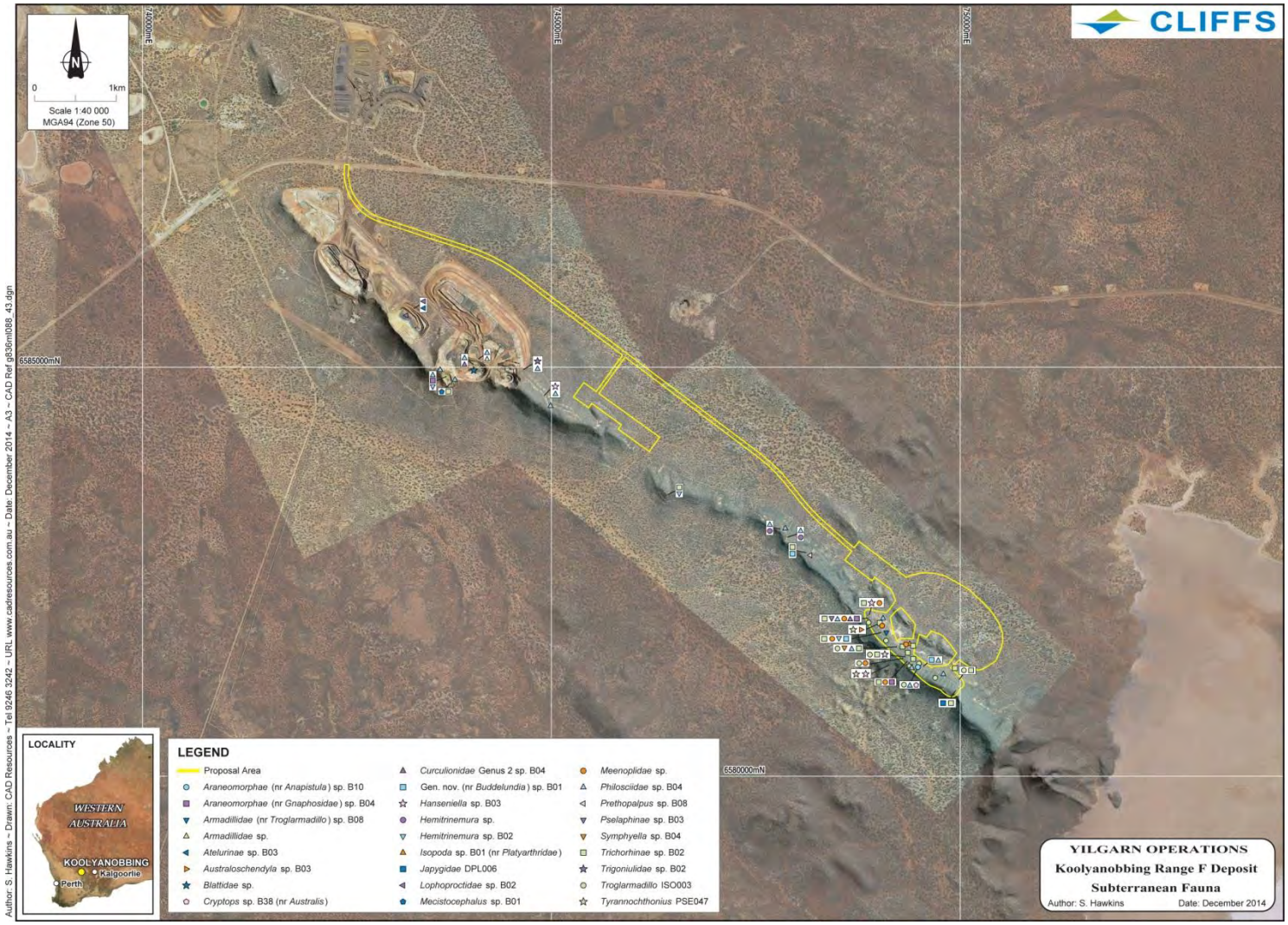

Figure 3-18 Recorded locations of Subterranean Fauna Taxa. The location of the Proposal is identified in yellow. The recorded locations of troglobitic subterranean fauna taxa in the vicinity of the Proposal are identified. Data Sources: Bennelongia (2008, 2014)

Mitigation Hierarchy

As outlined by Section 1.6 *Mitigation* Hierarchy, the Mitigation Hierarchy has been considered to minimise the potential environmental effects of the Proposal to fauna values, as summarised below:

Avoid

As many of the recorded environmental values occur broadly across the length of the southern Koolyanobbing Range, there has been limited availability to actively avoid fauna values, with minimisation then being the key measure (refer *Minimise* below). Whilst noting this, the Proposal design has resulted in avoidance of a variety of recorded fauna values, which include:

(a) Specially Protected Fauna taxa *Leipoa ocellata* (active nest mounds) and *Falco peregrinus* (roosting sites);

(b) a variety of potential short-range endemic invertebrate fauna taxa; and

(c) a variety of troglobitic subterranean fauna taxa.

Minimise

With regard to minimising the environmental effect to fauna values, Cliffs has also considered various mine planning layouts. The optimal mining design has been modified through minimising the spatial extent of the Mine Pits and by positioning of the Support Infrastructure and the Waste Rock Landform beyond the elevated ridge areas. The modified mine planning layout has resulted in a minimisation of the potential effect to a variety of recorded fauna values, which include:

(a) Habitat for Specially Protected Fauna taxa *Leipoa ocellata*, *Falco peregrinus*, *Merops ornatus and Cacatua leadbeateri*;

(b) DPaW-classified 'priority' fauna taxa *Aganippe castellum* (P4);

(c) Habitat for potential short-range endemic invertebrate fauna taxa; and

(d) Habitat for troglobitic subterranean fauna taxa.

Whilst many of the design modifications result in greater operational cost to Cliffs, these design modifications have been adopted to minimise the effect to the recorded fauna values.

Rehabilitate

At mine closure, following removal of infrastructure, the areas of the Waste Rock Landform and the Support Infrastructure will be rehabilitated with native vegetation of local provenance (noting that rehabilitation of the Mine Pits area will not be possible, as outlined by Section 1.4.1 *Mine Pits*). The rehabilitation works will include on-contour ripping of compacted areas and the respreading of rehabilitation materials (vegetation, topsoil and subsoil) that were removed and stockpiled during initial mine development. The rehabilitation works will be undertaken to meet defined rehabilitation completion criteria. The rehabilitation works will seek to restore many of the flora values of the Proposal area which provide habitat to fauna.

An assessment of the proposed rehabilitation of environmental values for the Proposal are described in Section 3.4 *Mine Closure*.

Offset

With regard to the key environmental factors of 'Terrestrial Fauna' and 'Subterranean Fauna', as outlined by the assessment of the environmental effect of the Proposal within Section 3.2 *Fauna*, Cliffs does not consider there are any significant residual environmental effects of the Proposal to fauna values for which a consideration of environmental offsets would be necessary.

Assessment of Fauna

Of the recorded fauna values of the southern Koolyanobbing Range, the Proposal coincides with records of:

(a) *Leipoa ocellata* (Specially Protected Fauna / Threatened Species);
(b) *Merops ornatus* (Specially Protected Fauna / Migratory Species);
(c) *Cacatua leadbeateri* (Specially Protected Fauna);
(d) *Aganippe castellum* (Priority 4);
(e) Potential short-range endemic invertebrate fauna; and
(f) Troglobitic subterranean fauna.

To note with regards to the interpretation of the results for fauna taxa, as the fauna surveys have focused on the Proposal area (with conversely, a lesser focus on areas beyond the Proposal area), the distribution mapping for the fauna taxa bias towards a greater concentration and proportion occurring within the Proposal area (with conversely, a lesser concentration and proportion identified beyond of the Proposal area). This bias also arises for the regional fauna surveys that assist to provide contextual information as to the regional distribution of fauna taxa.

The Proposal will be implemented within an area of 211ha, comprising approximately 194ha of land which contains native vegetation, and 17ha of previously cleared land. The native vegetation provides habitat for a variety of native fauna taxa.

An assessment of the environmental effect of the Proposal to fauna values is provided below:

***Leipoa ocellata* (Specially Protected Fauna / Threatened Species)**

Leipoa ocellata (Malleefowl) is a large and distinctive ground-dwelling bird which builds large nest-mounds[1] on the ground made of leaf litter and soil materials (DoE 2014f). *Leipoa ocellata* has been recorded across all mainland states of Australia except Queensland, with an estimated 100,000 breeding individuals (Garnett and Crowley 2000 cited in DoE 2014f). *Leipoa ocellata* has been assessed as meeting the 'Vulnerable' category using the IUCN (2001) criteria due to a population size reduction (DEH 2007). Within Western Australia, DPaW (2014k) identifies *Leipoa ocellata* as having a linear distribution of approximately 1,400km, extending from Albany in the south and Shark Bay in the north, and eastwards to the border of South Australia. The regional distribution and images of a *Leipoa ocellata* and a nest mound are presented in Figure 3-19.

[1] *Leipoa ocellata* nest mounds are generally described as 'active' or 'inactive'. The term 'active' is used to describe *Leipoa ocellata* nest mounds that exhibit characteristics associated with normal nesting activity (i.e. nest mounded up, litter trails leading to mound, extensive soil and litter disturbance, and/or birds seen actively digging) (Natural Heritage Trust c.2007). The term 'inactive' is used to describe *Leipoa ocellata* nest mounds that do not exhibit characteristics associated with normal nesting activity.

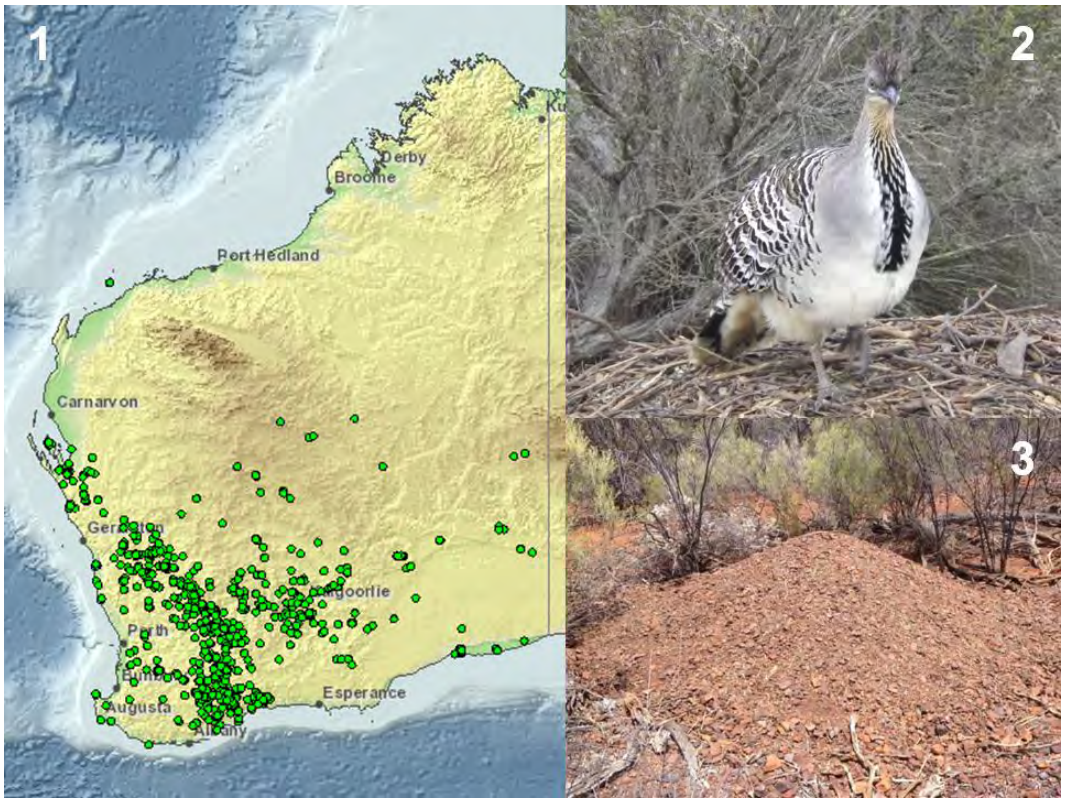

Figure 3-19 *Leipoa ocellata* Regional Distribution and Images. Image 1: The regional distribution of *Leipoa ocellata* is identified by green circles (adapted from DPaW 2014k). Image 2: *Leipoa ocellata* individual (Globe Environments unpublished 2008). Image 3: *Leipoa ocellata* nest mound (Biota 2014a)

A total of 34 *Leipoa ocellata* nest mounds have been recorded at the southern Koolyanobbing Range and its surrounds, occurring both within and outside the Proposal area (Biota 2014a; Cliffs unpublished data).

Leipoa ocellata has also been recorded within the other areas of Cliffs' Yilgarn Operations, including at the Windarling Range, Mt Jackson Range and the Deception Deposit. For context, the area of the Mt Jackson Range has been identified as key habitat for *Leipoa ocellata* with more than 200 nest mounds recorded.

The Proposal does not coincide with any recently active *Leipoa ocellata* nest mounds. Accordingly, the Proposal is not expected to remove any live *Leipoa ocellata* individuals.

The Proposal coincides with 3 inactive *Leipoa ocellata* nest mounds; with these records indicating the presence of habitat potentially suitable for *Leipoa ocellata* foraging and nesting. Whilst the Proposal will result in an increase to the removal of fauna habitat at the southern Koolyanobbing Range, this represents only a small proportion of the potential nesting and foraging habitat available to *Leipoa ocellata* across the Koolyanobbing Range and the broader region.

In consideration of the spatial area of the Proposal, and having regard to the absence of active *Leipoa ocellata* nest mounds within the Proposal area and the distribution of this taxon across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to *Leipoa ocellata* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' can therefore be

met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Leipoa ocellata*.

To note, the environmental effect of the Proposal to *Leipoa ocellata* was previously considered by DoE under the provisions of the *Environment Protection and Biodiversity Act 1999* (C'th), with DoE determining that the Proposal was unlikely to have a significant environmental effect to this taxon (Cliffs 2014e, DoE 2014a).

***Merops ornatus* (Specially Protected Fauna / Migratory Species)**

Merops ornatus (Rainbow Bee-eater) is medium-sized bird coloured green or blue-green on the forehead and chestnut on the back of the head, and is the only bee-eater in Australia (DoE 2014g). DPaW (2014l) identifies *Merops ornatus* as occurring throughout Western Australia, with a linear distribution of approximately 2,500km, extending from Albany in the south to near Kununurra in the north, and eastwards to the border of South Australia. Globally, *Merops ornatus* is also resident to Indonesia, Papua New Guinea, Solomon Islands and Timor-Leste, and vagrant to Japan, Taiwan and China (Birdlife International 2012 cited in IUCN 2014a). The conservation status of *Merops ornatus* has been assessed as of 'Least Concern' (i.e. not threatened) (Birdlife International 2012 cited in IUCN 2014a). The regional distribution and an image of *Merops ornatus* are presented in Figure 3-20.

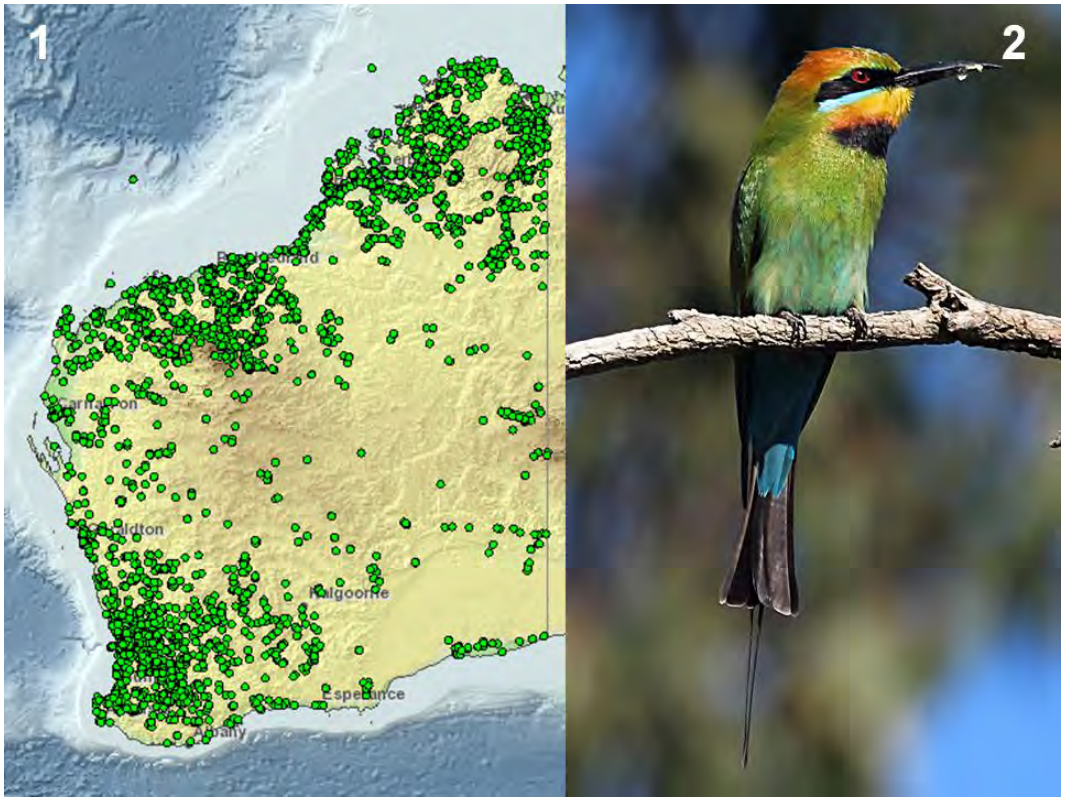

Figure 3-20 *Merops ornatus* Regional Distribution and Image. Image 1: The regional distribution of *Merops ornatus* is identified by green circles (adapted from DPaW 2014l). Image 2: *Merops ornatus* individual (Jones 2013 in Department of Environment and Heritage Protection 2014).

Merops ornatus has been recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area (Biota 2014a). The Proposal coincides with 3 records of *Merops ornatus* at the southern Koolyanobbing Range.

Merops ornatus has also been recorded locally in fauna surveys in the vicinity of the Helena and Aurora Range, Mt Jackson Range, Mt Finnerty Range, Perrinvale Range, Windarling Range, Die Hardy Range and Mt Elvire (DPaW 2014l). *Merops ornatus* has also been recorded making nests within stockpiled topsoil along Cliffs' existing haul roads (pers. com. J Shepherdson, Cliffs' Environmental Superintendent, June 2014).

The records from within the area of the Proposal (Biota 2014a; BCE c.2009) indicate *Merops ornatus* to be a visitor (non-resident) to the area during the survey period. Having regard to the mobility of this taxon, a direct effect to live individuals of *Merops ornatus* is not expected.

The records of *Merops ornatus* at the southern Koolyanobbing Range indicates the presence of habitat potentially suitable for *Merops ornatus* foraging and nesting. Whilst the Proposal will result in an increase to the removal of fauna habitat at the southern Koolyanobbing Range, this represents only a small proportion of the nesting and foraging habitat available to *Merops ornatus* across the Koolyanobbing Range and the broader region.

In consideration of the spatial area of the Proposal, and having regard to the distribution of this taxon across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to *Merops ornatus* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Merops ornatus*.

To note, the environmental effect of the Proposal to *Merops ornatus* was previously considered by DoE under the provisions of the *Environment Protection and Biodiversity Act 1999* (C'th), with DoE determining that the Proposal was unlikely to have a significant environmental effect to this taxon (Cliffs 2014e, DoE 2014a).

Cacatua leadbeateri (Specially Protected Fauna)

Cacatua leadbeateri (Major Mitchell's Cockatoo) is a small cockatoo with a salmon-pink face and underparts, and with a white and scarlet (red-pink) forward curving crest (WAZA 2014). DPaW (2014m) identifies *Cacatua leadbeateri* as having a linear distribution of approximately 1,500km, extending from the western coast of Western Australia to the border of South Australia. The broader distribution of *Cacatua leadbeateri* includes South Australia, Northern Territory, Queensland, New South Wales and Victoria (IUCN 2014b). The conservation status of *Cacatua leadbeateri* has been assessed as of 'Least Concern' (i.e. not threatened) (Birdlife International 2012 cited in IUCN 2014c). The regional distribution and an image of *Cacatua leadbeateri* are presented in Figure 3-21.

Cacatua leadbeateri was recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area (Biota 2014a). The Proposal coincides with 5 records of *Cacatua leadbeateri*.

Cacatua leadbeateri has also been recorded locally in fauna surveys near the Helena and Aurora Range, Mt Jackson Range and the Windarling Range (BCE 2010; DPaW 2014m; Ecologia 2001, 2013).

The records from within the area of the Proposal (BCE c.2009; Biota 2014a) indicate *Cacatua leadbeateri* to be a visitor (non-resident) to the area during the survey period. Having regard to the mobility of this taxon, a direct effect to live individuals of *Cacatua leadbeateri* is not expected.

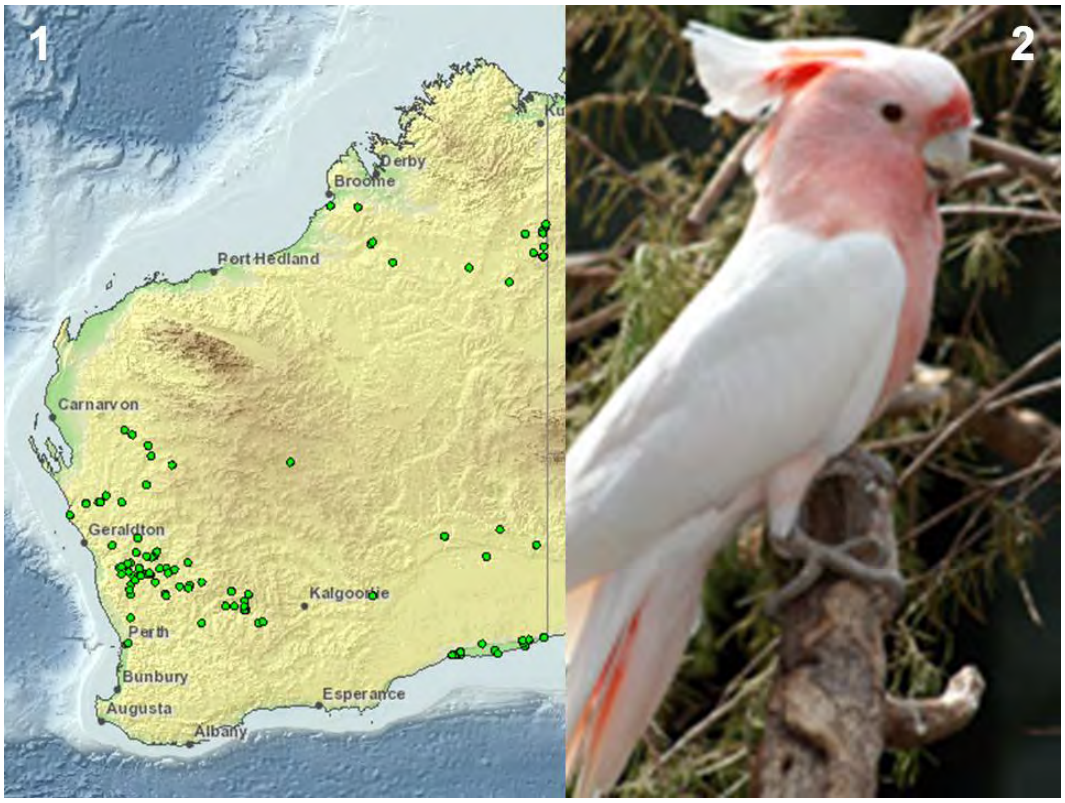

Figure 3-21 *Cacatua leadbeateri* Regional Distribution and Image. Image 1: The regional distribution of *Cacatua leadbeateri* is identified by green circles (adapted from DPaW 2014m). Image 2: *Cacatua leadbeateri* individual (Perth Zoo 2013).

The records of *Cacatua leadbeateri* at the southern Koolyanobbing Range indicates the presence of habitat potentially suitable for *Cacatua leadbeateri* foraging and nesting. Whilst the Proposal will result in an increase to the removal of fauna habitat at the southern Koolyanobbing Range, this represents only a small proportion of the nesting and foraging habitat available to *Cacatua leadbeateri* across the Koolyanobbing Range and the broader region.

In consideration of the spatial area of the Proposal, and having regard to the distribution of this taxon across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to *Cacatua leadbeateri* is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Cacatua leadbeateri*.

Aganippe castellum (P4)

Aganippe castellum (Tree-stem Trapdoor Spider) is a medium-sized trapdoor spider which builds its nest in the ground with an aerial, webbed tube extending up against the base of a tree or shrub. Clusters of twig lines from the aerial tube drape to the ground and surround the nest, with the twig lines directing foraging prey (mainly ants) past the opening of the nest.

DPaW (2014n) identifies *Aganippe castellum* as having a recorded linear distribution of approximately 450km, extending from near Morawa (east of Geraldton) to the south of

Southern Cross. The regional distribution and images of an *Aganippe castellum* individual and burrow are presented in Figure 3-22.

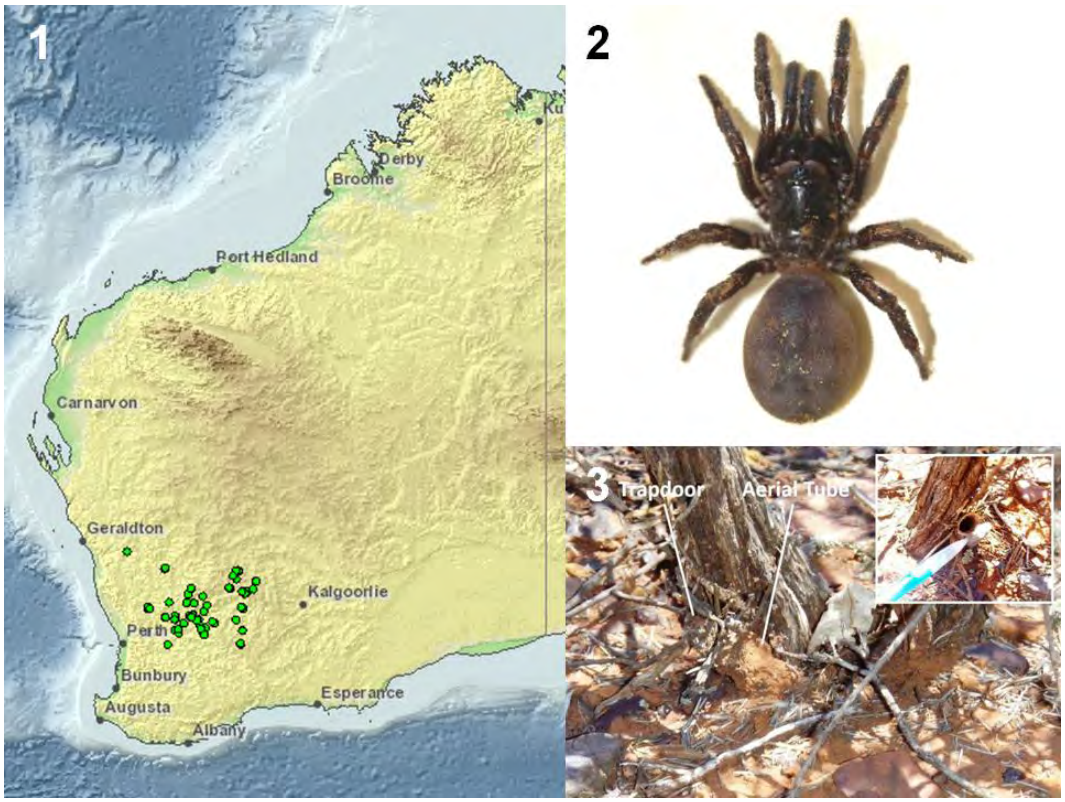

Figure 3-22 ***Aganippe castellum*** **Regional Distribution and Images.** Image 1: The regional distribution of *Aganippe castellum* is identified by green circles (adapted from DPaW 2014n). Image 2: *Aganippe castellum* individual (Russell 2008). Image 3: *Aganippe castellum* burrow (Globe Environments unpublished 2008).

Aganippe castellum has been recorded across the length of the southern Koolyanobbing Range, both within and outside of the Proposal area (BCE 2009; Biota 2012). A total of 227 *Aganippe castellum* burrows have been recorded at the southern Koolyanobbing Range through transects and opportunistic searches, however, this taxon is undoubtedly more abundant than the current transect and opportunistic records would indicate, with BCE (2009) conservatively estimating the population at the southern Koolyanobbing Range at approximately 45,000 individuals.

The Proposal coincides with 9 records for *Aganippe castellum*, however, having regard to the estimated total population, the expected direct effect of the Proposal to *Aganippe castellum* individuals can be expected to be greater than the current transect and opportunistic records indicate.

Whilst the Proposal will result in an increase to the removal of *Aganippe castellum* individuals and its habitat at the southern Koolyanobbing Range, this is likely to represent only a small proportion of the individuals and habitat available to *Aganippe castellum* across the Koolyanobbing Range and the broader region.

In consideration of the environmental effect of the Proposal to *Aganippe castellum*, and having regard to the distribution of this taxon across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to *Aganippe castellum* is not

considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of *Aganippe castellum*.

Potential Short-Range Endemic Invertebrate Fauna

Surveys for potential short-range endemic invertebrate fauna undertaken at the southern Koolyanobbing Range identified a variety of taxa comprising mygalomorph spiders, millipedes and a snail (Biota 2012, 2014b). None of the potential short-range endemic invertebrate fauna taxa recorded are of listed conservation significance.

For the millipede and the snail taxa, all taxa recorded within the Proposal area were also recorded elsewhere across the southern Koolyanobbing Range. Accordingly, this distribution supports an expectation that the Proposal is unlikely to result in a significant environmental effect to the survival of the millipede or snail taxa.

Most of the mygalomorph spider taxa were recorded both within and outside of the Proposal area, which indicates connectivity of habitat for mygalomorph spider taxa between the Proposal area and beyond. Accordingly, this distribution supports an expectation that the Proposal is unlikely to result in a significant environmental effect to the survival of such mygalomorph spider taxa.

Whilst noting the above, a number of mygalomorph spider taxa were recorded only from within the Proposal area. As outlined by Biota (2014b), based on previous mygalomorph spider surveys, such taxa are likely to have distribution at least across the length of the Koolyanobbing Range (for those taxa restricted to rocky habitats), with the distributions likely to be much broader for the taxa occupying the adjacent plain habitats. Based on the conclusions of Biota (2014b), it can be expected that further sampling would record these mygalomorph spider taxa beyond the Proposal area; with the apparent restriction an artefact of the sampling locations (i.e. the proportion of sampling locations within the Proposal area) and chance events (i.e. likelihood of recording an a particular taxa within any day/time). Accordingly, it can be similarly expected that the Proposal is unlikely to result in a significant environmental effect to the survival of the other mygalomorph spider taxa.

In consideration of the environmental effect of the Proposal to potential short-range endemic invertebrate fauna, and having regard to the recorded and expected distributions of such taxa across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to potential short-range endemic invertebrate fauna is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of potential short-range endemic invertebrate fauna.

Subterranean Fauna

Surveys for troglobitic subterranean fauna undertaken at the southern Koolyanobbing Range identified a variety of taxa comprising spiders, pseudoscorpions, crustaceans and myriapods (Bennelongia 2008, 2014). None of the troglobitic subterranean fauna taxa recorded are of listed conservation significance. The southern Koolyanobbing Range is considered to have a diverse community of troglobitic subterranean fauna compared to other studied areas in the Yilgarn Region, however, with a commonality of the Order of *Isopoda* being the dominant group (Bennelongia 2014).

Of the 26 putative taxa recorded at the southern Koolyanobbing Range, 17 taxa were recorded within the Proposal area. Of these 17 taxa, 8 taxa were recorded only from within the Proposal area; with the remaining taxa recorded elsewhere across the southern Koolyanobbing Range and/or recorded from other ranges in the broader Yilgarn Region.

Whilst a number of troglobitic subterranean fauna taxa were recorded only from within the Proposal area, as outlined by Bennelongia (2014), based on the continuity of habitat and the wide range of some taxa, it is likely that such taxa will have the wider ranges exhibited by related taxa and will occur at least across the length of the southern Koolyanobbing Range; with the apparent restriction an artefact of the sampling locations (i.e. proportion of sampling locations within the Proposal area) and chance events (i.e. likelihood of recording an a particular taxa within any day/time). Based on the conclusions of Bennelongia (2014), it can be expected that further sampling would record these troglobitic subterranean fauna taxa beyond the Proposal area. The apparent restriction of some troglobitic subterranean fauna taxa is therefore likely to be an artefact of the sampling locations and chance event; rather than spatial restriction of such taxa. Accordingly, it can be expected that the Proposal is unlikely to result in a significant environmental effect to the survival of the troglobitic subterranean fauna taxa.

In consideration of the environmental effect of the Proposal to subterranean fauna, and having regard to the distribution of such taxa across the southern Koolyanobbing Range and the broader region, the effect of the Proposal to subterranean fauna is not considered to be environmentally significant. The EPA's objectives for the key environmental factor of 'Subterranean Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of subterranean fauna.

Other Fauna Taxa

Fauna surveys undertaken in the area of the southern Koolyanobbing Range (BCE 2009, c.2009; Bennelongia 2008, 2014; Biota 2012, 2014a, 2014b) recorded approximately 150 fauna taxa. Accordingly, the Proposal can be expected to affect a variety of other fauna taxa in addition to the fauna taxa and fauna groups outlined above.

Such fauna taxa are not of conservation significance due to their population sizes and broad regional distributions. In this context, the environmental effect of the Proposal to other fauna taxa is not expected to be environmentally significant. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' and 'Subterranean Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of the other fauna taxa.

3.2.5 Environmental Management

Cliffs' mine operations are undertaken in accordance with an Environmental Policy (Cliffs Natural Resources 2014, Appendix 1), which outlines Cliffs' overarching objectives of environmental protection and continual improvement in environmental performance.

The Environmental Policy is implemented through Cliffs' EMS, which includes EMPs for the management of key environmental aspects. Cliffs' EMS for its Yilgarn Operations is certified and maintained to international standard AS/NZS ISO 14001:2004 (NCSI 2013, Appendix 2).

Cliffs' EMS contains a series of EMPs to ensure the potential environmental effects of mine operations are controlled and monitored to an acceptable standard. These EMPs address the management of a range of environmental aspects, including fauna. The management actions contained within the EMPs have been refined over a period of approximately 10 years, incorporating review and advice from both State and Commonwealth environmental and mining authorities as part of the various government assessment and approvals processes.

Compliance with the EMS and EMPs is regularly audited both internally and by independent third parties in order to ensure compliance, and to identify any changes that may improve the environmental outcomes. The regular auditing of the EMS and EMPs is consistent with Cliffs' Environmental Policy for evaluation of performance against environmental targets. Cliffs has a strong environmental compliance record, with Cliffs' remaining in compliance with all conditions of environmental and mining approvals granted under the *Environmental Protection Act 1986* (WA), *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Mining Act 1978* (WA) and the *Wildlife Conservation Act 1950* (WA).

For the key environmental factor of 'Terrestrial Fauna', Cliffs considers the environmental effects of the Proposal can be appropriately controlled and managed through the preparation and implementation of a:

(a) Fauna Management Plan.

The specific management aspects and controls to be addressed within the proposed Fauna Management Plan are outlined by Table 3-4.

The preparation of the Fauna Management Plan will be informed by Cliffs' experience in managing fauna at the approved Yilgarn Operations, particularly at the Mt Jackson Range where the Specially Protected Fauna taxon *Leipoa ocellata* occur in close proximity to the mine operations. The long-term fauna monitoring undertaken to date, in particular for *Leipoa ocellata,* provide a sound basis on which to conclude that the potential environmental effects to Specially Protected Fauna can be appropriately managed.

The management objective for the Fauna Management Plan will be to avoid or minimise environmental effects on conservation significant fauna which may result from Cliffs' activities. The performance indicator for implementation of the Fauna Management Plan will be to achieve no significant environmental effect on the health and abundance of conservation significant fauna outside of the approved mining area as a result of Cliffs' mine operations.

The effect of the Proposal to the key environmental factor of 'Subterranean Fauna' is not expected to be environmentally significant. The potential effects to subterranean fauna have been minimised through the design of the Proposal which minimises the extent of ground excavations and restricts mining to above the groundwater level. Groundwater abstraction for the Proposal can be appropriately controlled in accordance with Groundwater Licence GWL154459 (DoW 2014) as regulated by DoW in accordance with the *Rights in Water and Irrigation Act 1914* (WA). Accordingly, no additional environmental commitments for the key environmental factor of 'Subterranean Fauna' are proposed.

Table 3-4 Fauna Aspects, Indicators and Management Controls.

ASPECT	SPECIFIC INDICATORS	MANAGEMENT CONTROLS
Land clearing	Loss of habitat due to physical disturbance.	o Education and training of mine personnel on the fauna values present within the mining area and on fauna management, with a particular focus on Specially Protected Fauna. o Internal site disturbance permit process to control land clearing (of fauna habitat) to within only approved/exempt areas. o Removal and stockpiling (to 3m height) of rehabilitation materials (vegetation, topsoil and subsoil) for subsequent use in progressive and post-mining rehabilitation works to restore fauna habitat. o Incident reporting system to identify and communicate any environmental effects to fauna habitat.
Saline water	Loss of habitat due to contact with saline water.	o Education and training of mine personnel on the appropriate methods for the use of saline groundwater in dust suppression. o Mine planning of surface water drainage through containment and control measures (e.g. sumps, table drains, bunding, shut off valves). o Annual monitoring of vegetation condition at specified locations (to be determined) positioned within 100m of mine operations and at reference sites for any effects of saline groundwater use on the quality of fauna habitat. o Daily inspection of saline water equipment (pipelines and water carts) to detect any potential for leak/discharge to areas of native vegetation providing habitat to fauna. o Incident reporting system to identify and communicate any environmental effects to fauna habitat.
Altered surface water flow	Loss of habitat due to altered surface water flow.	o Mine planning of surface water drainage through containment and control measures (e.g. sumps, table drains, bunding, shut off valves).
Fire	Damage or loss of habitat due to fire.	o Education and training of mine personnel on fire risks, fire prevention and fire control. o Fire control equipment (fire extinguishers) within mine vehicles. o Incident reporting system to identify and communicate any environmental effects to fauna habitat.
Dust	Loss or decline in condition of habitat due to smothering by dust.	o Education and training of mine personnel on dust risks (to fauna habitat) and dust controls. o Dampening of cleared areas (daily, as required) using groundwater to minimise the potential for dust generation which could affect the quality of fauna habitat. o Daily visual monitoring of dust generation by mine personnel, with additional dampening of areas using groundwater to be undertaken where dust is visible. o Annual monitoring of vegetation condition at specified locations (to be determined) positioned within 100m of mine operations and at reference sites for any effects of dust to fauna habitat. o Incident reporting system to identify and communicate any environmental effects to fauna habitat.

ASPECT	SPECIFIC INDICATORS	MANAGEMENT CONTROLS
Introduced flora	Decline in habitat quality due to the introduction or spread of introduced flora.	o Education and training of mine personnel on appropriate hygiene procedures to minimise the introduction and spread of introduced flora. o Annual monitoring of introduced flora in areas adjacent to mine operations to detect any new occurrences or spread of existing occurrences, with data managed through a register. o If required, control (spraying) of introduced flora to minimise and/or eradicate known occurrences which may affect the quality of fauna habitat.
Introduced fauna	Damage to habitat or loss of conservation significant native fauna due to predation by introduced fauna.	o Annual monitoring of vegetation condition at specified locations (to be determined) positioned within 100m of mine operations and at reference sites for any effects of introduced fauna to fauna habitat. o Recording of sightings by mine personnel of introduced fauna in the vicinity of the mine operations. o Prohibition of pets within the mine operations. o If required, control of introduced fauna (trapping and/or culling) where significant disturbance to fauna or fauna habitat is recorded.

3.2.6 Environmental Commitments

Cliffs makes the following commitments for management of the environmental effects of the Proposal for the key environmental factor of 'Terrestrial Fauna':

(1) Fauna Management Plan

Cliffs will manage the environmental effects of the Proposal to fauna values through the preparation and implementation of a Fauna Management Plan.

The effect of the Proposal to the key environmental factor of 'Subterranean Fauna' is not expected to be environmentally significant. The Proposal design minimises the extent of ground excavations and restricts mining to above the groundwater level. Accordingly, no environmental commitments for the key environmental factor of 'Subterranean Fauna' are proposed.

A consolidation of Cliffs' commitments for the Proposal is contained in Section 5 *Environmental Commitments*.

3.2.7 Conclusion

As outlined by EPA (2014a, 2014c), the key environmental factors applicable to the assessment of the Proposal include:

(a) 'Terrestrial Fauna'; and

(b) 'Subterranean Fauna'.

The environmental effects of the Proposal to the key environmental factor of 'Terrestrial Fauna' are not expected to be environmentally significant, and can be appropriately managed through the preparation and implementation of a Fauna Management Plan. The EPA's objectives for the key environmental factor of 'Terrestrial Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of the recorded fauna values.

The environmental effects of the Proposal to the key environmental factor of 'Subterranean Fauna' are not expected to be environmentally significant, with the Proposal design minimising the extent of ground excavations and restricting mining to above the groundwater level. The EPA's objectives for the key environmental factor of 'Subterranean Fauna' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the representation, diversity, viability or ecological function of the recorded fauna values.

3.3 Landforms

3.3.1 Context

The Proposal will result in a change to the landform of the southern Koolyanobbing Range. Section 3.3 *Landforms* provides an assessment of the effect of the Proposal to the landform of the southern Koolyanobbing Range.

3.3.2 EPA Objective

The EPA's objective for the key environmental factor of 'Landforms' is:

> "*To maintain the variety, integrity, ecological functions and environmental values of landforms*" (EPA 2015a).

3.3.3 Legislation and Guidelines

Legislation, guidelines, standards and approvals relevant to the key environmental factor of 'Landforms' and the Proposal include:

(a) *Environmental Protection Act 1986* (WA)

(b) EPA Guidance Statement 33: *Environmental Guidance for Planning and Development* (EPA 2008)

(c) *Visual Landscape Planning in Western Australia* (WAPC 2007)

(d) *Visual Resource Management on Lands and Waters Managed by CALM* (DPaW 1989)

3.3.4 Assessment

Framework for Landform Assessment

As outlined by EPA (2008), landforms are considered to "*combine slope and elevation to produce the shape and form of the land surface*", which "*supports particular ecological communities, biota and ecosystem processes*". EPA (2008) also makes reference to '*landscape*' as a related concept which, together with landforms, "*influence human wellbeing and visual amenity, and reflect environmental health and essential ecosystem processes*".

Similarly, WAPC (2007) also identified both landscape and landforms as similar concepts, identifying landscapes and landforms as one of many considerations in planning for the use and development of land, with relevant assessment recommended where development may affect significant landforms. DPaW (1989) also identifies a need for developments to consider the visual aspects as an integral component of the land use planning and management processes.

Landform assessment is a subjective process, such that differing opinions between individuals are likely as to the visual perception and landform/landscape value that could be attributed to any particular area. As such, determining the significance of landform/landscape is also a subjective process.

The subjectivity of assessment of landform/landscape values is compounded by strong influences from both social and economic matters (i.e. not environmental factors). As outlined by EPA (2008), such social and economic matters which could be considered in landform/landscape assessment can include *inter alia* aesthetic values, recreation opportunities, economic and tourism opportunities, social opportunities, sense of place and spiritual experience, and heritage

values. This 'cross-over' between environmental, social and economic matters, compounded by the breadth of subjectivity on such matters, makes it difficult to accurately quantify the total range of views as to of the effect which a development may have to the landforms/landscapes present.

The EPA (2008) and WAPC (2007) identify a number of considerations relevant to the potential effect to landform/landscape values, which may include[1]:

(a) The well-being of the community which may be directly or indirectly affected by changes to landforms/landscapes;
(b) The effect of landform/landscape changes to both present generations and future generations;
(c) Potential for landform/landscape changes to result in environmental effects, such as loss of native vegetation, salinisation, erosion, eutrophication, contamination, soil acidification, water logging and air pollution;
(d) Changes to, or loss of, landforms/landscapes of limited distribution or unusual features;
(e) Spatial extent and configuration of development within landforms/landscapes;
(f) Changes to the original landscape, including elevation changes and alignment to existing landforms;
(g) Time sequence and anticipated success of rehabilitation within landforms/landscapes; and
(h) Views and distances of landforms/landscapes from nearest residences and public viewpoints.

The above considerations outlined by EPA (2008) and WAPC (2007) form the basis for this assessment of the effect of the Proposal for the key environmental factor of 'Landforms'.

Regional Landforms

The majority of the Yilgarn region is gently undulating lateritic duricrust and elevated sandplains, with low ironstone ranges rising above these plains. For contextual purposes, in the vicinity of the Proposal, these ironstone ranges include:

(a) Mt Finnerty (55kmENE of the Proposal, to 480mAHD);
(b) Mt Correll (75kmNW, 490mAHD);
(c) *Koolyanobbing Range* (510mAHD);
(d) Mt Watts (55kmENE, 515mAHD);
(e) Windarling Range (100kmNNW, 570mAHD);
(f) Mt Jackson (75kmNNW, 610mAHD);
(g) Mt Manning (100kmN, 630mAHD);
(h) Die Hardy Ranges (110kmN, 640mAHD); and
(i) Helena and Aurora Range (60kmN, 680mAHD).

The location and elevation of the ironstone ranges in the vicinity of the Proposal are identified by Figure 3-23.

[1] Points (a) to (d) adapted from EPA (2008), points (e) to (h) adapted from WAPC (2007).

Figure 3-23 Regional Landforms. The location and height of the ironstone range formations in the vicinity of the Proposal are identified. The Koolyanobbing Range is one of many ironstone ranges in the central Yilgarn region.

Landforms of the Koolyanobbing Range

The Koolyanobbing Range is an ironstone formation range that extends approximately 30km in length and to 510mAHD in height, covering both the northern and southern Koolyanobbing Ranges. Various sections of the Koolyanobbing Range vary in elevation between approximately 440mAHD and 510mAHD. For the purpose of landform/landscape assessment, the extent of the Koolyanobbing Range is generally defined by the boundary of the 2,500ha DPaW-classified PEC[1] (refer to Figure 3-6 in Section 3.1 *Flora*).

Surrounding the Koolyanobbing Range are extensive plains varying in elevation between approximately 340mAHD and 400mAHD, with salt lakes Lake Deborah and Lake Seabrook occurring at the lowest parts.

The elevations of the Koolyanobbing Range landform and the surrounding plains are identified by Figure 3-24.

The landforms of the Koolyanobbing Range have been modified through iron ore mining and mineral exploration over a period spanning more than 60 years, since 1950. The landforms of the Koolyanobbing Range have been modified through the excavation of several mine pits (depressions) and construction of adjacent waste rock landforms (elevated land masses). The surrounding plains have also been modified through clearing for the development of mining support infrastructure. Currently, the approved Koolyanobbing Range mine operations (covering both the Koolyanobbing Range and the surrounding plains) occupy a spatial area of approximately 790ha.

The landforms of the Koolyanobbing Range area have also been modified through salt mining undertaken at Lake Deborah, and by the development of the Perth-Kalgoorlie Railway. The spatial extent of these developments within the Koolyanobbing Range area has not been quantified.

The modifications to the landforms resulting from the approved Koolyanobbing Range mine operations will be rehabilitated to minimise the long-term visual and environmental effect of the mining development. As outlined by Section 3.4 *Mine Closure*, rehabilitation for the approved Koolyanobbing Range mine operations can be undertaken in accordance with a Mine Closure Plan. The rehabilitation will be undertaken for the areas of the Waste Rock Landforms and the Support Infrastructure, with the areas of the Mine Pits unable to be rehabilitated (refer Section 3.4 *Mine Closure*).

There are no recorded or known geodiversity values that are unique to the Koolyanobbing Range landform. The geodiversity values of the Koolyanobbing Range landform (i.e. the variety of rocks, minerals and soils) are considered to be consistent with the geodiversity values of other ranges across the broader region that were formed through the same geological processes.

Previously, EPA (2007b) identified the southern-end of the Koolyanobbing Range as having landscape value, with the views to Lake Seabrook identified as contributing to the landscape value.

As outlined by Section 3.1 *Flora*, the Koolyanobbing Range landform includes the 'Rare Flora' taxon *Tetratheca erubescens*; which is restricted to parts of the Koolyanobbing Range. As outlined by Section 3.1 *Flora* and Section 3.2 *Fauna*, the other flora and fauna values of the Koolyanobbing Range extend to other ranges across the broader region (i.e. not restricted).

[1] Consistent with the approach adopted by EPA (2014f).

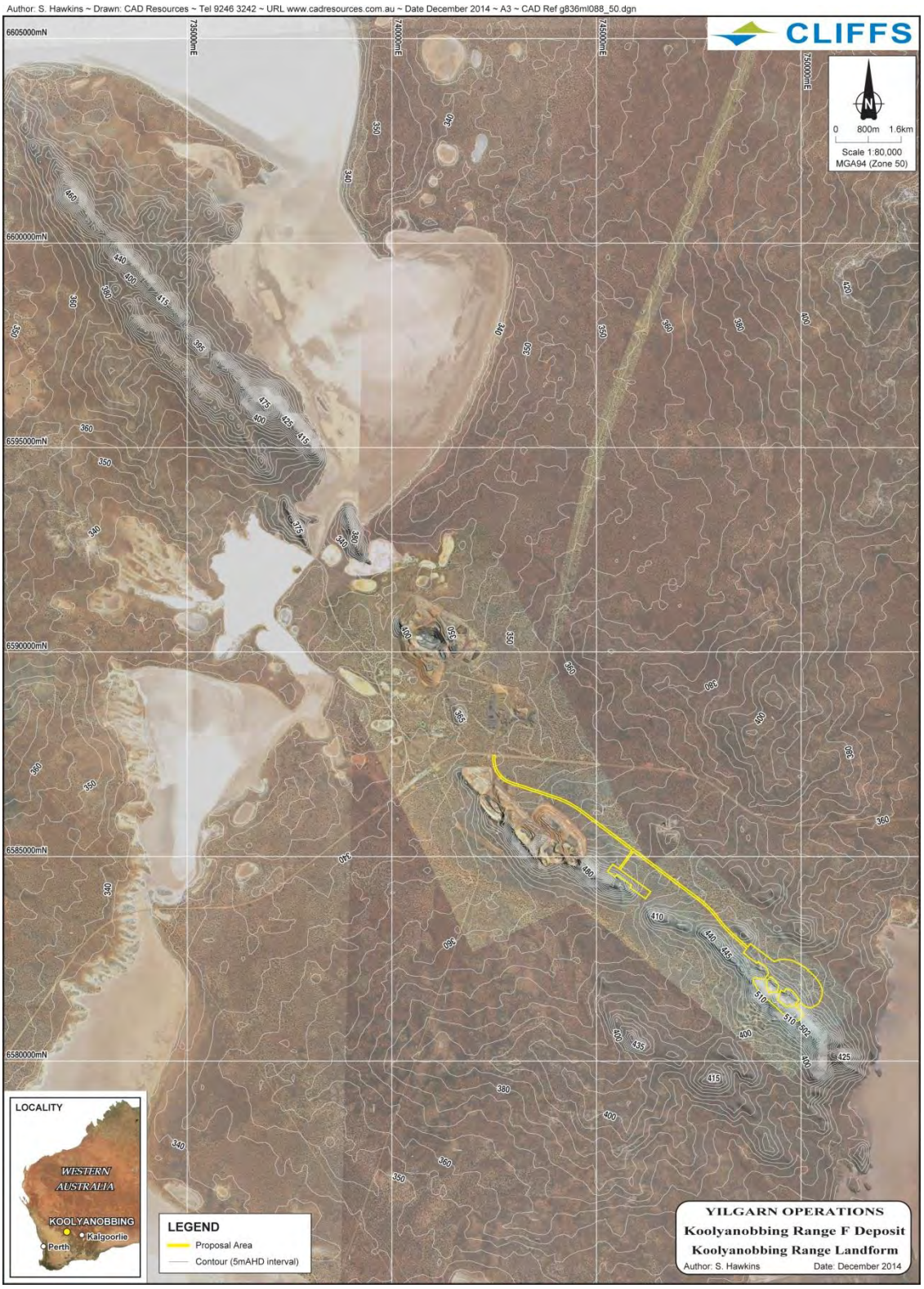

Figure 3-24 Koolyanobbing Range Landform. The Koolyanobbing Range extends approximately 30km in length, covering both the northern and southern Koolyanobbing Ranges. The peaks vary in elevation between approximately 440mAHD to 510mAHD. The surrounding plains vary in elevation between approximately 340mAHD to 400mAHD, with salt lakes occurring at the lowest points including Lake Seabrook and Lake Deborah.

Assessment of Landform Effects

Consistent with the existing mine operations at the Koolyanobbing Range, the Proposal will modify part of the Koolyanobbing Range through the excavation of Mine Pits (depressions) and construction of an adjacent Waste Rock Landform (an elevated land mass), as well as development of Support Infrastructure on the surrounding plains. Following the completion of mining, the Proposal area will require rehabilitation as part of the mine closure process (refer also to Section 3.4 *Mine Closure*). Conceptual imagery identifying the southern Koolyanobbing Range landforms pre-mining, during mining and post-mining is provided in Figures 3-25a to 3-25c.

Whilst the Koolyanobbing Range (to 510mAHD) is a prominent landform in the local area, the Koolyanobbing Range is of lower elevation than many other ironstone ranges in the local region (refer above under Regional Landforms). To that extent, the Koolyanobbing Range may be considered a significant landform at a local scale, however is unlikely to be a significant landform at a regional scale.

The Proposal will occupy an area of 211ha. The majority of the Proposal area (177ha, 86%) is located on the plains surrounding the Koolyanobbing Range, with a lesser area (34ha, 14%) for the Mine Pits positioned on the Koolyanobbing Range itself. The potential effect of the Proposal to the Koolyanobbing Range landform has been minimised through this mine planning configuration.

In context of the extent of the entire Koolyanobbing Range landform, which is generally defined by the boundary of the 2,500ha DPaW-classified PEC (refer to Figure 3-6 in Section 3.1 *Flora*), the Proposal coincides with 69ha (3%) of the Koolyanobbing Range landform. The effect of the Proposal to the entire Koolyanobbing Range landform is not considered to be significant. As outlined by Section 3.1 *Flora*, the approved Koolyanobbing Range mine operations coincide with approximately 25ha (1%) of the DPaW-classified PEC; such that the cumulative effect of the approved Koolyanobbing Range mine operations and the Proposal to the Koolyanobbing Range landform is also not considered to be significant.

Of the 34ha area for the Mine Pits positioned on the Koolyanobbing Range, approximately 9ha (26%) has previously been cleared through the construction of access tracks and drilling pads used in mineral exploration, with this resulting in fragmentation (i.e. separation) between parts of the landform. To that extent, the area of the Koolyanobbing Range landform in which the Proposal is situated is not considered to be intact (undisturbed).

The Proposal is positioned along the Koolyanobbing Range, approximately 2km from the most southerly end of the Koolyanobbing Range and Lake Seabrook. The landform values of this southern end beyond the Proposal perhaps hold the highest landform values of the southern Koolyanobbing Range, with this landform fanning-out towards Lake Seabrook in both northerly and southerly directions, and with only minimal land clearing from mineral exploration to date. The landform view from the Koolyanobbing Range towards Lake Seabrook, consistent with that identified in EPA (2007b)[1], will be maintained, as identified by Figure 3-26. The landform view from Lake Seabrook at the southern end of the Koolyanobbing Range will also not be affected, with the Proposal not visible due to the 'fanning-out' of the Koolyanobbing Range, with the retained view presented in Figure 3-27.

The Waste Rock Landform, to occupy an area of 76ha, will be an elevated land mass constructed on the lower slopes and plains on the northern side of the Koolyanobbing Range. The Waste Rock

[1] The image identified in EPA (2007b) of the southern Koolyanobbing Range landform and its view towards Lake Seabrook was taken from outside of the Proposal area.

Landform will be constructed to an elevation of approximately 420mAHD, which will be less than the adjacent area of the Koolyanobbing Range at 510mAHD. The potential visual effect of the Waste Rock Landform elevated land mass is expected to be further reduced by its orientation aligning with the north-west to south-east orientation of the Koolyanobbing Range.

The Koolyanobbing Range landform includes the 'Rare Flora' taxon *Tetratheca erubescens*; which is restricted to the Koolyanobbing Range. The Proposal will remove part of the *Tetratheca erubescens* population, including the habitat it occupies. An assessment of the habitat of *Tetratheca erubescens* is outlined in BGPA (2015). As outlined by Section 3.1 *Flora*, the removal of part of the *Tetratheca erubescens* population, and the habitat it occupies, is not expected to result in a significant detrimental effect to the taxon. Environmental monitoring undertaken at Cliffs' existing Windarling Range mine operations on the related flora taxon *Tetratheca paynterae* ssp. *paynterae* has demonstrated that population to remain healthy and viable after approximately 10 years of mine operations (monitoring data 2003 (pre-mining) to 2013), with the key outcomes identified including the maintenance of population health, flowering/fruiting continuing, and germination of new individuals within the population (Cliffs 2014c). This long-term monitoring of *Tetratheca paynterae* ssp. *paynterae* provides a sound basis on which to conclude that that the removal by the Proposal of part of the *Tetratheca erubescens* population, including the effect of any fragmentation from removal of part of the habitat it occupies, is similarly unlikely to affect the ecological function (i.e. health, reproduction) of the *Tetratheca erubescens* population within Koolyanobbing Range landform.

As outlined by Section 3.1 *Flora* and Section 3.2 *Fauna*, the other flora and fauna values of the Koolyanobbing Range extend to other ranges across the broader region (i.e. not restricted). As such, the removal by the Proposal of individuals of these taxa, including the effect of any fragmentation from removal of part of the habitat which such taxa occupy, is similarly unlikely to affect the ecological function (i.e. health, reproduction) of such taxa within Koolyanobbing Range landform and the broader region.

Following the completion of mining, the Proposal area will require rehabilitation as part of the mine closure process. As outlined by WAPC (2007), rehabilitation following mining can both minimise the visual effect of landform changes and allow for the future land use. As outlined by Section 3.4 *Mine Closure*, rehabilitation of the Waste Rock Landform and Support Infrastructure areas will be undertaken progressively during mining (where possible), and post-mining. Based on rehabilitation works at Cliffs' existing mine operations, the likelihood of successful rehabilitation is considered good, with the rehabilitation works expected to provide visual softening of the Proposal area within approximately 6 years following mine closure. The rehabilitation of the Waste Rock Landform can also be expected to partially screen the Mine Pits when viewed from the north (noting when viewed from the southern side, the Mine Pits will not be visible due to the retained topography of the Koolyanobbing Range). Viewshed images of the Proposal pre-mining, during mining and post-mining from fixed locations to the north-east, south-east and south-west of the proposal are identified by Figures 3-28a to 3-28c.

As outlined by WAPC (2007), the effect of a Proposal to landform values should be assessed from the nearest residences and public viewpoints. There are no nearby residences to the Proposal area, and accordingly, no effect to nearby residences is anticipated. Similarly, a visual effect from public viewpoints is also not expected, with the Proposal not expected to be visible from the Koolyanobbing-Southern Cross Road or from the Perth-Kalgoorlie Railway due to the separation distances and road/rail-side native vegetation providing visual screening. It is possible that the Proposal may be distantly visible from the nearest part of the Jaurdi Pastoral Lease managed by DPaW, positioned approximately 10km from the Proposal on the eastern side of Lake Seabrook.

In summary of the assessment information above, the effect of the Proposal to the key environmental factor of 'Landforms' is not expected to be significant, in that:

(a) Whilst the Koolyanobbing Range may be considered to have locally significant landform value, its landform value at the regional scale is not considered significant given its lower elevation than many other ranges in the local region and history of disturbance from mining and mineral exploration spanning more than 60 years;

(b) The spatial extent of the Proposal within the Koolyanobbing Range landform is limited, coinciding with approximately 3% of the Koolyanobbing Range landform;

(c) The configuration of the Proposal is such that its majority area will be positioned on the surrounding plains (which are extensive), with the lesser proportion of the Proposal positioned on the southern Koolyanobbing Range itself, within which approximately 26% has previously been cleared by mineral exploration;

(d) The effect of the Proposal to the Koolyanobbing Range landform is not expected to affect the ecological function of its flora and fauna taxa, with most of the flora and fauna taxa having recorded distributions beyond the Koolyanobbing Range across the broader region;

(e) The effect of the Proposal to landform values will be minimised through rehabilitation of the Waste Rock Landform and Support Infrastructure areas (refer also Section 3.4 *Mine Closure*), with the orientation of the Waste Rock Landform aligning to the southern Koolyanobbing Range and assisting to provide partial screening of the Mine Pits;

(f) The Proposal is not expected to be visible from any near residences or public viewpoints, with the Proposal potentially only distantly visible (from approximately 10km away) from part of the Jaurdi Pastoral Lease managed by DPaW. Similarly, an effect to other social aspects (e.g. community well-being) from the modified landforms is also not expected.

Assessment of Landform Considerations

As outlined above (*Framework for Landform Assessment*), EPA (2008) and WAPC (2007) identify a number of considerations relevant to the potential effect to landform/landscape values. Table 3-5 provides an assessment of the anticipated effect of the Proposal relative to the considerations outlined by EPA (2008) and WAPC (2007).

Figure 3-25a Conceptual Landforms Pre-Mining. The conceptual image identifies the current landforms of the southern Koolyanobbing Range, as viewed from the northern side. The approved Koolyanobbing Range mine operations are visible.

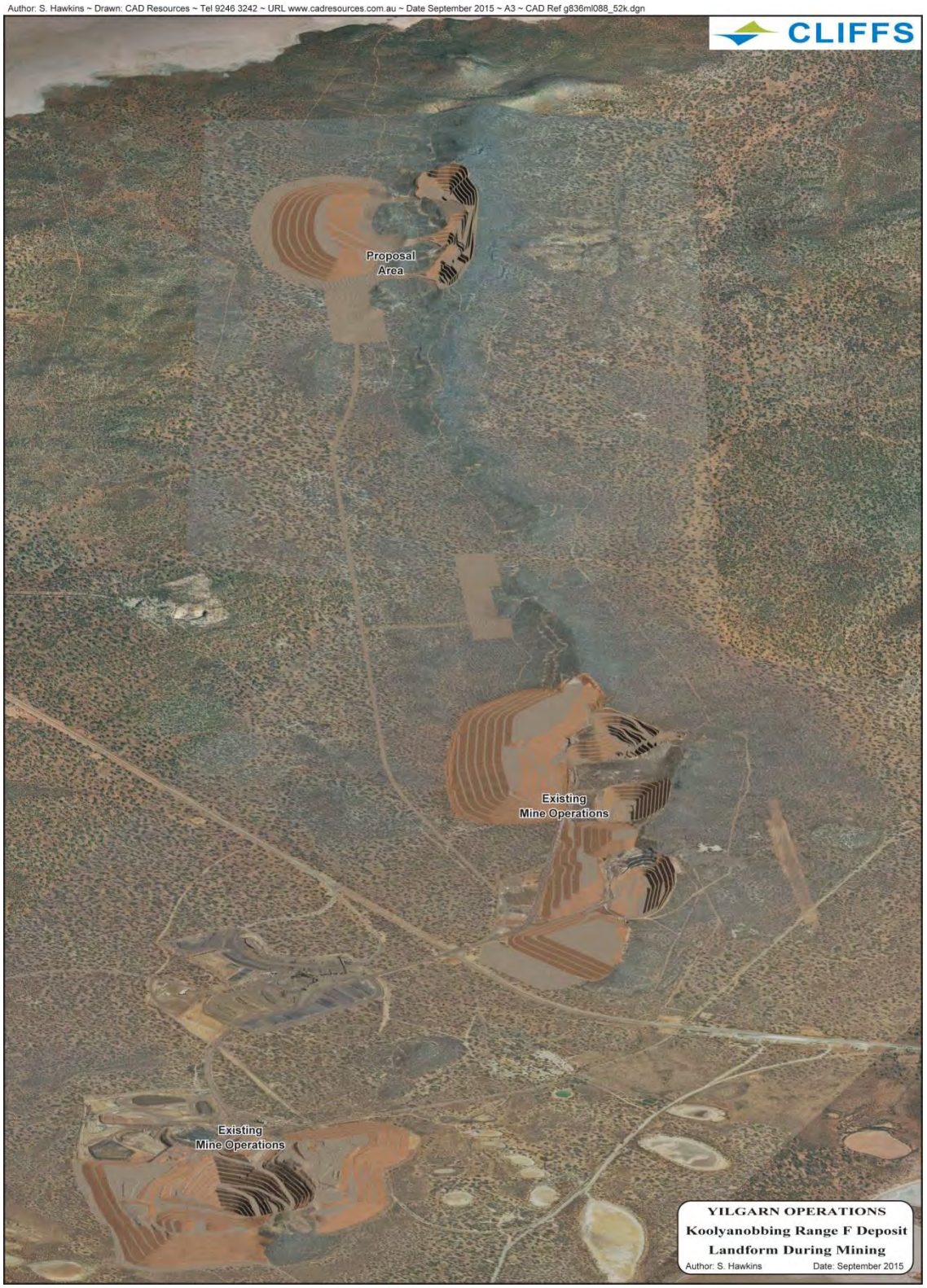

Figure 3-25b Conceptual Landforms during Mining. The conceptual image identifies the landforms of the southern Koolyanobbing Range during mine operations, as viewed from the northern side. The Proposal area is identified in yellow. The Proposal and the approved Koolyanobbing Range mine operations are identified at full development, prior to mine closure.

Figure 3-25c Conceptual Landforms Post-Mining. The conceptual image identifies the landforms of the southern Koolyanobbing Range post-mining with the Waste Rock Landform and Support Infrastructure areas rehabilitated. The areas of the approved Koolyanobbing Range mine operations are also identified as rehabilitated.

Figure 3-26 View from the Koolyanobbing Range towards Lake Seabrook. The image, taken from outside of the Proposal area, depicts the landscape view of the retained areas of the southern Koolyanobbing Range looking towards Lake Seabrook. Image: Globe Environments (2014 unpublished).

Figure 3-27 View of the Koolyanobbing Range from Lake Seabrook. The image, taken from Lake Seabrook, identifies the landscape view of the retained southern-end of the southern Koolyanobbing Range. The Proposal area is not expected to be visible from Lake Seabrook at the southern end of the southern Koolyanobbing Range. Image: Globe Environments (2014 unpublished).

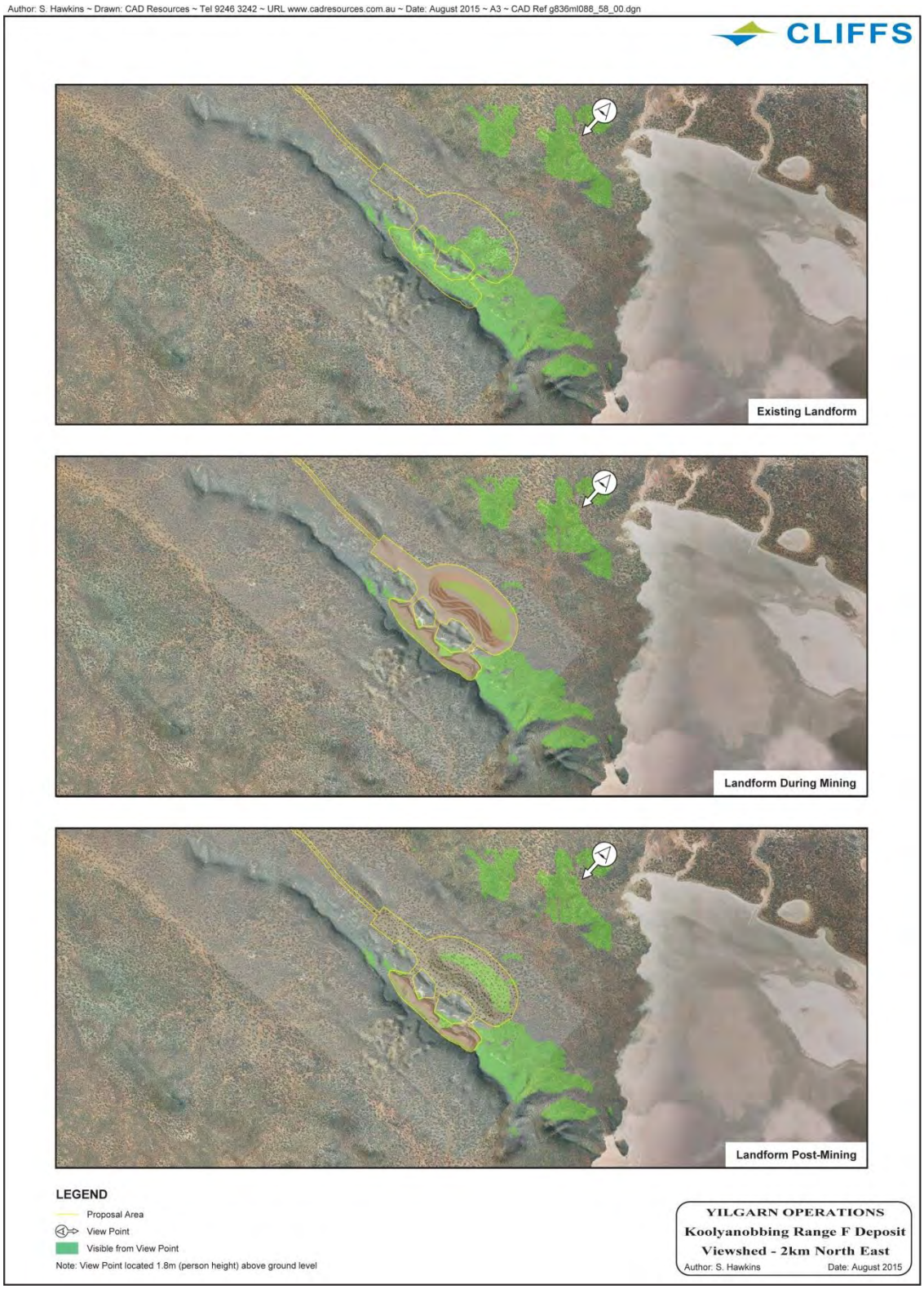

Figure 3-28a Viewshed of Landforms Pre-mining, Mining and Post-Mining from North-East of the Proposal. The image identifies the modelled viewshed towards the Proposal from the north-east (2km) at person-height (1.8m). Note the modelled viewshed is conservative as it does not incorporate the height of vegetation that may provide additional screening.

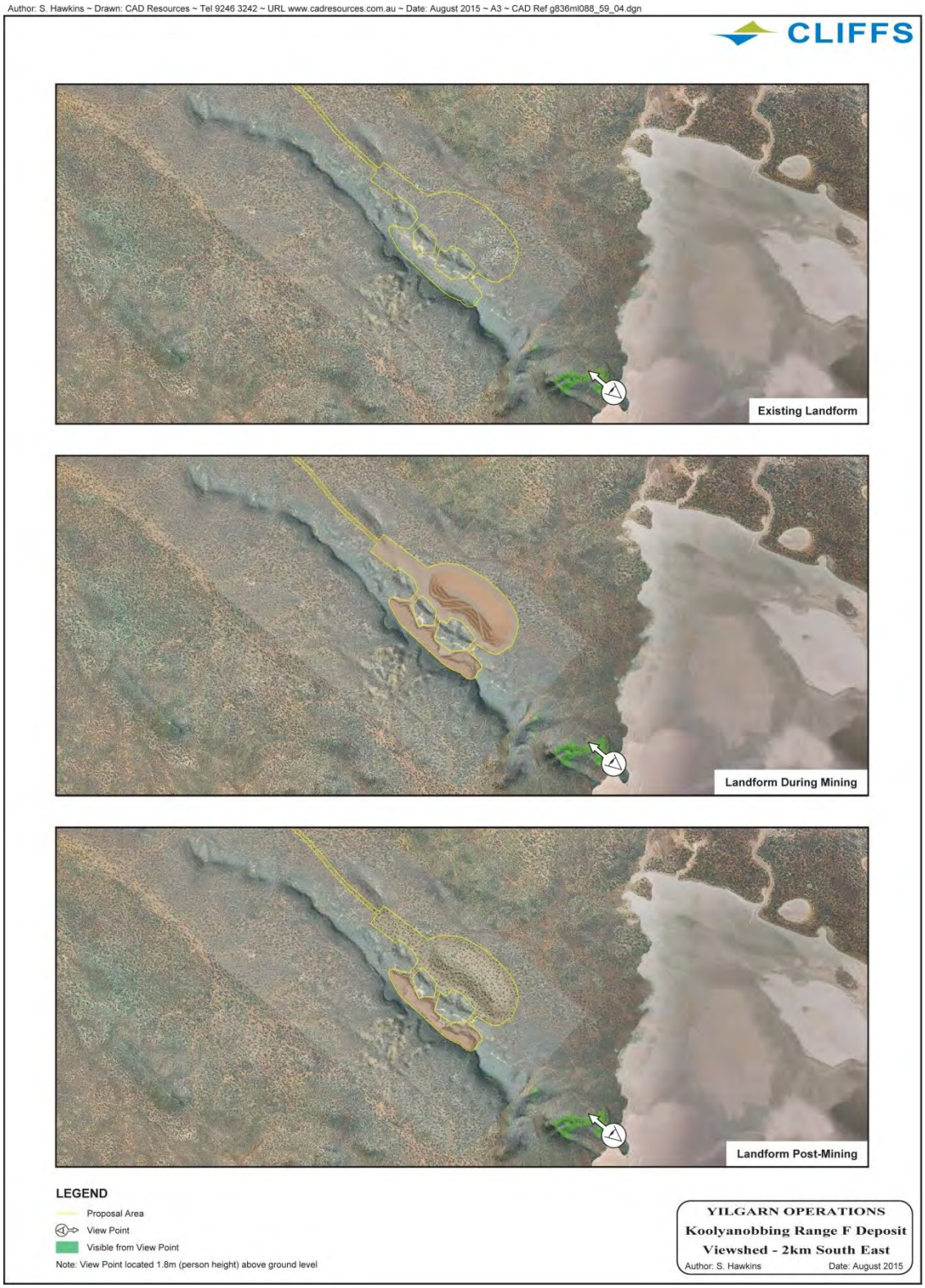

Figure 3-28b Viewshed of Landforms Pre-mining, Mining and Post-Mining from South-East of the Proposal. The image identifies the modelled viewshed towards the Proposal from the south-east (2km) at person-height (1.8m).

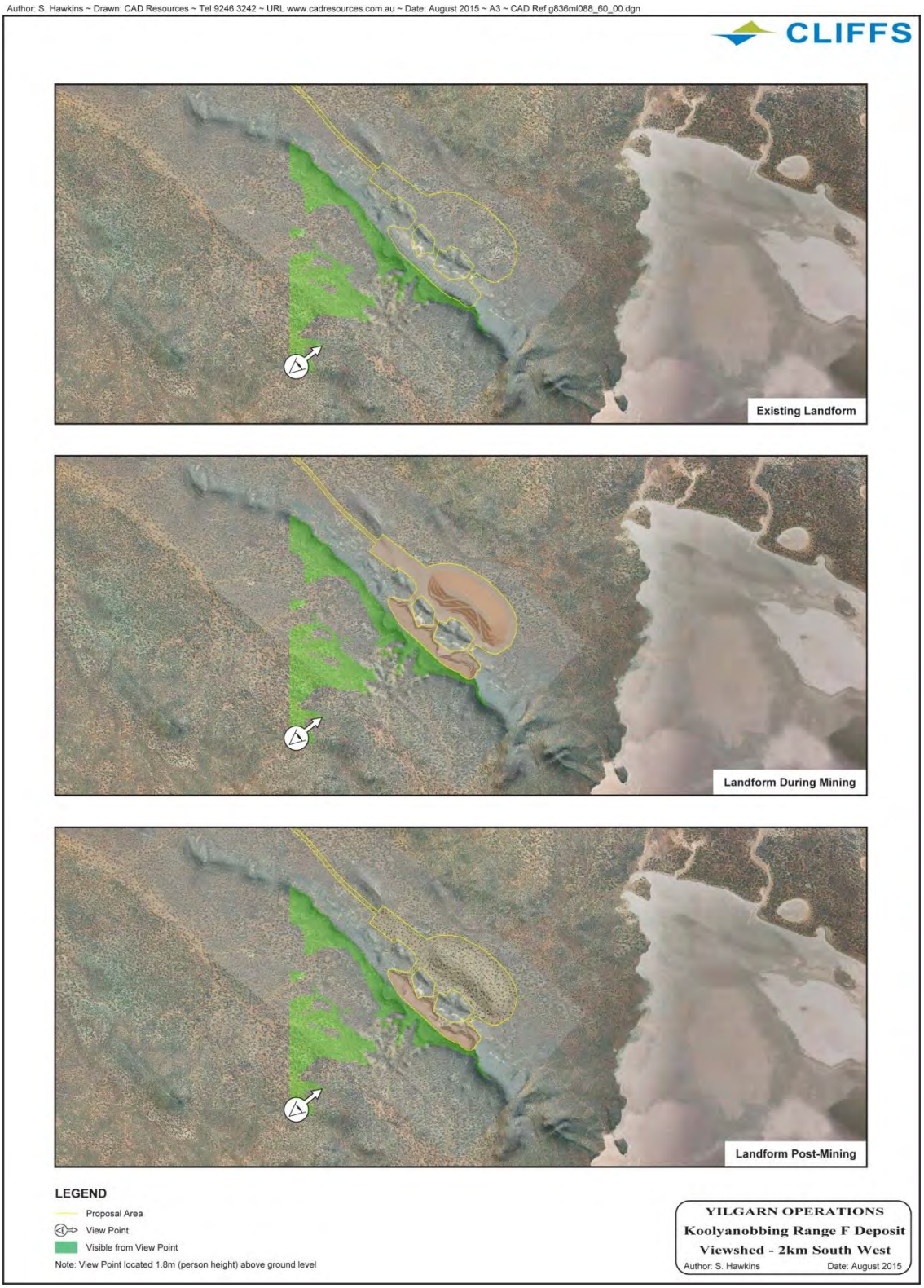

Figure 3-28a Viewshed of Landforms Pre-mining, Mining and Post-Mining from South-West of the Proposal. The image identifies the modelled viewshed towards the Proposal from the south-west (2km) at person-height (1.8m).

Table 3-5 Assessment of Landform Considerations. The anticipated effect of the Proposal to the considerations outlined by EPA (2008) and WAPC (2007) is assessed.

LANDFORM CONSIDERATIONS	THE PROPOSAL
The well-being of the community which may be directly or indirectly affected by changes to landforms/landscapes	The Proposal is located approximately 50km north-east of the nearest publicly occupied townsite (Southern Cross). Due to the separation distance between the Proposal and the community, the Proposal is not expected to result in a significant direct or indirect effect to community wellbeing.
The effect of landform/landscape changes to both present generations and future generations	The Proposal will modify part of the Koolyanobbing Range landform/landscape through the excavation of Mine Pits (depressions) and the construction of a Waste Rock Landform (elevated land mass). The Waste Rock Landform component of the Proposal will be rehabilitated following the completion of mining (refer to Section 3.4 *Mine Closure*). The effect to landform/landscape changes will be principally evident during mining (which is short-term), with permanent long-term change to the landform/landscape being limited to the confined area of the Mine Pit. The spatial area of the landform/landscape changes, and the temporal scale of such changes, would indicate the Proposal is unlikely to result in a significant effect to either present generations or future generations.
Potential for landform/landscape changes to result in environmental effects, such as loss of native vegetation, salinisation, erosion, eutrophication, contamination, soil acidification, water logging and air pollution	The Proposal will modify part of the Koolyanobbing Range landform/landscape through the excavation of Mine Pits (depressions) and the construction of a Waste Rock Landform (elevated land mass). As outlined by Section 3.1 *Flora*, the Proposal will require the clearing of native vegetation, with the effect not considered to be environmentally significant. As outlined by Section 3.4 *Mine Closure*, based on similar geology and the geochemical characterisation of waste rock samples from other ore deposits on the Koolyanobbing Range, the Proposal is not expected to present a risk of contamination from acid and metalliferous drainage. As outlined by Section 3.4 *Mine Closure*, the Waste Rock Landform design seeks to control the potential for erosion by surface water drainage through the use of gentle angle batters, backsloping berms, and rehabilitation with native vegetation. There are no aspects of the Proposal that would indicate a significant risk of salinisation, eutrophication, water logging or air pollution.
Changes to, or loss of, landforms/landscapes of limited distribution or unusual features	The Proposal is confined to a portion of the Koolyanobbing Range area, with no unusual features. The Koolyanobbing Range is one of many ranges in the Yilgarn Region, with such landforms/landscapes not considered to be of limited distribution.
Spatial extent and configuration of development within landforms/landscapes	The configuration of the Proposal provides for the majority of the Proposal components (Waste Rock Landform and Support Infrastructure, 177ha) being positioned on the extensive surrounding plains, with the lesser proportion of the Proposal (Mine Pit, 34ha) occurring within the ridge area of the Koolyanobbing Range.
Changes to the original landscape, including elevation changes and alignment to existing landforms	The Proposal will modify part of the Koolyanobbing Range landform/landscape through the excavation of Mine Pits (depressions) and the construction of a Waste Rock Landform (elevated land mass). The Mine Pits will remove a portion of the Koolyanobbing Range of an elevation of approximately 510mAHD (refer to Figure 3-24). The Waste Rock Landform will align to the orientation of the existing landform of the Koolyanobbing Range, with the lower elevation of approximately 420mAHD being consistent with other parts of the Koolyanobbing Range landform/landscape.
Time sequence and anticipated success of rehabilitation within landforms/landscapes	As outlined by Section 3.4 *Mine Closure*, the majority of the Proposal components (Waste Rock Landform and the Support Infrastructure, 177ha) will be progressively rehabilitated with native vegetation. There are no recorded constraints (e.g. waste rock geochemical characterisation or soil characterisation) that would indicate significant constraints to achieving successful rehabilitation. The rehabilitation works are expected to achieve the proposed completion criteria within approximately 6 years following the completion of mining.
Views and distances of landforms/landscapes from nearest residences and public viewpoints	As the Proposal is located approximately 50km north-east of the nearest publicly occupied townsite (Southern Cross), no visual effect to nearest residences is expected. The Koolyanobbing Range does not contain any public viewpoints.

3.3.5 Environmental Management

The effect of the Proposal to the key environmental factor of 'Landforms' is not expected to be significant. Accordingly, no environmental management actions are proposed.

The potential effect of the Proposal to the southern Koolyanobbing Range landform can be appropriately managed through contemporary mining processes and mining controls, which will include the implementation of land clearing controls, mine engineering design to achieve long-term safe and stable mining landforms, controlled blasting procedures, monitoring of wall stability during mining, and progressive and post-mining rehabilitation of disturbed areas. These contemporary mining processes and mining controls will assist to ensure the effects to the landform are contained to predictions within the defined Proposal area.

3.3.6 Environmental Commitments

The effect of the Proposal to the key environmental factor of 'Landforms' is not expected to be significant. Accordingly, no environmental commitments are proposed.

3.3.7 Conclusion

As outlined by EPA (2014a, 2014c), the key environmental factors applicable to the assessment of the Proposal include:

(a) 'Landforms'.

The effect of the Proposal to the key environmental factor of 'Landforms' is not expected to be significant. The EPA's objectives for the key environmental factor of 'Landforms' can therefore be met, noting the Proposal is not expected to result in a significant detrimental effect to the variety, integrity, functions or values of landforms.

3.4 Mine Closure

3.4.1 Context

The Proposal will require mine closure following its completion. Section 3.4 *Mine Closure* provides an assessment of mine closure for the Proposal.

3.4.2 EPA Objective

The EPA's objective for the key integrating factor of 'Rehabilitation and Decommissioning' is:

> "*To ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner*" (EPA 2015a).

3.4.3 Legislation and Guidelines

Legislation, guidelines, standards and approvals relevant to the key integrating factor of 'Rehabilitation and Decommissioning' and the Proposal include:

(a) *Mining Act 1978* (WA)
(b) *Mining Rehabilitation Fund Act 2012* (WA)
(c) *Environmental Protection Act 1986* (WA)
(d) *Land Administration Act 1997* (WA)
(e) *Mines Safety and Inspection Regulations 1995* (WA)
(f) *Guidelines for Preparing Mine Closure Plans* (DMP & EPA 2015)
(g) EPA Guidance Statement 6: *Rehabilitation of Terrestrial Ecosystems* (EPA 2006a)
(h) EPA Environmental Protection Bulletin 19: *EPA Involvement in Mine Closure* (EPA 2013b)
(i) *Safety Bund Walls Around Open Pit Mines – Guideline* (DMP 1997)
(j) *Yilgarn Operations Mine Closure Plan* (Cliffs 2015a)

3.4.4 Assessment

Legislative Framework for Mine Closure

Mine closure in Western Australia is principally administered under the *Mining Act 1978* (WA) and regulated by DMP. The *Mining Act 1978* (WA) requires a Mine Closure Plan to be prepared for mining operations, with the Mine Closure Plan to be reviewed and re-approved each 3 years.

The EPA may also elect to consider mine closure for mine developments assessed under the *Environmental Protection Act 1986* (WA) in cases where environmental effects or risks associated with mine closure exist which cannot be adequately regulated by DMP (EPA 2013b).

The requirements of DMP and EPA for mine closure are outlined within the document *Guidelines for Preparing Mine Closure Plans* (DMP & EPA 2015). This Guideline seeks to outline the requirements for mine closure that will meet the expectations of both DMP under the *Mining Act 1978* (WA) and EPA under the *Environmental Protection Act 1986* (WA).

Mine Closure is also regulated through the *Mining Rehabilitation Fund Act 2012* (WA) by DMP, through which mining operations make financial contributions towards a Mining Rehabilitation Fund based on the area and type of land disturbance.

Mine Closure Plan Framework

Cliffs undertakes mine closure at the Koolyanobbing Range mine operations in accordance with the Koolyanobbing Range Mine Closure Plan (Cliffs 2012). The Koolyanobbing Range Mine Closure Plan has been prepared in accordance with the DMP and EPA (2011) document *Guidelines for Preparing Mine Closure Plans*, and has been approved by DMP[1] (2013). The approved Koolyanobbing Range Mine Closure Plan is provided on the compact disc appended to this EIA-PER document, and is also publicly available on Cliffs' website (www.CliffsNaturalResources.com).

Similarly, mine closure for each of the Windarling Range mine operations, Mt Jackson Range mine operations and the Deception Deposit (undeveloped) are each outlined within separate Mine Closure Plans assessed and approved by DMP (i.e. four (4) separate Mine Closure Plans).

In 2014, Cliffs commenced a process to consolidate mine closure for the Yilgarn Operations into a single revised Mine Closure Plan, with the separate Mine Closure Plans to then be superseded. The purpose of the consolidation process was to align mine closure across the Yilgarn Operations given the general consistency of the mine infrastructure, rehabilitation requirements and post-mining land use. In April 2015, consistent with the requirements of the *Mining Act 1978* (WA), Cliffs submitted the revised Mine Closure Plan (Cliffs 2015a) to DMP for assessment. The revised Mine Closure Plan has been prepared in accordance with the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans* (revised version). As at September 2015, the revised Mine Closure Plan remained under assessment with DMP.

Cliffs discussed with DMP the potential to include the Proposal within the revised Mine Closure Plan given the consistency in the mine closure planning for the Proposal and the approved mine operations. The DMP identified that inclusion of the Proposal would prevent the approval of the revised Mine Closure Plan as a result of the DMP being unable to approve a Mine Closure Plan that included mine operations which are yet to be approved under the *Mining Act 1978* (WA). As such, it has not been possible to incorporate the Proposal within the revised Mine Closure Plan at this stage.

Section 3.4 *Mine Closure* seeks to provide an assessment of mine closure consistent with the key information requirements of the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans* (e.g. post-mining land use, objectives, management actions, completion criteria, monitoring). The intent of Section 3.4 *Mine Closure* is to outline how the Proposal can be rehabilitated and decommissioned in order to meet the EPA's objectives for the key integrating factor of 'Rehabilitation and Decommissioning'.

The mine closure information for the Proposal as outlined within this EIA-PER document is readily able to be incorporated into the next revision of the Mine Closure Plan, currently scheduled for 2018 (being prior to mine closure for the Proposal).

[1] Mine closure for the approved Koolyanobbing Range mine operations is regulated by DMP under the *Mining Act 1978* (WA). The EPA is currently not involved in the regulation of mine closure for the approved Koolyanobbing Range mine operations.

Mine Closure for the Proposal

The Proposal is located along the southern Koolyanobbing Range, and will function as an operational extension to the approved Koolyanobbing Range mine operations. In this context, the Proposal is not expected to present any mine closure aspects (i.e. infrastructure types, rehabilitated landforms, climate, soils and vegetation) that are materially different to the mine closure aspects outlined for the approved Koolyanobbing Range mine operations.

Consistent with the Mine Closure Plans (2012, 2015a), mine closure planning for the Proposal will be coordinated through the use of 'Management Units', with the Mine Pits and the Waste Rock Landform components of the Proposal included as new Management Units, and with the Support Infrastructure components incorporated within existing Management Units. Rehabilitation works for the Proposal will be focussed on establishing native vegetation within the Waste Rock Landform and Support Infrastructure Management Units, with the Mine Pits Management Unit to be retained as an unrehabilitated open void (consistent with the approach for other mine pits at the Koolyanobbing Range). Where possible, rehabilitation and decommissioning of each Management Unit will be undertaken progressively (e.g. rehabilitation of the completed lower lifts of the Waste Rock Landform Management Unit).

As the ridgeline habitat type occupied by the 'Rare Flora' taxon *Tetratheca erubescens* (refer to Section 3.1 *Flora*) will not occur within the rehabilitation areas of the Waste Rock Landform and the Support Infrastructure Management Units, the rehabilitation objectives relate to the establishment of native vegetation generally. Restoration of *Tetratheca erubescens* is therefore addressed separately within Section 3.5 *Offsets* and by the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

To provide context, whilst the approved Koolyanobbing Range mine operations have a history spanning more than 60 years, much of the rehabilitation works are at an early stage due to only limited areas having mining now completed and available for rehabilitation. A representative image of some of the initial rehabilitation works (approximately 3.5 years old) at the approved Koolyanobbing Range B/C Deposit Waste Rock Landform is presented in Figure 3-29.

Monitoring of the rehabilitation works to date indicates good rehabilitation establishment, with a view that further growth over time will position the rehabilitation works towards meeting the rehabilitation completion criteria. Table 3-6 provides an analysis of data for the progress of the monitored rehabilitation sites in reaching the completion criteria at the Koolyanobbing Range mine operations, as extracted from Cliffs (2015d). The data analysis is based upon a comparison of rehabilitation site quadrats at the A, B/C and K Deposit Waste Rock Landforms in 2014 with comparison to completion criteria derived from local reference site quadrats. The 3 key measures used to determine rehabilitation success are foliage cover (% cover), plant density (number of individuals per quadrat) and species richness (number of species per quadrat), with the completion criteria set at a percentage of the average values of the local reference sites (as outlined within Cliffs 2012, 2015a). The green-shaded boxes identify the monitoring sites where the completion criteria have been achieved, with the yellow-shaded boxes identifying where the completion criteria have yet to be achieved. As identified by Table 3-6, more than 40% of the monitored rehabilitation site quadrats currently meet the completion criteria for all 3 key measures of rehabilitation success, with a further 30% currently meeting 2 of 3 key measures.

Figure 3-29 Rehabilitation at the approved Koolyanobbing Range Mine Operations. The image depicts the progress of rehabilitation (at approximately 3.5 years age) at the Koolyanobbing Range B/C Deposits Waste Rock Landform. Progressive rehabilitation works has been completed on the lower lifts of the B/C Deposit Waste Rock Landform, with the active construction of the upper lifts also visible. Source: Globe Environments, September 2015.

Similarly, monitoring of the rehabilitation works at the Windarling Range W2 Deposit Waste Rock Landform and the Mt Jackson Range J2 and J3 Deposit Waste Rock Landforms also indicate good rehabilitation establishment. At these locations, more than 35% of the rehabilitation site quadrats have been recorded as meeting the completion criteria for all 3 key measures of rehabilitation success, with a further 45% currently meeting 2 of 3 key measures. Further growth over time is expected to position these rehabilitation works towards meeting the rehabilitation completion criteria at all sites.

Further detail of the monitoring approach, and the data analysis for the rehabilitation sites at the Koolyanobbing Range, Windarling Range and the Mt Jackson Range mine operations are provided in Appendix 9 (an extract from Cliffs 2015d). Additional images identifying the reference site areas and the rehabilitation monitoring site areas at the Koolyanobbing Range, Windarling Range and the Mt Jackson Range mine operations are provided in Appendix 10.

The rehabilitation works undertaken to date at the Koolyanobbing Range A, B/C and K Deposits Waste Rock Landforms provide relevant examples of the proposed approach and expected results for rehabilitation of the Proposal. These rehabilitation monitoring results, supported also by the rehabilitation monitoring results at the Windarling Range and Mt Jackson Range mine operations, provide a high level of confidence towards Cliffs' ability to be able to achieve successful rehabilitation for the Proposal.

	Koolyanobbing A1 Deposit WRL					Koolyanobbing B/C Deposit WRL				Koolyanobbing K Deposit WRL										
	Reference Sites	Monitoring Sites				Reference Sites	Monitoring Sites			Reference Sites	Monitoring Sites									
	Completion Criteria	A1 01	A1 02	A1 03	A1 04	Completion Criteria	BC 01	BC 02	BC 03	Completion Criteria	K 05	K 06	K 07	K 09	K 10	K 11	K 12	K 13	K 14	K 15
Foliage Cover (%)	8.7	16.4	17.6	2.9	17.6	8.7	9.7	3.2	4.7	5.8	4.4	7.6	26.4	17.2	24.1	26.0	20.8	1.6	0	0.2
Plant Density (No. individuals per quadrat)	4.7	8.9	20.5	1.9	13.7	4.7	5.1	3.9	10.8	4.0	4.7	6.5	7.5	16.2	20.4	15.5	27.2	8.3	0	0
Species Richness (No. species per quadrat)	9.1	20	13	14	14	9.1	12.0	2.0	12.0	8.9	10	8	12	9	10	8	8	8	0	1

Table 3-6 Rehabilitation analysis for Cliffs' approved Koolyanobbing Range mine operations. The data analysis for the progress of the rehabilitation works in reaching the completion criteria is identified for the Koolyanobbing Range A1 Deposit Waste Rock Landform, Koolyanobbing Range B/C Deposit Waste Rock Landform and the Koolyanobbing Range K Deposit Waste Rock Landform. The data analysis is based upon comparison of rehabilitation site quadrats relative to the completion criteria derived from reference site quadrats. The green-shaded boxes identify the monitoring sites where the completion criteria have been achieved, with the yellow-shaded boxes identifying where the completion criteria have yet to be achieved. Images identifying the reference sites and the rehabilitation monitoring sites at the Koolyanobbing Range, Windarling Range and the Mt Jackson Range mine operations are provided in Appendix 10. An outline of the monitoring approach and data analysis for the rehabilitation sites at the Koolyanobbing Range, Windarling Range and the Mt Jackson Range mine operations are provided in Appendix 9. Source: Adapted from Cliffs (2015d).

An assessment of the key mine closure considerations outlined within the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans* is provided below.

Stakeholder Consultation

Consultation on the Mine Closure Plans (Cliffs 2012, 2015a) applying to Cliffs' Yilgarn Operations has been undertaken with a range of stakeholders comprising government, private organisations, the Pastoral Leaseholder, indigenous groups, and community groups. Further consultation with stakeholders will be undertaken during mining to refine the mine closure objectives and the completion criteria for the approved Koolyanobbing Range mine operations.

For the Proposal, Cliffs has undertaken preliminary consultation with key stakeholders (refer Section 4 *Stakeholder Consultation*), with Cliffs identifying its broad objective to implement mine closure generally consistent with the Mine Closure Plan to allow for post-mining use.

This EIA-PER document seeks to expand on Cliffs' proposed outcomes for mine closure of the Proposal, with public review of this EIA-PER document representing additional consultation with stakeholders on mine closure.

Cliffs will continue to undertaken stakeholder consultation on mine closure during the implementation of the Proposal.

Post-Mining Land Use

As outlined by the Mine Closure Plans (Cliffs 2012, 2015a), the anticipated post-mining land use for the approved Koolyanobbing Range mine operations has been proposed as continued pastoralism in accordance with the underlying Brontie Pastoral Lease granted under the *Land Administration Act 1997* (WA). With this in mind, the Koolyanobbing Range mine operations had been targeted to achieve mine closure and rehabilitation that is consistent with a pastoral post-mining land use.

In July 2015, the Brontie Pastoral Lease expired, with the land area the reverting to Unallocated Crown Land under the *Land Administration Act 1997* (WA), vested with DoL. The proposed mine closure and rehabilitation outcomes are also considered to be appropriate for Unallocated Crown Land.

For the Proposal, it is similarly envisioned that the mine closure and rehabilitation outcomes proposed will also be applicable for post-mining use as Unallocated Crown Land.

The final post-mining land use(s) for the Koolyanobbing Range mine operations and the Proposal area will continue to be discussed and agreed upon with relevant stakeholders.

Mine Closure Actions

Consistent with the approach outlined by DMP and EPA (2015), the Mine Closure Plans (Cliffs 2012, 2015a) divide areas of the approved Koolyanobbing Range mine operations into 'Management Units' comprising landforms or features that have similar rehabilitation needs for their intended post-mining land use.

Cliffs considers the Proposal can be readily incorporated into the next subsequent revision of the Mine Closure Plan, with the Mine Pits and Waste Rock Landform components included as new Management Units, and the Support Infrastructure component incorporated within existing Management Units. Figure 3-30 identifies the proposed Management Units applicable to the Proposal.

For the Proposal, the post-mining landforms and the operational capability to undertake closure works will assist to define the types of mine closure actions that can be implemented within each proposed Management Unit. A general description of the mine closure actions proposed for each Management Unit for the Proposal is outlined below:

(a) Mine Pits Management Unit -

Consistent with standard mining practices, the Mine Pits will be left as open voids at the completion of mining. The Mine Pits will not be able to be rehabilitated due to the consolidated rock structure and safety constraints.

As outlined by DMP (1997), it will be necessary to prevent potential inadvertent access to the Mine Pits. Accordingly, Cliffs proposes to install post-mining safety abandonment bunding connecting the elevated areas of the Koolyanobbing Range on the outside of the Mine Pits to the Waste Rock Landform (within the Proposal area). The retained steep topography and vegetation of the southern Koolyanobbing Range is expected to prevent inadvertent access to the Mine Pits from other directions.

(b) Waste Rock Landform Management Unit –

Consistent with standard mining practices, the Waste Rock Landform will require rehabilitation with native vegetation progressively during mining (as sections become completed) and post-mining. The rehabilitation works will include earthworks to meet the design criteria (i.e. batter angles, back-sloping), on-contour ripping of compacted areas, and the respreading of rehabilitation materials (vegetation, topsoil and subsoil) that were removed and stockpiled during mine development. The Waste Rock Landform will also require the management of drainage to ensure long-term stability and minimisation of erosion.

The positioning of the Waste Rock Landform on the plains on the northern side of the Koolyanobbing Range (i.e. not positioned on the elevated main ridge or lower ridges), and its alignment parallel to the southern Koolyanobbing Range landform, will minimise any potential for interference with natural drainage lines associated with the southern Koolyanobbing Range.

(c) Support Infrastructure Management Unit –

Consistent with standard mining practices, above-ground infrastructure within the Support Infrastructure area will be removed at mine closure. The Support Infrastructure area will then be rehabilitated with native vegetation by on-contour ripping of compacted areas and the respreading of rehabilitation materials (vegetation, topsoil and subsoil) that were removed and stockpiled during mine development.

The progressive and post-mining rehabilitation works described for the Proposal above will utilise rehabilitation materials (vegetation, topsoil and subsoil) that were removed and stockpiled during initial land clearing works. Soil characterisation undertaken within the Proposal area has identified sufficient soil materials will available for rehabilitation (MWH 2015). The topsoil and subsoil materials from the ridges and mid-to-lower slope areas are considered valuable rehabilitation materials given their physical and chemical properties of high coarse rock fragment content, moderately rapid hydraulic conductivity, non-saline, pH neutral and non-sodic. The topsoil and subsoil materials of the lower slopes were identified as suitable for use in rehabilitation of relatively flat areas (i.e. within the Support Infrastructure) given their comparatively poorer physical and chemical properties (partially dispersive, sodic, moderately saline and low hydraulic conductivity). The appropriate handling, temporary storage and use of the rehabilitation materials will assist

to achieve stable landforms (with drainage and erosion controlled) capable of sustaining native vegetation.

Figure 3-31 provides a conceptual image of the Proposal area following completion of the mine closure actions described above.

Consistent with standard mining practices, within the context of the above objectives, minor access tracks may be retained within parts of the Proposal area to provide for ongoing access to the rehabilitation areas for the purposes of post-mining environmental monitoring and supplementary closure works (if required, for example, supplementary seeding).

Figure 3-30 Mine Closure Management Units. The Mine Closure Management Units for the Proposal are identified.

Figure 3-31 Conceptual Post-Mining Layout. A conceptual model of the Proposal area at the completion of mine closure is identified.

Mine Closure Objectives

As outlined by the Mine Closure Plans (Cliffs 2012, 2015a), Cliffs' overarching objective for mine closure of the Koolyanobbing Range mine operations is to achieve stable, non-polluting landforms with self-sustaining vegetation that is compatible with the post-mining land use. This overarching objective aligns to the objectives outlined by the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*.

Similarly for the Proposal, specific mine closure objectives have been developed for each Management Unit, as outlined by Table 3-7. These specific mine closure objectives for the Proposal are consistent with the objectives outlined within the Mine Closure Plan.

MANAGEMENT UNIT	ASPECT	CLOSURE OBJECTIVE
Mine Pits	Public Safety	Land is physically safe
Waste Rock Landform	Landform Stability	Landforms are stable and erosion is controlled
	Soils	Soil profiles are stable to support native vegetation
	Vegetation	Re-establish native vegetation
	Sustainability	Landforms are safe, stable, non-polluting
Support Infrastructure	Infrastructure	Infrastructure is removed
	Landform Stability	Landforms are stable and erosion is controlled.
	Soils	Soil profiles are stable to support native vegetation
	Vegetation	Re-establish native vegetation
	Sustainability	Landforms are safe, stable, and non-polluting

Table 3-7 Mine Closure Objectives. The mine closure objectives for each Management Unit for the Proposal are identified. Source: Adapted from Cliffs (2015a).

Completion Criteria

Completion criteria are an agreed set of performance indicators, which upon being met, will demonstrate successful mine closure, and subsequently, allow for long-term responsibility of the land to be transferred from the miner to the landowner. As outlined by the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans*, development of interim completion criteria should commence in the environmental assessment stage, with the interim completion criteria refined during Proposal implementation based on additional data obtained.

The process for the development of completion criteria is illustrated by Figure 3-32.

The proposed interim completion criteria for the Proposal are identified by Table 3-8. The proposed interim completion criteria are consistent with the criteria outlined within the revised Mine Closure Plan (Cliffs 2015a), and have been drafted in a manner such that they are directly measurable (e.g. percentages, angles, etc.), or alternatively, can be determined by judgement of a competent professional for that field.

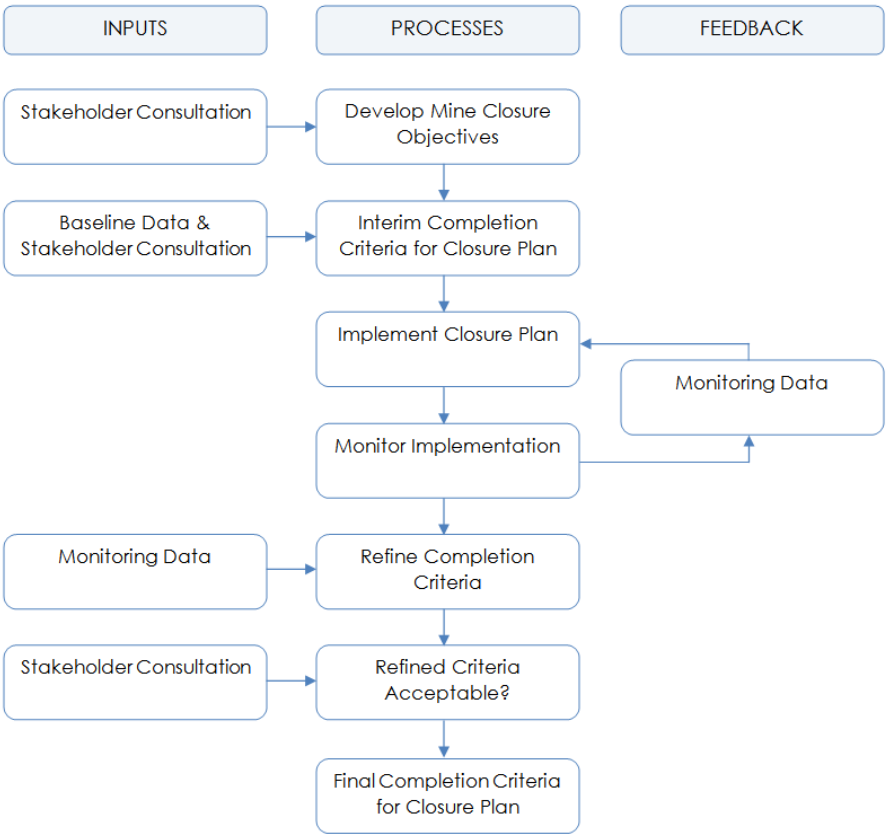

Figure 3-32 Completion Criteria Development Flowchart. The development of completion criteria is an iterative process whereby interim criteria are later refined during Proposal implementation through incorporation of additional data and ongoing stakeholder consultation. Source: Adapted from Nichols (2010).

In development of the interim completion criteria, Cliffs has had regard to the following considerations:

(a) Constructed mining landforms will be structurally different to natural landforms as a result of their different physical and chemical characteristics;

(b) Flora species composition and structure on constructed mining landforms will be different to natural landforms as a result of the ability for each species to regenerate and/or be a function of the habitat requirements of each species;

(c) Separate completion criteria may be required for each management unit to address the differences in their physical and chemical characteristics; and

(d) Completion criteria should be developed over time based on the results of monitoring the initial rehabilitation works, consideration of appropriate reference sites, and an improved understanding of physical and chemical characteristics of the rehabilitated constructed mining landforms.

As outlined in the DMP and EPA (2015) document *Guidelines for Preparing Mine Closure Plans* and illustrated in Figure 3-32, the interim completion criteria will be refined during Proposal implementation based on additional data obtained. The development of the final completion criteria will include consultation with relevant stakeholders.

MANAGEMENT UNIT	ASPECT	CLOSURE OBJECTIVE	INTERIM COMPLETION CRITERIA
Mine Pits	Public Safety	Land is physically safe	o Safety abandonment bunding installed as per DMP (1997) guidelines to prevent inadvertent access
Waste Rock Landform	Landform Stability	Landforms are stable and erosion is controlled	o Construction to design criteria of 10m lifts, 15^0 batters, 5m berms with 5^0 backslope o Surface water drainage is effectively managed
	Soils	Soil profiles are stable to support native vegetation	o Surface cover comprises ~0.2m soil/subsoil, rock/gravel for erosion protection, and vegetation debris
	Vegetation	Re-establish native vegetation	o Foliar cover 50% - 80% of reference sites o Species richness 50% - 80% of reference sites o Plant density 50% - 80% of reference sites o Weed cover not greater than reference sites
	Sustainability	Landforms are safe, stable, non-polluting	o Surface water drainage from rehabilitated lands do not result in off-site effects
Support Infrastructure	Infrastructure	Infrastructure is removed/restored	o Above-ground infrastructure is removed to enable rehabilitation o Re-instatement of Pastoral Lease fencing
	Landform Stability	Landforms are stable and erosion is controlled.	o Landforms reflect pre-mining land contours o Surface water drainage is effectively managed
	Soils	Soil profiles are stable to support native vegetation	o Surface cover comprises ~0.2m soil/subsoil, rock/gravel for erosion protection, and vegetation debris
	Vegetation	Re-establish native vegetation	o Foliar cover 50% - 80% of reference sites o Species richness 50% - 80% of reference sites o Plant density 50% - 80% of reference sites o Weed cover not greater than reference sites
	Sustainability	Landforms are safe, stable, and non-polluting	o Surface water drainage from rehabilitated lands do not result in off-site effects

Table 3-8 Interim Completion Criteria. The interim mine closure completion criteria for each Management Unit for the Proposal are identified. Adapted from Cliffs (2015a).

Monitoring

Monitoring of mine closure is necessary to assist in determining whether the completion criteria have been met. Table 3-9 identifies the proposed monitoring methodology and monitoring frequency for the Proposal.

Monitoring for mine closure for the Proposal is currently expected to commence from 2020, following the planned cessation of productive mining during 2019.

It is anticipated that the monitoring requiring a single physical inspection (e.g. to confirm removal of infrastructure) will be undertaken once during 2020. The monitoring in relation to long-term outcomes (e.g. rehabilitation) is expected to commence from 2020 and continue for approximately 6 years, to 2026, which reflects the schedule in which Cliffs considers the completion criteria could potentially be met. The formal monitoring will be in addition to the opportunistic observations by Cliffs' on-site environmental personnel during Proposal implementation and progressive mine closure.

MANAGEMENT UNIT	COMPLETION CRITERIA	MONITORING	FREQUENCY
Mine Pits	o Safety abandonment bunding installed as per DMP (1997) guidelines to prevent inadvertent access	Survey	Once, 2020
Waste Rock Landform	o Construction to design criteria of 10m lifts, 15^0 batters, 5m berms with 5^0 backslope o Surface water drainage is effectively managed	Survey	Once, 2020
	o Surface cover comprises ~0.2m soil/subsoil, rock/gravel for erosion protection, and vegetation debris	Survey	Once, 2020
	o Foliar cover 50% - 80% of reference sites o Species richness 50% - 80% of reference sites o Plant density 50% - 80% of reference sites o Weed cover not greater than reference sites	Botanical Assessment	Each 3 years, 2020 to 2026
	o Surface water drainage from rehabilitated lands do not result in off-site effects	Visual Inspection	Each 3 years, 2020 to 2026
Support Infrastructure	o Above-ground infrastructure is removed to enable rehabilitation o Re-instatement of Pastoral Lease fencing	Visual Inspection	Once, 2020
	o Landforms reflect pre-mining land contours o Surface water drainage is effectively managed	Survey	Each 3 years, 2020 to 2026
	o Surface cover comprises ~0.2m soil/subsoil, rock/gravel for erosion protection, and vegetation debris	Survey	Once, 2020
	o Foliar cover 50% - 80% of reference sites o Species richness 50% - 80% of reference sites o Plant density 50% - 80% of reference sites o Weed cover not greater than reference sites	Botanical Assessment	Each 3 years, 2020 to 2026
	o Surface water drainage from rehabilitated lands do not result in off-site effects	Visual Inspection	Each 3 years, 2020 to 2026

Table 3-9 Mine Closure Monitoring. The proposed mine closure monitoring type and frequency used to determine achievement of the completion criteria are identified.

Monitoring by survey will be undertaken by suitably qualified survey personnel.

Monitoring by botanical assessment will be undertaken by suitably qualified environmental personnel. Consistent with the monitoring methodology applying to the approved Koolyanobbing Range mine operations, the monitoring of the rehabilitation works for the Proposal will be undertaken using permanent transects/quadrats with comparison to reference sites.

Monitoring by visual inspection will be undertaken by suitably qualified environmental and/or geological personnel (as appropriate).

Where monitoring indicates that progress towards meeting the completion criteria is not progressing as necessary, contingency actions will be implemented, which may include additional civil earthworks, additional removal of infrastructure, and/or additional revegetation works, with subsequent additional monitoring to then also be implemented.

Ongoing Investigations – Waste Rock Geochemical Characterisation

Previous investigations of the geochemistry of the iron ore deposits of the southern Koolyanobbing Range (SWC 2009, 2010, 2011a, 2011b, 2011c, 2014) identified the presence of a limited volume of waste rock with the potential to generate acidic and/or metaliferous drainage. The geochemistry of the waste rock to be excavated by the Proposal is currently being investigated (SRK 2015 in prep.), with this investigation expected to be completed during Q3 2015. The results of the waste rock geochemical characteristics investigation will be provided to EPA and DMP.

As identified by Figure 3-33 and Table 3-10, the mapped and measured geology of the waste rock within the Proposal area is consistent with the mapped and measured geology of the waste rock of the approved Koolyanobbing Range mine operations at the A, B and C Deposits. Accordingly, it is expected that the potential risk for the Proposal of acidic and/or metaliferous drainage will be equally low, and similarly, also manageable through the standard co-mingling of waste rock. The waste rock geochemical characterisation investigation being undertaken for the Proposal will seek to confirm this expectation.

	A, B, C DEPOSITS			F DEPOSIT		
Element	No. Samples	Range (%)	Mean (%)	No. Samples	Range (%)	Mean (%)
Arsenic	4,676	0.001-0.342	0.006	242	0.001-0.022	0.005
Cobalt	6,814	0.001-0.245	0.005	292	0.001-0.007	0.004
Chromium	6,814	0.001-0.345	0.011	292	0.001-0.160	0.008
Copper	6,814	0.001-0.323	0.009	292	0.001-0.020	0.005
Manganese	9,728	0.001-13.629	0.190	1,989	0.001-24.315	0.119
Nickel	6,814	0.001-0.325	0.009	292	0.001-0.028	0.005
Lead	6,814	0.001-0.200	0.004	292	0.001-0.011	0.005
Sulphur	9,734	0.001-12.900	0.081	1,989	0.002-3.119	0.066
Zinc	6,814	0.001-0.101	0.005	292	0.001-0.010	0.005

Table 3-10 Waste Rock Geochemical Data Comparison of the Koolyanobbing Range A, B, C and F Deposits. For each measured element the number of samples, range of sample results and mean of sample results is identified. All results are measured as percentage weight. The samples results for the F Deposit are consistent with the sample results for the A, B and C Deposits.

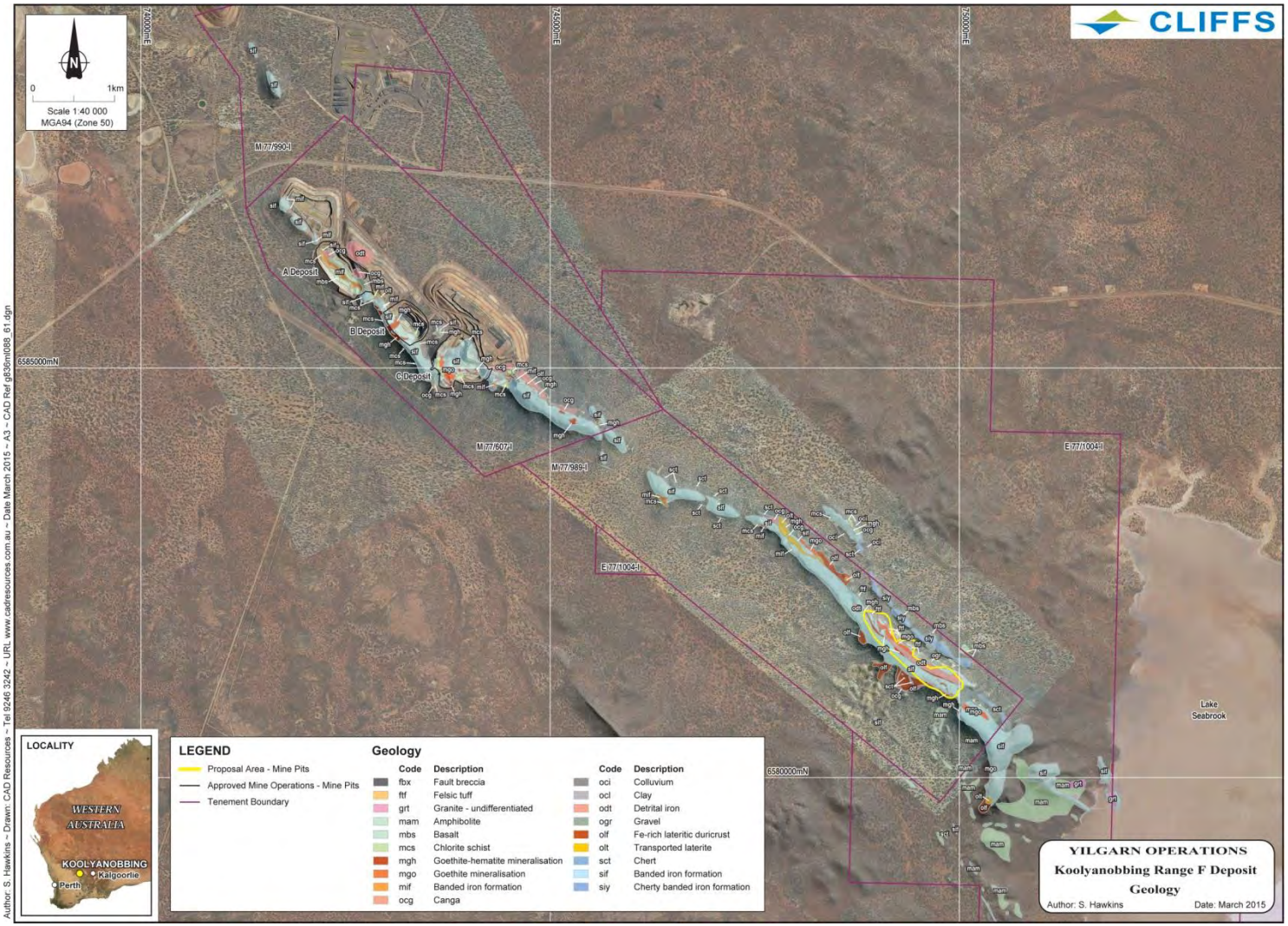

Figure 3-33 Koolyanobbing Range Geology. The location of the Mine Pits for the Proposal and the approved Koolyanobbing Range mine operations are identified. The mapped geology of the Koolyanobbing Range is identified. Data Source: Cliffs unpublished.

Future Works – Reference Sites

Reference sites, being undisturbed areas of native vegetation used to compare the success of the rehabilitation works, will be selected during the first year of mine operations for the Proposal. Reference sites will be selected consistent with the approach applied to the approved Koolyanobbing Range mine operations, with a view towards identifying representative reference sites that are typical of the surrounding vegetation types (mid-slopes and plains).

Risk Assessment

The potential risks associated with mine closure for the Proposal have been considered in context of the risk assessment framework contained within the revised Mine Closure Plan (Cliffs 2015a). The Proposal presents an overall level of risk that is equivalent to, or less than, the level of risk for the approved mine operations. The outcomes of this risk assessment can readily be incorporated in the next revision of the Mine Closure Plan.

Financial Provision

Cliffs maintains financial provision for its mine closure costs, with this financial provision maintained as a liability on corporate accounts. The financial provision is reviewed annually to account for changes in the area of land disturbance.

The financial provision calculations are based on established unit rate cost estimates ($/ha) provided by industry third parties providing service to Cliffs. The financial provisions are estimated separately for each management unit (i.e. Mine Pits, Waste Rock Landforms, Support Infrastructure), with the unit rate costs multiplied by the area of disturbance. The underlying rehabilitation cost assumptions and the resulting unit cost estimates are independently reviewed every three years to ensure the estimated unit costs are periodically refined to reflect true cost.

As outlined by the Mine Closure Plan (Cliffs 2015a), the estimated mine closure costs for the approved Koolyanobbing Range mine operations is approximately A$13million.

Based on Cliffs' unit rate costs and spatial area of each component of the Proposal, the mine closure cost for the Proposal has been estimated at approximately A$3million. This financial provision will be maintained as a liability on Cliffs' corporate accounts to ensure that sufficient funds are available for mine closure of the Proposal.

Management of Information and Data

Cliffs' spatial data (e.g. operational boundaries, flora and fauna records) is held in geographical information system formats Surpac® and MapINFO®. Relevant documents (e.g. flora and fauna reports) are catalogued electronically and accessed via the Sharepoint® system. This approach for the management of information and data will also be applied to the management of information and data for the Proposal.

3.4.5 Environmental Management

Cliffs' mine operations are undertaken in accordance with an Environmental Policy (Cliffs Natural Resources 2014, Appendix 1), which outlines Cliffs' overarching objectives of environmental protection and continual improvement in environmental performance.

The Environmental Policy is implemented through Cliffs' EMS, which includes EMPs for the management of key environmental aspects. Cliffs' EMS for its Yilgarn Operations is certified and maintained to international standard AS/NZS ISO 14001:2004 (NCSI 2013, Appendix 2).

Cliffs' EMS contains a series of EMPs to ensure the potential environmental effects of mine operations are controlled and monitored to an acceptable standard. These EMPs address the management of a range of environmental aspects, including mine closure.

Compliance with the EMS and EMPs is regularly audited both internally and by independent third parties in order to ensure compliance, and to identify any changes that may improve the environmental outcomes. The regular auditing of the EMS and EMPs is consistent with Cliffs' Environmental Policy for evaluation of performance against environmental targets. Cliffs has a strong environmental compliance record, with Cliffs' remaining in compliance with all conditions of environmental and mining approvals granted under the *Environmental Protection Act 1986* (WA), *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Mining Act 1978* (WA) and the *Wildlife Conservation Act 1950* (WA).

For the key integrating factor of 'Rehabilitation and Decommissioning, Cliffs considers the environmental effects of the Proposal can be appropriately controlled and managed through the preparation and implementation of a:

(a) Mine Closure Plan.

The preparation of the Mine Closure Plan will be informed by Cliffs' experience in managing rehabilitation and decommissioning across Cliffs' Yilgarn Operations, including the approved Koolyanobbing Range mine operations. The Mine Closure Plan will outline the environmental management actions required to actively control and manage the potential environmental effects of mine closure, so as to ensure mine closure for the Proposal is undertaken consistent with agreed outcomes to enable the post-mining land use(s).

As the Proposal will form an operational extension to the approved Koolyanobbing Range mine operations, and the Proposal is not expected to materially alter the mine closure profile for the approved Koolyanobbing Range mine operations, it is proposed that the Proposal will be incorporated within the next revision of the Mine Closure Plan, currently scheduled for 2018 (being prior to mine closure of the Proposal).

The Mine Closure Plan will have regard to the following aspects of the Proposal, which have been considered above:

(a) Stakeholder consultation, including continued consultation during Proposal implementation;

(b) Post-mining land use, to restore the land condition by rehabilitation with native vegetation suitable for an undefined use compatible with the land tenure of Unallocated Crown Land (or an alternate land use as may be applicable at that time);

(c) Mine closure actions and objectives, including public safety, landform stability, infrastructure, soils, vegetation and sustainability;

(d) Completion criteria, including public safety, landform stability, infrastructure, soils, vegetation and sustainability;

(e) Monitoring, to determine progress towards meeting the completion criteria;

(f) Ongoing investigations and future works, to further inform mine closure for the Proposal;

(g) Risk assessment, to continue to assess potential mine closure risks;

(h) Financial provision, to ensure that an appropriate level of funding is provided to enable mine closure to be completed; and

(i) Management of information and data, to ensure relevant mine closure information is recorded and maintained.

3.4.6 Environmental Commitments

Cliffs makes the following commitments for management of the environmental effects of the Proposal for the key integrating factor of 'Rehabilitation and Decommissioning':

(1) Mine Closure Plan

Cliffs will manage the environmental effects of the Proposal for rehabilitation and decommissioning through the preparation and implementation of a Mine Closure Plan.

A consolidation of Cliffs' commitments for the Proposal is contained in Section 5 *Environmental Commitments*.

3.4.7 Conclusion

As outlined by EPA (2014a, 2014c), the key integrating factors applicable to the assessment of the Proposal include:

(a) 'Rehabilitation and Decommissioning'.

The environmental effects of the Proposal to the key environmental factor of 'Rehabilitation and Decommissioning' are not expected to be environmentally significant, and can be appropriately managed through the preparation and implementation of a Mine Closure Plan.

As the Proposal will form an operational extension to the approved Koolyanobbing Range mine operations, and the Proposal is not expected to materially alter the mine closure profile for the approved Koolyanobbing Range mine operations, it is proposed that the Proposal will be incorporated within the next revision of the Mine Closure Plan, currently scheduled for 2018 (being prior to mine closure of the Proposal).

The EPA's objectives for the key integrating factor of 'Rehabilitation and Decommissioning' can therefore be met, noting the Proposal area can be closed and rehabilitated consistent with agreed outcomes to enable the post-mining land use(s).

3.5 Offsets

3.5.1 Context

Section 3.5 *Offsets* provides an assessment of the applicability to the Proposal of the key integrating factor of 'Offsets'.

3.5.2 EPA Objective

The EPA's objective for the key integrating factor of 'Offsets' is:

> *"To counterbalance any significant residual environmental impacts or uncertainty through the application of offsets"* (EPA 2015a).

3.5.3 Legislation and Guidelines

Legislation, guidelines, standards and approvals relevant to the key integrating factor of 'Offsets' include:

(a) *Environmental Protection Act 1986* (WA)
(b) *WA Environmental Offsets Policy* (Government of Western Australia 2011)
(c) *WA Environmental Offsets Guidelines* (Government of Western Australia 2014)
(d) EPA Environmental Protection Bulletin 1: *Environmental Offsets* (EPA 2014d)
(e) *Corporate Policy Statement No. 4: Environmental Offsets* (DPaW 2014o)

3.5.4 Assessment

Applicability of Environmental Offsets

As outlined by Section 3.1 *Flora,* whilst the environmental effect of the Proposal to *Tetratheca erubescens* is not expected to change the current threat category ranking under the IUCN (2012) criteria, the removal of up to approximately 22% of the *Tetratheca erubescens* population may be considered a significant residual environmental effect for which consideration of the EPA (2015a) key integrating factor of 'Offsets' may be applicable.

As outlined by Section 3.1 *Flora*, a significant residual environmental effect is not expected to other matters for the key environmental factor of 'Flora and Vegetation'. Accordingly, further consideration of the applicability of the key integrating factor of 'Offsets' is not considered necessary for the key environmental factor of 'Flora and Vegetation'.

As outlined by Section 3.2 *Fauna*, Section 3.3 *Landforms* and Section 3.4 *Mine Closure*, a significant residual environmental effect related to the key environmental factors of 'Terrestrial Fauna', 'Subterranean Fauna' and 'Landforms' and the key integrating factor of 'Rehabilitation and Decommissioning' is not expected. Accordingly, consideration of the applicability of the key integrating factor of 'Offsets' is not considered necessary for the key environmental factors of 'Terrestrial Fauna', 'Subterranean Fauna' and 'Landforms' and the key integrating factor of 'Rehabilitation and Decommissioning'.

Framework for the Management of Rare Flora Taxa

The *Wildlife Conservation Act 1950* (WA) provides for the declaration and management of 'Rare Flora' taxa, and is regulated by DPaW. The DPaW hold the statutory responsibility for the administration of the *Wildlife Conservation Act 1950* (WA), and by virtue, hold responsibility for the coordination of 'Rare Flora' management within Western Australia; including the 'Rare Flora' taxon *Tetratheca erubescens*.

In accordance with the DPaW Policy Statement 44 *Wildlife Management Programs* (DPaW 1992), the coordination of the management of 'Rare Flora' taxa by DPaW is undertaken through a framework of Recovery Plans. Recovery Plans identify the management actions necessary for the recovery of 'Rare Flora' (i.e. restoration and rehabilitation), including addressing any threatening processes, and often identify research considered necessary to inform the management actions (for example, understanding the reproductive biology to inform subsequent field translocations).

Financial resources for the preparation and implementation of the management actions are obtained through both State Government and non-Government sources (e.g. companies, sponsorship). It is understood that the preparation and implementation of Recovery Plans are coordinated by the DPaW regional offices.

To provide context as to the implementation framework for 'Rare Flora Recovery Plans', the DPaW adopted an objective for 2014 to undertake translocation of 15 'Rare Flora' taxa, and to collect and store the seeds of a further 50 'Rare Flora' taxa (DPaW 2014p).

Currently, no Recovery Plan exists for *Tetratheca erubescens.*

Proposed Environmental Offsets

The absence of a Recovery Plan for *Tetratheca erubescens* presents a clear gap in the current management of this taxon, and accordingly, provides an opportunity for Cliffs to contribute to this work being undertaken through an environmental offset.

To offset the effect of the Proposal to *Tetratheca erubescens*, Cliffs proposes to contribute towards the preparation and implementation of a *Tetratheca erubescens* Recovery Plan. Conceptually, the actions required to prepare and implement a Recovery Plan would include:

(a) Drafting of the Recovery Plan, including identification of existing knowledge (e.g. population information, genetics) and the research priorities considered necessary for on-ground restoration works; and

(b) Implementation of the Recovery Plan, focussing initially on the research priorities considered necessary for restoration, and secondly, on implementing on-ground restoration works (taking into account any outcomes/guidance learnt from the research priorities).

Cliffs' proposed environmental offset to contribute towards the preparation and implementation of a *Tetratheca erubescens* Recovery Plan aligns to the WA Environmental Offsets Policy (Government of Western Australia 2011) in that it would include a combination of defined research to provide knowledge, and following, on-ground management incorporating the knowledge gained from the research (i.e. adaptive management approach).

Cliffs' proposed environmental offset for the *Tetratheca erubescens* Recovery Plan also aligns to DPaW's Policy Statement 44 *Wildlife Management Programs* (DPaW 1992) and Corporate Policy No. 4 *Environmental Offsets* (DPaW 2014o), in that DPaW would retain responsibility for coordinating the management of the 'Rare Flora' taxon *Tetratheca erubescens*, and with Cliffs providing financial resources as a non-Government funding source.

Alignment to other Environmental Offsets

As outlined above, Cliffs has sought to align the proposed environmental offset for *Tetratheca erubescens* with DPaW's Recovery Plan framework approach for 'Rare Flora' taxa within Western Australia.

The proposed environmental offset to contribute towards the preparation and implementation of a *Tetratheca erubescens* Recovery Plan also aligns to other previous assessments and approvals under the *Environmental Protection Act 1986* (WA). For example, similar environmental offsets were applied to the 'Rare Flora' taxa *Tetratheca paynterae* ssp. paynterae and *Ricinocarpos brevis* at Cliffs' Windarling Range mine operations (WA Minister for Environment 2003, 2012, 2014a). Similarly, environmental offsets requiring the preparation and implementation of a Recovery Plan have also been applied in relation to other 'Rare Flora' taxa, for example, *Darwinia masonii* and *Lepidosperma gibsonii* at the Mt Gibson Ranges (WA Minister for Environment 2007).

Existing Knowledge

The results of existing research and recovery actions undertaken by Cliffs for the related flora taxon *Tetratheca paynterae* ssp. *paynterae* may provide an insight to the potential likelihood of success of the proposed environmental offsets for *Tetratheca erubescens* at the Koolyanobbing Range.

To date, the research on *Tetratheca paynterae* ssp. *paynterae* of the Windarling Range has contributed to the scientific understanding of its biology and ecological requirements for restoration. As a result, individuals of *Tetratheca paynterae* ssp. *paynterae* have been successfully propagated from cuttings in greenhouse conditions, and with a small number also established from seed at field sites as part of a small-scale translocation trial. Images identifying the greenhouse cuttings and field translocation from seed are identified by Figure 3-34.

The *Tetratheca paynterae* ssp. *paynterae* research and translocations remain ongoing, including additional field translocations using seed undertaken during 2014 in consultation between Cliffs and BGPA. The targeted aim of the additional field translocations is to establish a greater number of translocated individuals within field translocation sites. An image identifying the field seeding for *Tetratheca paynterae* ssp. *paynterae* is identified by Figure 3-35.

An overview of Cliffs' previous research and translocation works on *Tetratheca paynterae* ssp. *paynterae* is provided in Cliffs (2015c, Appendix 7), with a peer review of this work outlined by Dixon (2015, Appendix 8). As concluded by Dixon (2015), the previous research and translocation works for 'Rare Flora' have been appropriately resourced and supported consistent with Cliffs' environmental commitments, with Cliffs' approach to the management of 'Rare Flora' considered 'leading practice' in comparison to other companies within the mining industry.

The previous research for the related flora taxon *Tetratheca paynterae* ssp. *paynterae* at the Windarling Range are considered to provide the foundation for research into understanding the biology and habitat requirements of the *Tetratheca* genus. The previous translocations also provide a sound basis for confidence in the potential likelihood of success for the proposed environmental offsets for *Tetratheca erubescens* at the Koolyanobbing Range.

Figure 3-34 *Tetratheca paynterae* ssp. *paynterae* Cuttings and Translocated Seedlings. Image 1: Cuttings of *Tetratheca paynterae* ssp. *paynterae* (Source: Cliffs unpublished 2005). Image 2: A translocated *Tetratheca paynterae* ssp. *paynterae* individual successfully established from seed at the Windarling Range mine operations

Figure 3-35 *Tetratheca paynterae* ssp. *paynterae* Translocations at the Windarling Range, 2014. Additional trial translocations for *Tetratheca paynterae* ssp. *paynterae* were undertaken by botanical personnel from Cliffs and BGPA during 2014.

Offsets Schedule

Cliffs suggests that the environmental offset for the preparation and implementation of the *Tetratheca erubescens* Recovery Plan could be undertaken over a period of up to 5 years, as outlined by Table 3-11. The environmental offset would commence within 1 year of the Proposal commencing implementation.

YEAR	ACTION	TARGET OUTCOME
Year 1	Prepare Recovery Plan	Recovery Plan
Year 2	Implement Recovery Plan	Research Priorities
Year 3	Implement Recovery Plan	Research Priorities / On-ground Restoration
Year 4	Implement Recovery Plan	On-ground Restoration & Monitoring
Year 5	Implement Recovery Plan	Monitoring & Reporting

Table 3-11 *Tetratheca erubescens* Recovery Plan Schedule. The proposed schedule for the preparation and implementation of a *Tetratheca erubescens* Recovery Plan is identified.

Offset Governance

As outlined above, DPaW hold responsibility for the management of 'Rare Flora' within Western Australia under the provisions of the *Wildlife Conservation Act 1950* (WA). The responsibility for the coordination of the preparation and implementation of the *Tetratheca erubescens* Recovery Plan will be retained by the regional DPaW office (Kalgoorlie) through consultation with Cliffs.

It is envisioned that through conditions imposed in approval of the Proposal under the *Environmental Protection Act 1986* (WA), Cliffs will be required to provide financial contributions for the preparation and implementation of the *Tetratheca erubescens* Recovery Plan, in consultation with EPA and DPaW.

Offset Finance

Table 3-12 identifies the proposed financial contribution to be provided by Cliffs for the preparation and implementation of the *Tetratheca erubescens* Recovery Plan.

The Year 1 financial provision of $25,000 is based upon engagement of an Environmental Officer at part-time for the administrative drafting of the Recovery Plan, including consultation between EPA, DPaW and Cliffs.

The financial provision for Year 2 to Year 4 of $100,000 each is based upon engagement of an Environmental Officer at part-time ($25,000 per year) for administration of the recovery actions, with the larger component of the contribution ($75,000 per year) to be used for the implementation of the research priorities and on-ground restoration. The implementation component would include the collection of seed material during the flowering period of each year to provide the necessary plant material.

The financial provision for Year 5 of $50,000 is based upon engagement of an Environmental Officer at part-time for monitoring and reporting on the implementation of the Recovery Plan.

YEAR	ACTION	VALUE (A$)
Year 1	Prepare Recovery Plan	$25,000
Year 2	Implement Recovery Plan	$100,000
Year 3	Implement Recovery Plan	$100,000
Year 4	Implement Recovery Plan	$100,000
Year 5	Implement Recovery Plan	$50,000
	Total	$375,000

Table 3-12 *Tetratheca erubescens* Recovery Plan Financial Provisions.

Risk Management

The management actions associated with the preparation of the *Tetratheca erubescens* Recovery Plan are considered unlikely to present any risk.

A key potential risk for the management actions associated with the implementation of the *Tetratheca erubescens* Recovery Plan is the availability of seed material for field translocation; with the availability of seed expected to be dependent on the timing and volume of the preceding winter rainfall (i.e. drought conditions, if they arise, may limit the mass of seed available). This potential risk can be minimised by seed collection in multiple years (i.e. Year 1 and Year 2) as well as by supplementing the seed mass through the use of the seed collected by Cliffs from preceding years (if necessary).

Whilst previous trials on the related flora taxon *Tetratheca paynterae* ssp. *paynterae* at the Windarling Range have confirmed the potential to successfully translocate individuals of the *Tetratheca* genus, the ability to achieve translocation at a larger scale is untested. Accordingly, the outcomes of the on-ground restoration works present a potential risk. The target number of translocated individuals and development of potential contingency options (if targets are not met) can be addressed during the preparation of the *Tetratheca erubescens* Recovery Plan.

BGPA (2015) has assessed the habitats potentially suitable for *Tetratheca erubescens* across the southern Koolyanobbing Range, with potential habitats identified both within existing occupied areas (in the vicinity of the Proposal) and at currently unoccupied areas (in the vicinity of the Koolyanobbing Range B and C Deposits). The specific habitats to be targeted for the translocations can be considered within the *Tetratheca erubescens* Recovery Plan.

Offset Monitoring

Detail of the monitoring would be addressed as part of the preparation of the *Tetratheca erubescens* Recovery Plan. Recovery Plans typically set success criteria, and include monitoring against such criteria.

At a conceptual level, the initial monitoring of the restoration works may seek to record *Tetratheca erubescens* germinants within each translocation site as a proportion of the total sites/seeds (i.e. % germination success), with subsequent monitoring seeking to determine the percentage of germinants that survive after the first year (i.e. % survival).

Offset Reporting

Reporting on implementation would be addressed as part of the preparation of the *Tetratheca erubescens* Recovery Plan.

At a conceptual level, it is envisioned that the reporting would include both annual progress reports and a final report; each outlining the progress of the research priorities and the outcomes of the restoration works.

Alternate Environmental Offsets

As outlined above, Cliffs has proposed environmental offsets outlined within the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4). Alternatively, Cliffs would welcome discussion with EPA and DPaW on any potential alternate environmental offset arrangements (e.g. alternate offsets, or alternate frameworks/schedules) that may be appropriate to offset the residual environmental effect of the Proposal to *Tetratheca erubescens*.

3.5.5 Environmental Management

Environmental management of Cliffs' Yilgarn Operations is undertaken in accordance with an EMS. Cliffs' EMS is certified and maintained to the international standard AS/NZS ISO 14001:2004 (NCSI 2013, Appendix 2). Cliffs' EMS contains a series of EMPs to ensure the potential environmental effects of mine operations are controlled and monitored to an acceptable standard.

For the key integrating factor of 'Offsets', Cliffs has prepared a *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4) to outline environmental offsets to counterbalance the residual environmental effect of the Proposal. The *Tetratheca erubescens* Environmental Offsets Plan will be incorporated within the EMS, with its implementation coordinated by Cliffs' site-based environmental personnel.

The *Tetratheca erubescens* Environmental Offsets Plan outlines Cliffs' proposed approach to contribute towards the preparation and implementation of a *Tetratheca erubescens* Recovery Plan, which conceptually would include a 5-year project comprising:

(1) Drafting of the Recovery Plan, including:
    (a) Identification of existing knowledge (e.g. population information, genetics);
    (b) Identification of the research priorities considered necessary for on-ground restoration works;
(2) Implementation of the Recovery Plan, including:
    (a) Research priorities considered necessary for restoration, and secondly, on implementing;
    (b) On-ground restoration works (taking into account any outcomes/guidance learnt from the research priorities);
    (c) Environmental monitoring of the success of restoration works, with measurement against success criteria; and
    (d) Annual progress reports and a final report to EPA on implementation of the works.

Cliffs' proposed environmental offset to contribute towards the preparation and implementation of a *Tetratheca erubescens* Recovery Plan aligns to the WA Environmental Offsets Policy (Government of Western Australia 2011), DPaW Policy Statement 44 *Wildlife Management Programs* (DPaW 1992) and DPaW Corporate Policy No. 4 *Environmental Offsets* (DPaW 2014o), with DPaW to retain responsibility for coordinating the management of the 'Rare Flora' taxon *Tetratheca erubescens*, with Cliffs providing financial resources as a non-Government funding source.

Cliffs proposes to implement the *Tetratheca erubescens* Environmental Offsets Plan to counterbalance the residual environmental effect of the Proposal to the *Tetratheca erubescens* taxon.

Consistent with WA Environmental Offsets Guidelines (Government of Western Australia 2014), a completed environmental offsets template describing the proposed environmental offsets for *Tetratheca erubescens* is provided at Appendix 5.

3.5.6 Environmental Commitments

Cliffs makes the following commitments for management of the environmental effects of the Proposal for the key integrating factor of 'Offsets':

(1) Environmental Offsets

Cliffs will counterbalance the significant residual environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens* through implementation of the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

A consolidation of Cliffs' commitments for the Proposal is contained in Section 5 *Environmental Commitments*.

3.5.7 Conclusion

As outlined by EPA (2014a, 2014c), the key integrating factors applicable to the assessment of the Proposal include:

(a) 'Offsets'.

The key integrating factor of 'Offsets' may be considered applicable to the residual environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens*. The potential environmental offsets outlined within the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4) seek to counterbalance the residual environmental effect by contributing towards both research and management of the *Tetratheca erubescens* taxon; consistent with established offset frameworks for 'Rare Flora' taxa. The EPA's objectives for the key integrating factor of 'Offsets' can therefore be met, with the proposed offsets seeking to counterbalance the residual environmental effect to the *Tetratheca erubescens* population.

4 Stakeholder Consultation

Stakeholder consultation is an integral component of Cliffs' planning, assessment and development processes. During the planning and assessment for the Proposal undertaken to date, Cliffs has consulted with a range of key stakeholders from both government and community sectors. Details of these consultations are provided below.

4.1 Government

4.1.1 Environmental Protection Authority / Office of the EPA

As outlined by Section 1.11 *Government Assessment and Approval Processes*, the Proposal will be subject to environmental assessment by EPA/OEPA under the *Environmental Protection Act 1986* (WA). Accordingly, EPA/OEPA are stakeholders for the Proposal.

Consultation with EPA/OEPA on the Proposal commenced in March 2013, during which representatives for Cliffs (S Hawkins) provided EPA/OEPA an opportunity to comment on the range of environmental surveys proposed to support the future referral of the Proposal. The OEPA (M Jefferies) advised Cliffs that consideration of the environmental surveys by EPA/OEPA would not be necessary, in that the EPA/OEPA's requirements would likely be met as a result of similar consultation being undertaken by Cliffs with DPaW on the environmental surveys (refer Section 4.1.3 *Department of Parks and Wildlife*, below).

In May 2014, a meeting was held with representatives for OEPA (A Sutton, F Browne) and Cliffs (R Howard, S Hawkins) to discuss the Proposal and its proposed referral under the *Environmental Protection Act 1986* (WA). This consultation included identification of the infrastructure components and location of the Proposal, completed environmental surveys, potential environmental effects, mine closure, and stakeholder consultation processes. With regards to the potential environmental effects, the discussions focused on the 'Rare Flora' taxon *Tetratheca erubescens*, including consideration of the environmental effects using the conservation criteria of the IUCN and a likely requirement for environmental offsets.

In July 2014, Cliffs submitted the Proposal to EPA under s38(1) of the *Environmental Protection Act 1986* (WA) for assessment (Cliffs 2014a). The submitted documentation included a description of the Proposal and its location, a summary of the environmental effects, an outline of the stakeholders consulted, and copies of the completed environmental survey reports.

In July 2014, EPA published on its website the Proposal referral documentation submitted by Cliffs (2014a) under the *Environmental Protection Act 1986* (WA), with an invitation from EPA for public submissions on the Proposal. Two public submissions were received by EPA.

In August 2014, EPA requested advice from DPaW and DMP on the Proposal. The advice from DPaW and DMP were received by EPA in August and September 2014, respectively (refer Section 4.1.3 *Department of Parks and Wildlife* and Section 4.1.4 *Department of Mines and Petroleum*, below).

In September 2014, EPA determined that the Proposal should be subject to an Environmental Impact Assessment (EIA) at the level of Public Environmental Review (PER) (EPA 2014a; 2014b). EPA (2014a; 2014c) identified the key environmental factors and key integrating factors applicable to the assessment of the Proposal as:

(a) 'Flora and Vegetation' (key environmental factor);

(b) 'Terrestrial Fauna' (key environmental factor);

(c) 'Subterranean Fauna' (key environmental factor);

(d) 'Landforms' (key environmental factor);

(e) 'Rehabilitation and Decommissioning' (key integrating factor); and

(f) 'Offsets' (key integrating factor).

In November 2014, a meeting was held with representatives for OEPA (K Carter, M Jefferies) and Cliffs (R Howard, S Hawkins) to discuss the OEPA's views as to the potential environmental effects of the Proposal to the key environmental factors and key integrating factors that were identified by EPA (2014a) as requiring environmental assessment within this EIA-PER document.

In November 2014, OEPA provided its draft Environmental Scoping Document for the purpose of providing guidance on the matters to be addressed within the EIA-PER document for the Proposal, and a schedule for environmental assessment of the Proposal.

In November 2014, a meeting was held with representatives for OEPA (M Jefferies, K Carter, L Jacenko, J Sheppard) and Cliffs (R Howard, S Hawkins) to discuss potential environmental offsets for *Tetratheca erubescens*. The meeting discussed Cliffs' proposed approach for aligning potential environmental offsets for *Tetratheca erubescens* with DPaW's Recovery Plan framework, with agreement for Cliffs to subsequently present its proposed environmental offsets to EPA within an Environmental Offsets Plan for OEPA consideration.

In December 2014, Cliffs provided OEPA (K Carter, L Jacenko, J Sheppard) with a draft *Tetratheca erubescens* Environmental Offsets Plan (Revision B) for consideration and comment. In December 2014, OEPA (L Jacenko) provided without prejudice advice to Cliffs (S Hawkins) that, if the proposal is found acceptable, the draft plan "*provides a good framework for the application of offsets for the likely impacts to Tetratheca erubescens and at this framework level is likely to align with the principles of the WA Environmental Offsets Policy and WA Environmental Offsets Guidelines*". The OEPA advice also suggested some improvements to the draft *Tetratheca erubescens* Environmental Offsets Plan, which have been incorporated within the version provided with this EIA-API document (Cliffs 2015b, Appendix 4).

In December 2014, a meeting was held with representatives for EPA (P Vogel), OEPA (I Munro, F Browne) and Cliffs (J Grace, R Howard, S Hawkins) to discuss future mine developments and environmental assessment processes for the Yilgarn Operations, which included identification of the Proposal location and Government assessment and approval processes. Representatives for DMP were also in attendance at this meeting (refer Section 4.1.4 *Department of Mines and Petroleum*, below).

In December 2014, EPA (2014c) provided its Environmental Scoping Document to Cliffs for the purpose of providing guidance on the matters to be addressed within the EIA-PER document for the Proposal, and a schedule for environmental assessment of the Proposal.

In January 2015, Cliffs provided EPA with its draft EIA-PER document for the Proposal. The EIA-PER document described the Proposal, an assessment of the environmental effects and environmental management for the Proposal, and stakeholder consultation.

In February 2015, EPA provided advice to Cliffs on requested changes to the EIA-PER document, with the key changes requested relating to further detail on the proposed environmental management measures, changes to references of recently updated EPA guidelines, inclusion of EPA forms and checklists (Appendices 10 and 11), further detail on Cliffs' history of management of Rare Flora, and further detail on stakeholder consultation. In March 2015, a revised draft EIA-PER document addressing the requested key changes was submitted by Cliffs to EPA.

In April 2015, EPA requested from Cliffs further changes to the EIA-PER document on the proposed environmental management measures for the Proposal, with a subsequent meeting held with representatives for OEPA (M Jefferies, K Carter, R Sutherland) and Cliffs (R Howard, S Hawkins).

In June 2015, EPA requested from Cliffs further changes to the EIA-PER document on the proposed environmental management measures for the Proposal, with a subsequent meeting held with representatives for EPA (P Vogel), OEPA (A Sutton) and Cliffs (J Grace, V Roberts, R Howard, S Hawkins).

In July 2015, a revised draft EIA-PER document addressing the requested changes was submitted by Cliffs to EPA. The OEPA confirmed to Cliffs that the draft EIA-PER document was suitable for review by Government agencies. In July 2015, OEPA provided DPaW, DMP, DER, DoW and DAA a copy of the draft EIA-PER document for review and comment.

In August 2015, EPA/OEPA provided Cliffs with further comment on the draft EIA-PER document. The EPA/OEPA further comment, and Cliffs' response, is summarised in Appendix 12.

In September 2015, a meeting was held with representatives for EPA (P Vogel), OEPA (A Sutton, S Bowman, N Bowers, R Sutherland) and Cliffs (J Grace, V Roberts, R Howard, S Hawkins) to discuss the Government agency comments on the draft EIA-PER document, with a request for Cliffs to make further minor changes to Section 3.4 *Mine Closure*.

Submission of this EIA-PER document to EPA/OEPA, and its subsequent assessment by EPA/OEPA, represents further consultation by Cliffs on the Proposal.

Further consultation between Cliffs and EPA/OEPA is expected to continue through the environmental assessment and approval processes under the *Environmental Protection Act 1986* (WA).

As an outcome of the assessment and approvals processes under the *Environmental Protection Act 1986* (WA), it is anticipated that EPA/OEPA will monitor the implementation of the Proposal, with Cliffs to prepare and submit to EPA/OEPA an annual environmental report regarding the implementation of the Proposal and its environmental effects.

4.1.2 Department of the Environment

As outlined by Section 1.11 *Government Assessment and Approval Processes*, the Proposal was referred for environmental assessment to DoE under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th). Accordingly, DoE is a stakeholder for the Proposal.

In June 2014, representatives for DoE (P Patel) and Cliffs (S Hawkins) discussed the Proposal and its proposed referral under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th). This consultation included identification of the infrastructure components and location of the Proposal, completed environmental surveys, potential environmental effects, and stakeholder consultation processes.

In June 2014, Cliffs submitted the Proposal to DoE under s68(2) of the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) for consideration (Cliffs 2014e). The submitted documentation included a description of the Proposal and its location, a summary of the environmental effects, an outline of the stakeholders consulted, and copies of the completed environmental survey reports.

In June 2014, DoE published on its website the Proposal referral documentation submitted by Cliffs (2014e) under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), with an invitation from DoE for public submissions. Two public comments on the Proposal were received by DoE.

In August 2014, DoE (2014a) determined that that Proposal did not require assessment or approval under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th). Further consultation with DoE on the Proposal is therefore not considered necessary.

4.1.3 Department of Parks and Wildlife

As outlined by Section 1.11 *Government Assessment and Approval Processes*, the Proposal will be subject to environmental assessment by DPaW under the *Wildlife Conservation Act 1950* (WA). The DPaW is also a key advisory agency to EPA/OEPA for the environmental assessment process under the *Environmental Protection Act 1986* (WA). Accordingly, DPaW is a stakeholder for the Proposal.

In March 2013, a meeting was held with representatives for DPaW (S Thomas, D Coffey) and Cliffs (R Howard, S Hawkins) during which Cliffs provided an opportunity for DPaW to comment on the range of environmental surveys proposed to support the future referral of the Proposal. This consultation included discussion of the existing environmental information available for the Proposal area, and the draft scopes for additional environmental surveys for flora and vegetation, vertebrate fauna, and invertebrate fauna.

In April 2013, DPaW provided its advice to Cliffs on the draft scopes of works for the environmental surveys to be undertaken for the Proposal, with the comments subsequently addressed by Cliffs.

In May 2014, representatives for DPaW (S Thomas, D Coffey, K Atkins, A Jones, J Futter[1], J Jackson[1]) and Cliffs (R Howard, S Hawkins) met to discuss the Proposal and its proposed referral under the *Environmental Protection Act 1986* (WA). The consultation on the Proposal included identification of the infrastructure components and location, completed environmental surveys, potential environmental effects, mine closure, and stakeholder consultation processes. With regards to the potential environmental effects, the discussions focused on the 'Rare Flora' taxon *Tetratheca erubescens*, including consideration of the environmental effects using the conservation criteria of the IUCN.

In July 2014, Cliffs provided a copy to DPaW (D Coffey) of the Proposal referral documentation submitted to EPA under the *Environmental Protection Act 1986* (WA). The submitted documentation included a description of the Proposal and its location, a summary of the environmental effects, an outline of the stakeholders consulted, and copies of the completed environmental survey reports.

In August 2014, DPaW provided advice on the Proposal referral documentation to EPA (DPaW 2014q). The DPaW advice covered aspects including land tenure, a need to assess the environmental effect to *Tetratheca erubescens* (including direct effects, indirect effects including genetics, and restoration/translocation), the boundary of the DPaW-classified PEC, and the potential effect to troglobitic subterranean fauna.

In December 2014, Cliffs provided DPaW (S Thomas, N Woolfrey, K Atkins, A Jones, J Futter) with a draft *Tetratheca erubescens* Environmental Offsets Plan (Revision B) for consideration and comment. In December 2014, DPaW (S Thomas) advised Cliffs (S Hawkins) that consideration of the draft *Tetratheca erubescens* Environmental Offsets Plan would be undertaken in parallel with the assessment of this EIA-PER document.

In March 2015, DPaW (2015) granted Cliffs a Licence under the *Wildlife Conservation Act 1950* (WA) to collected seed of the 'Rare Flora' taxon *Tetratheca erubescens* within the area of the

[1] by teleconference

Project for the purpose of future actions targeted at the recovery of the taxon (i.e. field translocations).

In May 2015, representatives for DPaW (S Thomas, A Jones, J Futter, J Jackson, J Lizamore, T Pieterse) and Cliffs (J Shepherdson, K Wilkinson, L MacDonald) inspected the Proposal area to view the 'Rare Flora' taxon *Tetratheca erubescens*.

In July 2015, OEPA provided DPaW a copy of the draft EIA-PER document for review and comment. In August 2015, DPaW provided EPA/OEPA comment on the draft EIA-PER document. The DPaW comment, and Cliffs' response, is summarised in Appendix 12.

In addition to the above, it is also noted that representatives for DPaW were in attendance at the meetings of Cliffs' Community Consultation Group held in September 2013, March 2014 and September 2014, at which the Proposal was discussed (refer Section 4.2.1 *Community Consultation Group*, below).

During 2015, Cliffs is scheduled to submit to DPaW an application for a Licence to take *Tetratheca erubescens*, in accordance with the requirements of the *Wildlife Conservation Act 1950* (WA). Submission of the Licence application, and its subsequent assessment by DPaW, will represent further consultation between Cliffs and DPaW on the Proposal. Consultation between Cliffs and DPaW on the Proposal will be ongoing throughout the environmental assessment and approval processes under the *Wildlife Conservation Act 1950* (WA).

As an outcome of the assessment and approvals processes under both the *Environmental Protection Act 1986* (WA) and the *Wildlife Conservation Act 1950* (WA), further consultation between Cliffs and DPaW during Proposal implementation is expected to continue through reporting on the implementation of the proposed environmental offsets outlined within the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

4.1.4 Department of Mines and Petroleum

As outlined by Section 1.11 *Government Assessment and Approval Processes*, the Proposal will be subject to an environmental and mining assessment by DMP under the *Mining Act 1978* (WA). The DMP is also a key advisory agency to EPA/OEPA for the environmental assessment of mining operations under the *Environmental Protection Act 1986* (WA). Accordingly, DMP is a stakeholder for the Proposal.

In March 2013, a meeting was held with representatives for DMP (D Endacott, A Buckeridge) and Cliffs (S Hawkins) during which Cliffs provided an opportunity for DMP to comment on the range of environmental surveys proposed to support the future referral of the Proposal. This consultation included discussion of the existing environmental information available for the Proposal area, and the draft scopes for additional environmental surveys for flora and vegetation, vertebrate fauna, and invertebrate fauna.

In May 2014, representatives for DMP (C Grosser, L Ilkiw) and Cliffs (R Howard, P Braedon, S Hawkins) met to discuss the Proposal and its proposed referral under the *Environmental Protection Act 1986* (WA). This consultation on the Proposal included identification of the infrastructure components and location, completed environmental surveys, potential environmental effects, mine closure, and stakeholder consultation processes.

In July 2014, Cliffs provided a copy to DMP (I Mitchell) of the Proposal referral documentation submitted to EPA under the *Environmental Protection Act 1986* (WA). The submitted documentation included a description of the Proposal and its location, a summary of the environmental effects, an outline of the stakeholders consulted, and copies of the completed environmental survey reports.

In September 2014, DMP provided its advice on the Proposal referral documentation to EPA (DMP 2014). The DMP advice addressed EPA's request for information regarding the history of mineral exploration and rehabilitation within the Proposal area.

In December 2014, a meeting was held with representatives for DMP (D Machin, S Tantala) and Cliffs (J Grace, R Howard, S Hawkins) to discuss future mine developments and environmental assessment processes for the Yilgarn Operations, which included identification of the Proposal location and Government assessment and approval processes. Representatives for EPA/OEPA were also in attendance at this meeting (refer Section 4.1.1 *Environmental Protection Authority / Office of the EPA*, above).

In January 2015, a meeting was held with representatives for DMP (C Grosser) and Cliffs (S Hawkins) to provide an update on the status of the Project, including schedule for submission of a Mining Proposal under the *Mining Act 1978* (WA), proposed Programmes of Work *Mining Act 1978* (WA) associated with the Project development (sterilisation drilling and gravel costeans), and the status of the environmental assessment processes under the *Environmental Protection Act 1986* (WA).

In July 2015, OEPA provided DMP a copy of the draft EIA-PER document for review and comment. In August 2015, DMP provided EPA/OEPA comment on the draft EIA-PER document. The DMP comment, and Cliffs' response, is summarised in Appendix 12.

During 2015, Cliffs is scheduled to submit to DMP a Mining Proposal in accordance with the requirements of the *Mining Act 1978* (WA). Submission of the Mining Proposal application, and its subsequent assessment by DMP, will represent further consultation between Cliffs and DMP on the Proposal. Consultation between Cliffs and DMP on the Proposal will be ongoing throughout the environmental assessment and approval processes under the *Mining Act 1978* (WA).

As an outcome of the assessment and approvals processes under the *Mining Act 1978* (WA), further consultation between Cliffs and DMP during Proposal implementation is expected to continue through annual compliance reporting and site audits.

4.1.5 Department of Environmental Regulation

As outlined by Section 1.11 *Government Assessment and Approval Processes*, Cliffs will seek an amendment to Cliffs' granted Licence 5850 (DER 2015) under s59 of the *Environmental Protection Act 1986* (WA) to allow for crushing and screening of gravels under 'Category 12' and for landfill disposal of wastes under 'Category 64' as defined by the *Environmental Protection Regulations 1987* (WA). Accordingly, DER is a stakeholder for the Proposal.

In July 2015, OEPA provided DER a copy of the draft EIA-PER document for review and comment.

During 2015, Cliffs is scheduled to submit to DER the application under s59 of the *Environmental Protection Act 1986* (WA). Submission of the application, and its subsequent assessment by DER, will represent further consultation between Cliffs and DER on the Proposal. Consultation between Cliffs and DER on the Proposal will be ongoing throughout the environmental assessment and approval processes under the *Environmental Protection Act 1986* (WA) / *Environmental Protection Regulations 1987* (WA) for the Licence 5850 amendment.

As an outcome of the assessment and approvals processes under the *Environmental Protection Act 1986* (WA) / *Environmental Protection Regulations 1987* (WA), further consultation between Cliffs and DER during Proposal implementation is expected to continue through annual compliance reporting and site audits.

4.1.6 Department of Water

As outlined by Section 1.11 *Government Assessment and Approval Processes*, Cliffs will seek a Licence from DoW under s26D of the *Rights in Water and Irrigation Act 1914* (WA) for the installation of additional groundwater well(s) within the Proposal area, and following construction of the groundwater wells, Cliffs will seek an amendment to Cliffs' granted Groundwater Licence GWL154459 (DoW 2014) under s5C of the *Rights in Water and Irrigation Act 1914* (WA) to allow for groundwater abstraction from the additional groundwater well(s). Accordingly, DoW is a stakeholder for the Proposal.

In July 2015, OEPA provided DoW a copy of the draft EIA-PER document for review and comment.

During 2015, Cliffs is scheduled to submit to DoW the application under s26D of the *Rights in Water and Irrigation Act 1914* (WA), and following, the application under s5C of the *Rights in Water and Irrigation Act 1914* (WA). Submission of the s26D and 5C applications, and their subsequent assessment by DoW, will represent further consultation between Cliffs and DoW on the Proposal. Consultation between Cliffs and DoW on the Proposal will be ongoing throughout the environmental assessment and approval processes under the *Rights in Water and Irrigation Act 1914* (WA).

As an outcome of the assessment and approvals processes under the *Rights in Water and Irrigation Act 1914* (WA), further consultation between Cliffs and DoW during Proposal implementation is expected to continue through annual compliance reporting and site audits.

4.1.7 Department of Aboriginal Affairs

As outlined by Section 1.12 *Related Approvals*, Cliffs has been granted s18 Consent under the *Aboriginal Heritage Act 1972* (WA) covering part of the Proposal area (WA Minister for Indigenous Affairs 2003). Accordingly, DAA is a stakeholder for the Proposal.

In July 2015, OEPA provided DAA a copy of the draft EIA-PER document for review and comment.

Whilst the Proposal does not coincide with any registered Aboriginal Heritage site within the meaning of s5 of s6 of the *Aboriginal Heritage Act 1972* (WA) (DAA 2014a, 2014b, 2014c, 2014d), consultation between Cliffs and DAA may occur during Proposal implementation in accordance with the conditions of the granted s18 Consent.

4.2 Community

4.2.1 Community Consultation Group

Cliffs maintains a Community Consultation Group (CCG) to provide review and comment on the environmental aspects of Cliffs' Yilgarn Operations. The CCG was established in 2004 and includes representatives of:

(a) Shire of Yilgarn;
(b) Wildflower Society of Western Australia;
(c) Yilgarn Land Conservation District Committee;
(d) Malleefowl Preservation Group;
(e) Windarling Preservation Group;
(f) Toodyay Naturalists Club;
(g) Pastoral representatives; and
(h) Community representatives.

The membership of the CCG was previously determined by the Western Australian Minister for Environment based on submissions of interest from environmental and community stakeholders. Accordingly, the CCG is considered to represent the key stakeholders with an interest in Cliffs' mine operations and its environmental effects.

Consultation with CCG on the Proposal commenced in September 2013, during which Cliffs provided CCG with an update on the range of environmental surveys being undertaken at the southern Koolyanobbing Range, with a view that the environmental surveys would then support the future referral of the Proposal. In particular, the consultation provided an update on the *Tetratheca erubescens* census (Maia 2013) which identified a greater number of individuals compared to previous records. A representative for DPaW (J Jackson) was also in attendance at this meeting of the CCG.

In March 2014, Cliffs provided CCG with an update on the Proposal, including an outline of the Proposal location, anticipated infrastructure components, key environmental effects (in particular, to *Tetratheca erubescens*), government assessment and approvals processes, and the development schedule. Representatives for DPaW (J Futter, V Jackson) were also in attendance at this meeting of the CCG.

In September 2014, Cliffs provided CCG with a further update on the Proposal, including an outline of the Proposal location and infrastructure components, status of the Government assessment and approval processes under the *Environmental Protection Act 1986* (WA) and the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), and the proposed development schedule. Representatives for DPaW (J Futter, D Pickles) were also in attendance at this meeting of the CCG.

In September 2015, Cliffs provided CCG with a site inspection of the Proposal area. A further update on the Proposal was provided outlining the Proposal infrastructure components, the effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens*, and the status of the Government assessment and approval processes.

Further consultation between Cliffs and CCG is expected to continue during Proposal implementation through the annual meetings of the CCG.

4.2.2 Pastoral Leaseholder

As outlined by Section 2.6 *Land Tenure*, the Proposal coincided with part of the former Brontie Pastoral Lease that was granted to the Della Bosca family of Southern Cross under the provisions of the *Land Administration Act 1997* (WA). Whilst the Brontie Pastoral Lease expired in June 2015, the Della Bosca family remain stakeholders for the Proposal.

In September 2014, representatives for Cliffs (S Hawkins) and the Della Bosca family (W Della Bosca) discussed the Proposal and the Brontie Pastoral Lease. The Pastoral Leaseholder identified that the area of the southern Koolyanobbing Range in which the Proposal is located is not currently used for pastoral activities. The key action from the Pastoral Leaseholder arising from this consultation was the need to reinstate the Pastoral Lease fencing following the completion of mining and rehabilitation; with this action incorporated within the mine closure actions (refer Table 3-8 in Section 3.4 *Mine Closure*).

In June 2015, representatives for Cliffs (S Hawkins) and the Della Bosca family (W Della Bosca) discussed the Proposal and the Brontie Pastoral Lease. The Pastoral Leaseholder identified that the Brontie Pastoral Lease was scheduled to expire in July 2015, with renewal not currently proposed.

In September 2015, the Della Bosca family (W Della Bosca) confirmed to representatives for Cliffs (S Hawkins) that the Brontie Pastoral Lease was not renewed, with the land area reverting to Unallocated Crown Land.

In addition, the Della Bosca family has also been consulted through representation on the CCG (refer above), with attendance at the CCG meetings of March 2014, September 2014 and September 2015.

Further consultation between Cliffs and the Della Bosca family is expected to be ongoing during Proposal implementation through both direct communications and the CCG.

4.2.3 General Community

As Cliffs' key community stakeholders are represented on the CCG, extensive general community consultation on the Proposal has not been considered necessary. General community consultation has been limited to the public availability of documentation submitted under the relevant government assessment and approval processes.

In June 2014, DoE published on its website the Proposal referral documentation submitted by Cliffs (2014e) under the *Environment Protection and Biodiversity Conservation Act 1*999 (C'th), with an invitation by DoE for public submissions. The documentation made publicly available included a description of the Proposal and its location, a summary of the environmental effects, an outline of the stakeholders consulted, and copies of the completed environmental survey reports. The public availability of Cliffs' referral documentation represents an opportunity for general consultation with the community on the Proposal. Two public comments on the Proposal were received by DoE, with the comments addressing the potential environmental effect of the Proposal in relation to the flora taxa *Tetratheca erubescens* and *Banksia arborea*, and native vegetation. The effect of the Proposal to the environmental matters raised in the public comments is outlined in Section 3.1 *Flora*.

In July 2014, EPA published on its website the Proposal referral documentation submitted by Cliffs (2014a) under the *Environmental Protection Act 1986* (WA), with an invitation from EPA for public submissions. The documentation made publicly available included a description of the Proposal and its location, a summary of the environmental effects, an outline of the stakeholders consulted, and copies of the completed environmental survey reports. The public availability of Cliffs' referral documentation represents an opportunity for general consultation with the community on the Proposal. Two public comments on the Proposal were received by EPA, with the comments addressing the potential environmental effect of the Proposal in relation to the flora taxa *Tetratheca erubescens* and *Banksia arborea* (including direct and indirect effects), and landscape/landforms. The effect of the Proposal to the environmental matters raised in the public comments is outlined in Section 3.1 *Flora* and Section 3.3 *Landforms*.

As outlined by EPA (2014c), this EIA-PER document has also been made publicly available for a period of 4 weeks for public review and comment. The public availability of this EIA-PER document represents an opportunity for further general consultation with the community on the Proposal.

4.3 Consultation Outcomes

Government agencies and the Community have provided a variety of views on the Proposal. These stakeholder views have been considered by Cliffs in the development of the Proposal, and in the information presented in this EIA-PER document. Whilst the stakeholder views have not resulted in any changes for the Proposal itself, the stakeholder views have informed the type and detail of the environmental assessment information presented within this EIA-PER document.

4.4 Ongoing Consultation

Consultation with the key Government agencies for the Proposal, being EPA, DPaW and DMP, will be ongoing during implementation of the Proposal through the reporting provisions and site audits under the statutory approvals managed by the agencies.

Consultation with the community during implementation of the Proposal will continue through the existing framework for the CCG.

5 Environmental Commitments

Cliffs has made a number of environmental commitments within this EIA-PER document for the management of key environmental factors and key integrating factors identified by EPA (2014c) as applicable to the Proposal. Cliffs intends that these commitments will become legally binding through environmental conditions within the Proposal approval to be issued by the Western Australian Minister for Environment under s45(5) the *Environmental Protection Act 1986* (WA). A recommended Schedule for environmental approval is provided in Appendix 6.

A consolidation of Cliffs' environmental commitments for the Proposal is provided below. For consistency, the commitments are drafted in a similar text-based manner as the conditions imposed by the Western Australian Minister for Environment.

(1) Flora and Vegetation Management Plan

Cliffs will manage the environmental effects of the Proposal to flora values through the preparation and implementation of a Flora and Vegetation Management Plan.

(2) *Tetratheca erubescens* Monitoring Plan

Cliffs will monitor for potential indirect environmental effects of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens* through the preparation and implementation of a *Tetratheca erubescens* Monitoring Plan.

(3) Fauna Management Plan

Cliffs will manage the environmental effects of the Proposal to fauna values through the preparation and implementation of a Fauna Management Plan.

(4) Mine Closure Plan

Cliffs will manage the environmental effects of the Proposal for rehabilitation and decommissioning through the preparation and implementation of a Mine Closure Plan.

(5) Environmental Offsets

Cliffs will counterbalance the significant residual environmental effect of the Proposal to the 'Rare Flora' taxon *Tetratheca erubescens* through implementation of the *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b, Appendix 4).

6 Study Team

Development of this EIA-PER document has involved a range of supporting consultants. The key consultants and their contributions are acknowledged and appreciated by Cliffs.

Globe Environments Australia Pty Ltd www.GlobeEnvironments.com.au	o Project Management o Environmental Impact Assessment
Bamford Consulting Ecologists	o Vertebrate Fauna Survey o Invertebrate Fauna Survey
Bennelongia Environmental Consultants www.Bennelongia.com.au	o Subterranean Fauna Survey
Biota Environmental Sciences www.Biota.net.au	o Vertebrate Fauna Survey o Invertebrate Fauna Survey
Botanic Gardens and Parks Authority www.BGPA.wa.gov.au	o Flora Assessment

Maia Environmental Consultancy Pty Ltd www.Maia.net.au	o Flora Survey
MWH Australia Pty Ltd www.MWHGlobal.com	o Soil Characterisation
Woodman Environmental Consulting www.WoodmanEnv.com.au	o Flora and Vegetation Survey
CAD Resources www.CADResources.com.au	o Mapping and GIS Services

7 References

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Subject to the provisions of the *Copyright Act 1968* (C'th), a copy of each reference to which Cliffs has authority to reproduce is provided on the compact disc attached to this report.

Western Australian legislation cited in this report can be obtained from the State Law Publisher at http://www.slp.wa.gov.au. Commonwealth legislation cited in this report can be obtained from the Australasian Legal Information Institute at http://www.austlii.edu.au/au/legis/cth/consol_act/.

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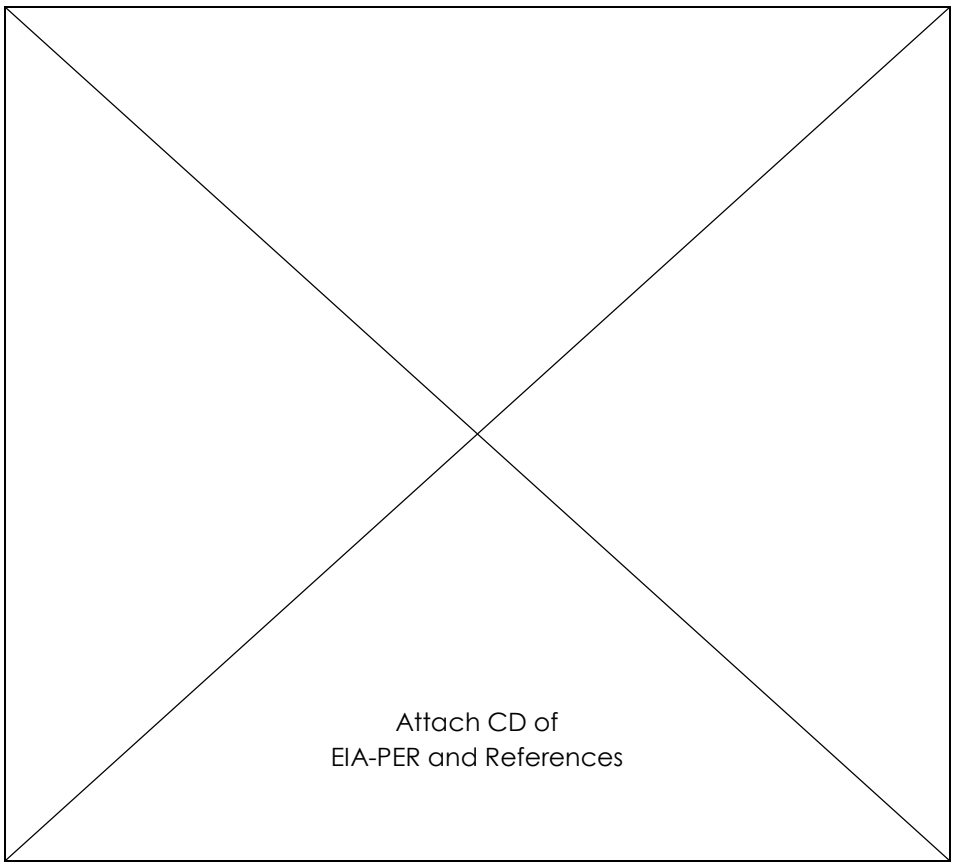
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EIA-PER and References

8 Glossary

Symbols and Acronyms

%	percent
^{0}	degree
>	greater than
<	less than
^{0}C	temperature in degrees Celsius
A$	Australian Dollars
AHD	Australian Height Datum
AS/NZS	Australian and New Zealand Standard
BGPA	Botanic Gardens and Parks Authority
CCG	Community Consultation Group
C'th	Commonwealth of Australia
DPaW	Department of Parks and Wildlife (WA)
DAA	Department of Aboriginal Affairs (WA)
DMP	Department of Mines and Petroleum (WA)
DoL	Department of Lands (WA)
DoW	Department of Water (WA)
DoE	Department of the Environment (C'th)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Environmental Protection Authority (WA)
Fe	iron (chemical symbol)
ha	hectare
ISO	International Standards Organisation
km	kilometre
km^2	square kilometre
m	metre
M	million
Mt	million tonnes
Mtpa	million tonnes per annum
M77/1000-I	Mining Lease (example alpha-numeric code)
PER	Public Environmental Review
pers. com.	personal communication
sp.	species
ssp.	subspecies
WA	Western Australia

Terms

The terms used in this document have the following meanings:

Abandonment Bund means an earthen embankment placed beyond the crest of a mine pit for the purpose of preventing post-mining inadvertent human access to an abandoned mine pit and which is placed at a distance not being potentially susceptible to mine pit wall collapse.

Acid and Metaliferous Drainage means a mobilised sulphuric acid leachate (a liquid) which may be generated from the oxidation of sulphur present within waste rock material, which in turn, may contain metals released into the leachate.

Annual Recurrence Interval (ARI) means the average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration (as defined in BoM 2014c). A rainfall event of 1:10 ARI has a 9.5% chance of being equalled or exceeded within any one year (percentage expressed as an Annual Exceedance Probability (AEP)).

Completion Criteria means an agreed set of performance indicators, which upon being met, will demonstrate successful mine closure, and subsequently, allow for long-term responsibility of the land to be transferred from the miner to the landowner.

Conservation Significance means, in relation to flora or fauna, a taxa or a biological association listed and protected under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Wildlife Conservation Act 1950* (WA), Japan - Australia Migratory Birds Agreement (Government of Australia and Government of Japan 1981), China - Australia Migratory Birds Agreement (Government of Australia and Government of the People's Republic of China 1988), Republic of Korea – Australia Migratory Birds Agreement (Government of Australia and Government of the Republic of Korea 2007) or the Convention on the Conservation of Migratory Species of Wild Animals (Government of Australia 1979). Conservation significance may also relate to taxa considered to be under threat or otherwise in need of protection as indicated by published literature, scientific/expert opinion or other guidance.

Dewatering means the process of extracting groundwater to the surface that is undertaken to result in a temporary reduction in the elevation of the groundwater level.

Endemic means, in relation to flora or fauna, a species that occurs exclusively within a defined area. Generally, the defined area is specified to be either a regional area or state area.

Environmental Impact Assessment means the process of environmental assessment as defined under Part IV of the *Environmental Protection Act 1986* (WA) and the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012* (EPA 2012a).

Fauna means animals, both indigenous and introduced.

Flora means plants, both indigenous and introduced.

Geodiversity means the variety of rocks, minerals, soils and landforms, and the processes that have shaped these features over time (as defined by DECC 2008).

Inert means not readily chemically reactive with other substances.

Koolyanobbing Range F Deposit Mine Pits means the ground excavations to access the ore of the Koolyanobbing Range F Deposit within part Tenement M77/989-I.

Koolyanobbing Range F Deposit Proposal means the Proposal to undertake mining of the Koolyanobbing Range F Deposit, but does not include (i.e. exclusions) (a) the pre-existing components of Cliffs' Yilgarn Operations, (b) surveys and/or investigations of a geological or geotechnical or environmental or hydrological or planning or heritage nature (including any potential environmental effects associated with such surveys and/or investigations), (c) changes in asset ownership or land tenure, or (d) approval or consent or agreement associated with the existing components of Cliffs' Yilgarn Operations or surveys or investigations or ownership or tenure.

Koolyanobbing Range F Deposit Support Infrastructure means the infrastructure necessary to support development of the Koolyanobbing Range F Deposit Proposal positioned within part Tenements M77/607-I, M77/989-I and M77/1278-I, and includes ore stockpiles, rehabilitation stockpiles (vegetation, topsoil and subsoil), administration facilities, water storage dams, power generation facilities, chemical and hydrocarbon and explosive storage facilities, and mine roads.

Koolyanobbing Range F Deposit Waste Rock Landform means the designed and engineered earthen structure positioned within part Tenements M77/989-I and M77/1278-I used for the disposal of waste rock excavated from the Koolyanobbing Range F Deposit Mine Pits.

Migratory Species means fauna declared by the Commonwealth Minister for Environment and protected under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a matter of national environmental significance for being a Migratory Species listed under the Japan - Australia Migratory Birds Agreement (Government of Australia and Government of Japan 1981), China - Australia Migratory Birds Agreement (Government of Australia and Government of the People's Republic of China 1988), Republic of Korea – Australia Migratory Birds Agreement (Government of Australia and Government of the Republic of Korea 2007) or the Convention on the Conservation of Migratory Species of Wild Animals (Government of Australia 1979). *Migratory Species* also means fauna declared by the Western Australian Minister for Environment as Specially Protected Fauna under the *Wildlife Conservation Act 1950* (WA) due to it being a Migratory Species.

Mine Closure means the processes by which mine infrastructure is removed, actions are undertaken to ensure safety, contaminated areas are remediated and affected areas are rehabilitated to restore their environmental values.

Mine Pit means an open ground excavation used to access an ore deposit.

Mining, as defined by the *Mining Act 1978* (WA), means fossicking, prospecting and exploring for minerals, and mining operations.

Mining Operations, as defined by the *Mining Act 1978* (WA), means any mode or method of working whereby the earth or any rock structure, stone, fluid, or mineral bearing substance may be disturbed, removed, washed, sifted, crushed, leached, roasted, distilled, evaporated, smelted or refined or dealt with for the purpose of obtaining any mineral there from whether it has been previously disturbed or not, and includes –

(a) the removal of overburden by mechanical or other means and the stacking, deposit, storage and treatment or any other substance considered to contain any mineral;
(b) operations by means of which salt or other evaporates may be harvested;
(c) operations by means of which mineral is recovered from the sea or a natural water supply; and
(d) the doing of all lawful acts incident or conducive to any such operation or purposes.

Native Title means the recognition by Australian law that some Indigenous people have rights and interests to land that arise from their traditional laws and customs. Native Title rights may be exclusive (occupy to the exclusion of others) or non-exclusive.

Non-Impact Area means the area beyond the spatial boundary of the approved Koolyanobbing Range mine operations and the Proposal in which mining operations are not currently proposed.

Offsets mean measures that seek to counterbalance any significant residual environmental effects which may arise from an action, after appropriate avoidance, minimisation and rehabilitation measures have been taken.

Precautionary Principle means where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment, and (b) an assessment of the risk-weighted consequences of various options (as defined by s4A of the *Environmental Protection Act 1986* (WA)). Measures to prevent environmental degradation should also be cost effective (as defined by Principle 15 of the 1992 Rio Declaration (United Nations 1992)).

Priority Ecological Community means a naturally occurring vegetation assemblage that occurs in a particular type of habitat that is known from a few to many occurrences and which may or may not be managed for conservation and which may or may not be under threat. Classifications are made by DPaW and categorised into five priority categories, with 'Priority 1' being of the highest conservation significance and/or a priority for surveying and determining the conservation significance based on current knowledge of perceived threat. PECs have no specific legal protection under the *Wildlife Conservation Act 1950* (WA) or the *Environmental Protection Act 1986* (WA), other than the general protection that may be afforded to native vegetation under such legislation.

Priority Fauna means fauna which are known from one, a few or several populations which may or may not be under threat, or may otherwise be rare. Classifications are made by DPaW and categorised into 5 priority categories, with Priority 1 being of the highest conservation significance and/or a priority for surveying and determining the conservation significance based on current knowledge of perceived threat. Priority fauna have no specific legal protection under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), *Wildlife Conservation Act 1950* (WA) or the *Environmental Protection Act 1986* (WA), other than the general protection that may be afforded to native fauna under such legislation

Priority Flora means flora which are known from one, a few or several populations which may or may not be under threat, or may otherwise be rare. Classifications are made by DPaW and categorised into four priority categories, with 'Priority 1' being of the highest conservation significance and/or a priority for surveying and determining the conservation significance based on current knowledge of perceived threat. Priority flora have no specific legal protection under the *Wildlife Conservation Act 1950* (WA) or the *Environmental Protection Act 1986* (WA), other than the general protection that may be afforded to native vegetation under such legislation.

Proponent means Cliffs Asia Pacific Iron Ore Pty Ltd (ACN 001 892 995) as the Proponent for the Koolyanobbing Range F Deposit Proposal.

Proposal means a project, plan, program, policy, operation, undertaking or development or change in land use as defined under the *Environmental Protection Act 1986* (WA). Mining development of the Koolyanobbing Range F Deposit is a Proposal.

Public Environmental Review means a level of Environmental Impact Assessment as defined by the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012* (EPA 2012a).

Rare Flora means flora taxa that is declared by the Western Australian Minister for Environmental as protected under the *Wildlife Conservation Act 1950* (WA) due to it being considered likely to become extinct or rare and therefore in need of special protection, or flora that is presumed to be extinct in the wild and therefore in need of special protection.

Short-Range Endemic Invertebrate Fauna means invertebrate fauna that are geographically restricted in range due to life characteristics that may include (one or a combination of) poor powers of dispersal, confinement to discontinuous habitats, low levels of fecundity, and/or have seasonal activity (active during cool and wet periods).

Significant means having, or likely to have, a major effect or impact of consequence. Antonym: Non-significant.

Specially Protected Fauna means fauna taxa that is declared by the Western Australian Minister for Environment as protected under the *Wildlife Conservation Act 1950* (WA) due to it being rare or likely to become extinct, presumed to be extinct, subject to an international agreement on migratory birds, or otherwise in need of special protection.

Subterranean Fauna means fauna that have adapted to live underground. Subterranean fauna includes stygobitic fauna (aquatic subterranean fauna) and troglobitic fauna (non-aquatic subterranean fauna).

Taxa or *Taxon* (or *Species*) means the fundamental category of biological classification for flora and fauna, composed of genetically related individuals that share common characteristics and are capable of breeding.

Tenement means a specified area of land to which a Licence of Lease is granted or acquired under the *Mining Act 1978* (WA) and to which the provisions of the *Mining Act 1978* (WA) apply. Tenements may be in the form of a Prospecting Licence, Exploration Licence, Retention Licence, Mining Lease, General Purpose Lease or a Miscellaneous Licence.

Threatened Species means taxa of flora or fauna declared by the Commonwealth Minister for Environment and protected under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) as a matter of national environmental significance for being extinct, facing a risk of extinction, or in need of a conservation program to prevent the species from a risk of extinction. Threatened species are allocated a category of extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependent.

Threatened Ecological Community means a naturally occurring vegetation assemblage that occurs in a particular type of habitat that is facing a high, very high or extremely high risk of extinction in the wild in the medium-term, near or immediate future. TECs are declared and protected under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), with subsequent protection also afforded under the *Environmental Protection Act 1986* (WA).

Vegetation means an assemblage of flora taxa.

Viewshed means an area that is visible from a defined location.

Waste Rock means the rock and soil material excavated from a Mine Pit that does not contain a concentration of iron at an economic grade (which may change subject to market specifications and available technologies).

Waste Rock Landform means a designed and engineered structure made of waste rock.

Yilgarn Operations means the iron ore mining operations at the Koolyanobbing Range (Deposits A, B, C, D and K), Mt Jackson Range (Deposits J1, J2 and J3), Windarling Range (Deposits W1, W2, W3/5, W4W and W4E) and the Deception Deposit (undeveloped), ore processing facility at Koolyanobbing, and road and rail facilities connecting the mines and ore processing facility to the Port of Esperance where the ore is exported to international customers.

9 Appendices

Appendix 1 Environmental Policy (Cliffs Natural Resources 2014)

Appendix 2 ISO 14001:2004 Environmental Management System Certification (NCSI 2013)

Appendix 3 Assessment of the Threatened Taxa Category for *Tetratheca erubescens* using the IUCN (2012) Criteria (Cliffs 2014b)

Appendix 4 *Tetratheca erubescens* Environmental Offsets Plan (Cliffs 2015b)

Appendix 5 Environmental Offsets Guideline Template

Appendix 6 Recommended Schedule for Environmental Approval

Appendix 7 Summary of Monitoring, Research and Field Translocations of the Rare Flora taxa *Tetratheca paynterae* ssp. *paynterae* and *Ricinocarpos brevis* (Cliffs 2015b)

Appendix 8 Peer Review of the outcomes of the Management, Rehabilitation and Restoration of Rare Flora at the Yilgarn Operations (Dixon 2015)

Appendix 9 Rehabilitation monitoring data from Cliffs' Yilgarn Operations

Appendix 10 Rehabilitation monitoring images from Cliffs' Yilgarn Operations

Appendix 11 Checklist of EPA requirements of the Environmental Scoping Document

Appendix 12 Government agency comments on draft EIA-PER document

Appendix 13 Checklist for documents submitted to EPA