



Report and recommendations of the Environmental Protection Authority



Christmas Creek Iron Ore Mine Expansion

Fortescue Metals Group Ltd

Report 1567

May 2016

Public Environmental Review Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
25/11/13	Level of assessment set	
16/05/14	Final Environmental Scoping Document (ESD) approved	24
23/03/15	Public Environmental Review (PER) document released for public review	44
20/04/15	Public review period for PER document closed	4
25/9/15	Final proponent Response To Submissions report received	22
17/12/15	EPA meeting	11
03/03/16	Final proposal information received from proponent	11
23/5/16	EPA report provided to the Minister for Environment	12
25/5/16	Publication of EPA report (three working days after report provided to the Minister)	3 days
8/6/16	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority did not meet its timeline objective in the completion of the assessment and provision of a report to the Minister.



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Chairman
23 May 2016

ISSN 1836-0483 (Print)
ISSN 1836-0491 (Online)
Assessment No. 1989

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1 Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on outcomes of the EPA's environmental impact assessment of the proposed change by Fortescue Metals Group Limited (FMG) to the Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B to expand the Christmas Creek Mine. Fortescue Metals Group Limited was nominated as the proponent responsible for the proposal.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires that the EPA prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister for Environment. The report must set out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation of the proposal should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The aims of environmental impact assessment and the principles of environmental impact assessment considered by the EPA in its assessment of this proposal are set out in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012*.

The proponent referred the proposal to the EPA on 5 November 2013. On 25 November 2013 the EPA set the level of assessment at Public Environmental Review (PER) with a four-week public review period. The Environmental Scoping Document (ESD) (EPA 2014a) for the proposal was approved on 16 May 2014 and the PER (FMG 2015a) was released for public review from 23 March 2015 to 20 April 2015.

The proposal was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 13 November 2013 as it may impact on the following Matters of National Environmental Significance (MNES):

- listed threatened species and communities (section 18 and 18A) and
- listed migratory species (sections 20 & 20A).

The proposal is being assessed under the bilateral agreement between the Commonwealth and Western Australian governments.

Appendix 7 contains a summary of submissions from the public review period and the proponent's response to submissions (on CD at the back of this report

and at www.epa.wa.gov.au). It is included for information only and does not form part of the EPA's report and recommendations. Relevant significant environmental issues identified from this process have been taken into account by the EPA during its assessment of the proposal.

This report provides the EPA advice and recommendations in accordance with section 44 of the EP Act.

2 The proposal

The proponent, Fortescue Metals Group Limited (FMG), proposes a change (referred to in this Report as the proposal) to the approved Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B, located approximately 111 km north-north-east of Newman (Figure 1).

The proposal is located within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region and is located mostly within the Fortescue IBRA subregion.

The Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B consists of the following two approved proposals:

- Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B (Ministerial Statement 707, 16 December 2005) for open pit iron ore mines at Christmas Creek and Mindy Mindy and an east-west railway to link the Christmas Creek mine with the north-south railway to Port Hedland; and
- Christmas Creek Water Management Scheme (Ministerial Statement 871, 1 August 2011) to increase mine dewatering up to 50 GLpa and to inject surplus mine dewater up to 42.5 GLpa.

The proposal is constituted by the following additional activities for the Christmas Creek iron ore mine:

- development of additional mine pits;
- development of additional permanent waste landforms and tailings disposal facilities;
- development of additional infrastructure including conveyors, roads, drainage and other associated mine infrastructure.

The Christmas Creek Mine Development Envelope (Mine Development Envelope) and the additional indicative footprint for the proposal to expand the Christmas Creek Mine is shown in Figure 2. The expansion would enable iron ore production to continue at a rate of 46 to 55 million tonnes per annum (Mtpa) incorporating peaks of up to 85 Mtpa, for approximately 14 years.

The change, if approved, and the existing approved proposals (Ministerial Statements 707 and 871) would result in the following total likely impacts:

- clearing of up to 17,956 hectares (ha) (additional clearing of 7,821 ha) of vegetation within the proposed Mine Development Envelope of 32,868 ha;
- abstraction of groundwater for dewatering of up to 110 gigalitres per annum (GL/a) (increase in dewatering of 60 GL/a); and
- injection of up to 110 GL/a of surplus brackish and saline dewater (increase of 67.5 GL/a).

The main characteristics of the revised proposal (i.e. the amalgamation of the existing approved proposals and this proposal) are summarised in Tables 1 and 2, consistent with Environmental Assessment Guideline No. 1 (EAG 14) *Defining the Key Characteristics of a Proposal Environmental Protection Act 1986*. A detailed description of the proposal in relation to the existing approved proposal is provided in section 4 of the PER document (FMG 2015a).

Table 1: Summary of revised key proposal characteristics

Proposal Title	Pilbara Iron Ore and Infrastructure Project (Christmas Creek Mine, East-West Railway and Mindy Mindy Mine)
Short Description	The proposal is to revise the existing Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B located approximately 70 to 100 km north of Newman in the Pilbara region of Western Australia. The proposal includes mines and associated infrastructure at Christmas Creek and Mindy Mindy, and an east-west railway to link the Stage A north-south railway (to Port Hedland) to the Christmas Creek Mine. The revision includes modification/expansion or development of additional mine pits and associated infrastructure; processing facilities; water management infrastructure; and power station and associated infrastructure at the Christmas Creek Mine.

Table 2: Revised proposal elements for the Christmas Creek Mine

Element	Location	Existing approval	Proposed change (This assessment)	Proposed Extent (Revised proposal)
Mine pits and associated infrastructure	Figure 2	Clearing up to 10,135.5 ha (Statement 707) (Development envelope undefined)	Additional clearing of up to 7,821 ha of vegetation.	Clearing of no more than 17,956 ha within the 32,868 ha Christmas Creek Mine Development Envelope
Dewatering	Figure 3	Up to 50 GL/a (Statement 871)	Additional abstraction of up to 60 GL/a of groundwater	Abstraction of up to 110 GL/a of groundwater
Surplus dewater management	Figure 3	Up to 42.5 GL/a (Statement 871)	Injection of up to 110 GL/a of groundwater	Injection of up to 110 GL/a of groundwater
Water supply	-	-	Up to 35 GL/a, supplied from	Up to 35 GL/a, supplied from

Element	Location	Existing approval	Proposed change (This assessment)	Proposed Extent (Revised proposal)
			mine dewatering, desalination, transfer from nearby mine sites and an external water supply borefield.	mine dewatering, desalination, transfer from nearby mine sites and an external water supply borefield.
Waste Rock	Figure 2	- (Note: approximately 213 Mtpa of tailings is currently produced at the existing operation)	Increase in disposal to WRSFs by up to 109 Mtpa.	Disposal of up to 322 Mtpa to WRSFs to a life of project maximum 3,800 Mt.
Tailings	Figure 2	- (Note: approximately 4 Mtpa of tailings is currently produced at the existing operation)	Increase in disposal to TSFs by up to 7 Mtpa.	Disposal of up to 11 Mtpa to TSFs to the life of project maximum of 144 Mt.
Backfilling of mine pits	Figure 2	Pit backfilling (Statement 707)	No change	Mine pits will be backfilled to at least above pre-mining water table.

The potential impacts of the proposal on the environment identified by the proponent in the PER document (FMG 2015a) and their proposed management are summarised in table ES4 (Executive Summary) in the PER document.

Six agency and three public submissions were received during the public review period. The key issues raised related to:

- Hydrological Processes: adequacy of hydrological modelling for the increase up to 110 GL/a of dewatering and the need to reflect current mine planning;
- Subterranean Fauna: adequacy of the information relating to troglodfauna habitat and habitat connectivity; and
- Rehabilitation and Decommissioning: adequacy of progressive rehabilitation for the existing mine.

The issues raised were addressed by the proponent in the Response to Submissions document that was received by the EPA on 27 November 2015 (FMG 2015b, Appendix 7).

In assessing this proposal, the EPA notes that the proponent has sought to avoid, minimise, and rehabilitate environmental impacts associated with the proposal by:

- minimising impacts to Priority flora through the design of the injection borefield and associated infrastructure;
- minimising indirect impacts to Mulga, Samphire and Coolibah / River Red Gum through the design of surface water infrastructure and management of groundwater drawdown and mounding;
- avoiding the 74 ha of rocky escarpment habitat which is potential denning habitat for the Northern Quoll; and
- backfilling pits to minimise waste landforms and designing waste rock storage facilities and tailings storage facilities to minimise the risk of acid mine drainage.

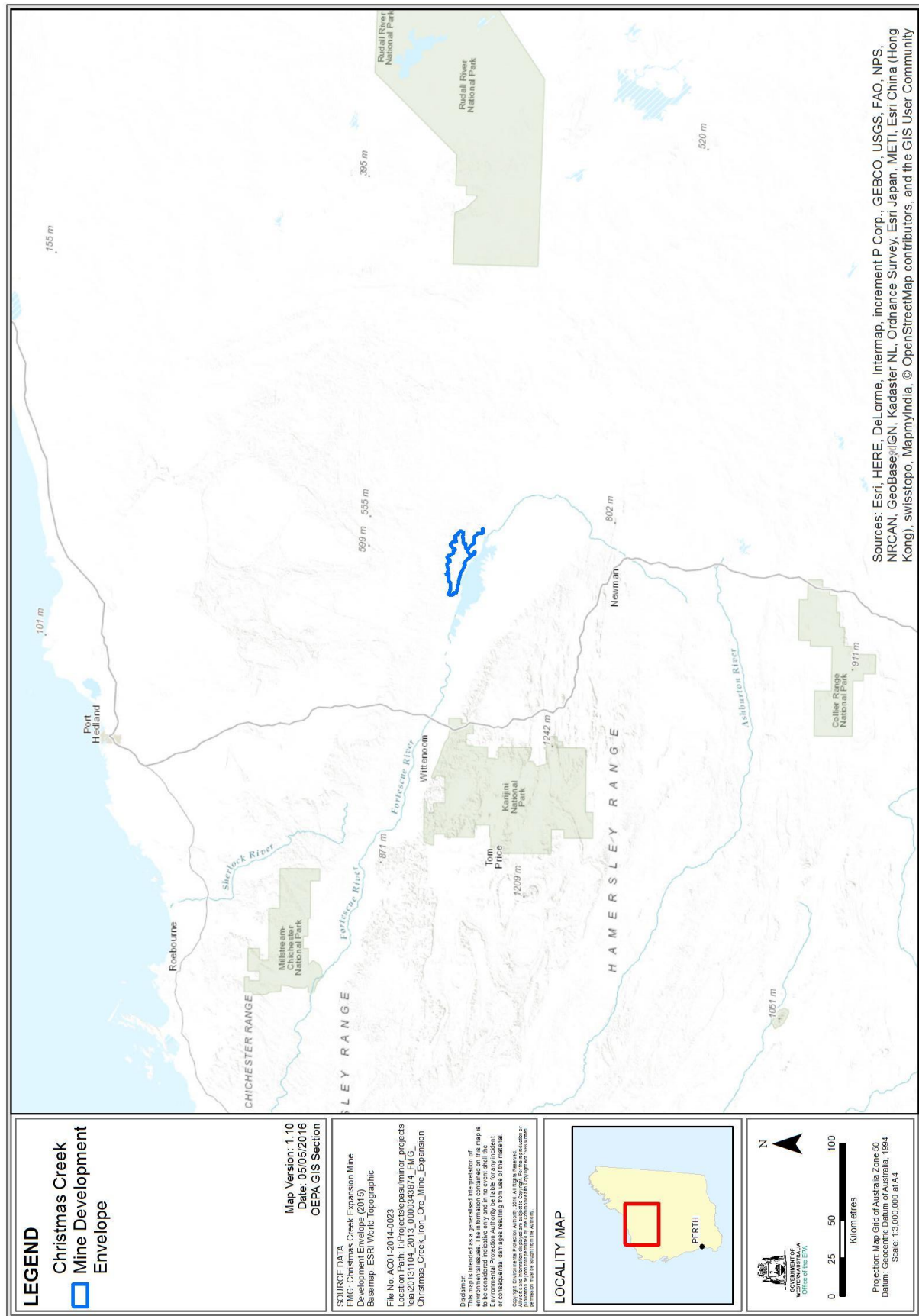
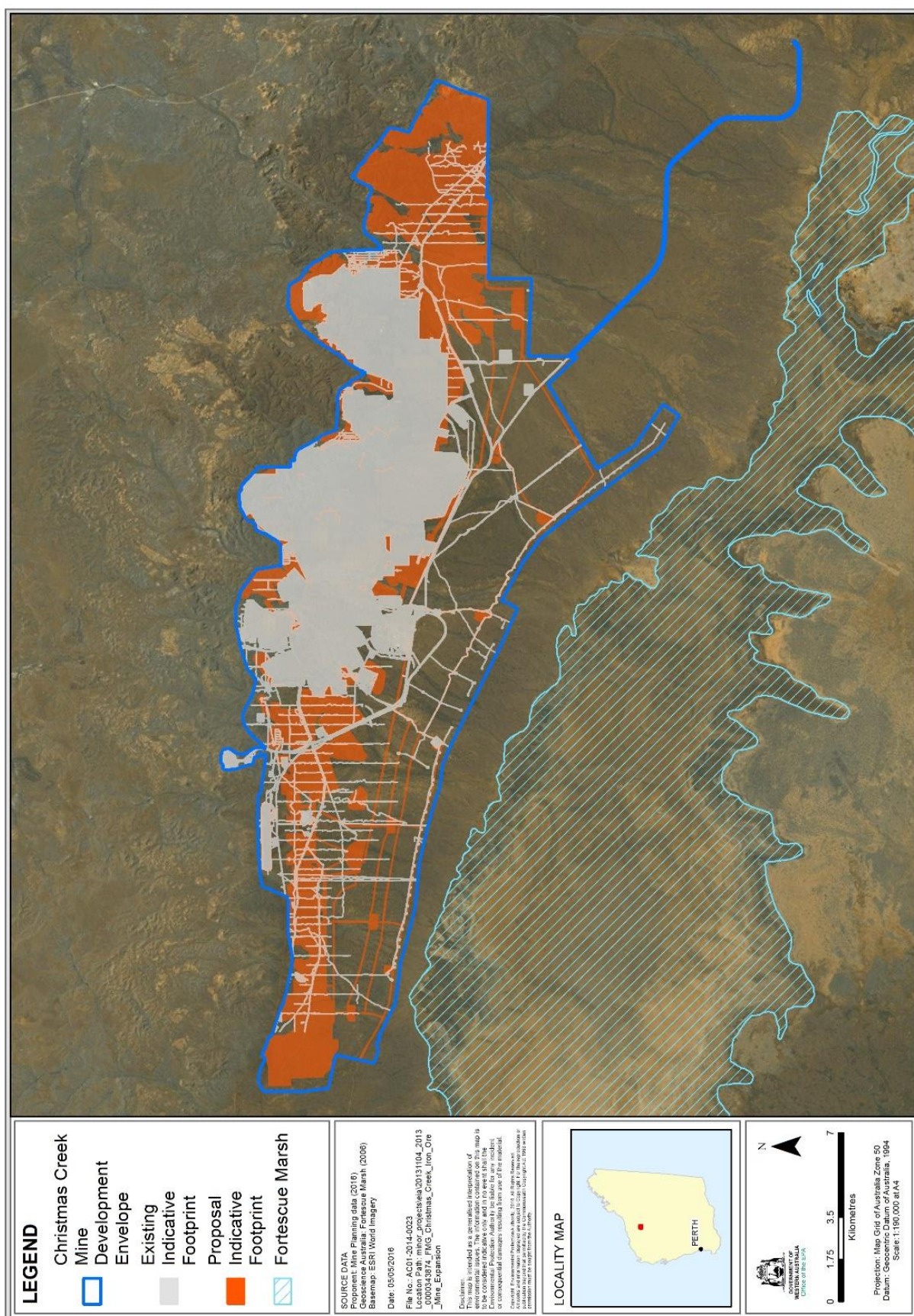


Figure 1: Proposal location



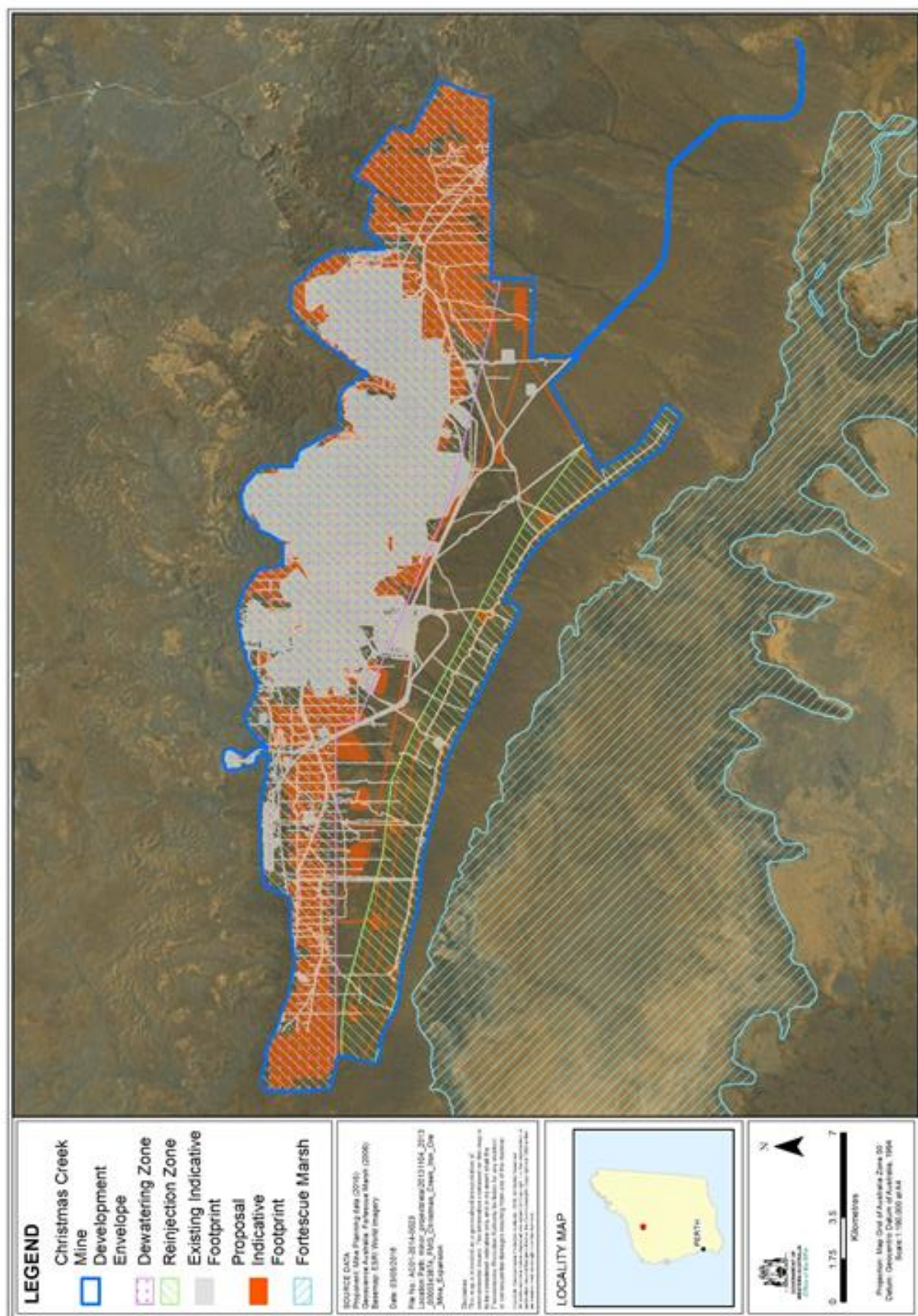


Figure 3: Indicative injection and dewatering zones

3 Key environmental factors

In undertaking its assessment of this proposal and preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 provides a summary of the principles and how the EPA applied these principles in its assessment. The EPA notes that the principles under s4A relate to all parts of the EP Act and therefore some of the principles are more applicable to parts of the EP Act other than Part IV.

The EPA identified the following preliminary key environmental factors in the determination to assess the proposal at the PER level of assessment:

1. **Hydrological Processes / Inland Waters Environmental Quality** – potential impacts from drawdown and mounding of groundwater, potential changes in surface flow regimes and potential changes in water quality;
2. **Flora and Vegetation** – direct impacts from the clearing of flora and vegetation and indirect impacts on vegetation from groundwater drawdown and mounding, and changes to surface water flows;
3. **Subterranean Fauna** – potential impacts from loss of habitat due to dewatering and excavation of mine pits;
4. **Terrestrial Fauna** – potential impacts from the loss of habitat for conservation significant species from the clearing of vegetation;
5. **Rehabilitation and Decommissioning (Integrating Factor)** – potential long-term impacts to vegetation and fauna habitat if rehabilitation is unsuccessful, and potential long-term impacts to aquifer water quality once dewatering and injection ceases; and
6. **Offsets (Integrating Factor)** – to counterbalance the significant residual impacts to native vegetation in ‘Good to Excellent’ condition, including habitat for conservation significant fauna species; and vegetation in the proposed Fortescue Marsh Conservation Reserve and Fortescue Marsh management zone 1a.

Having regard to:

- the proponent’s PER document;
- public and agency comments on the PER document;
- the proponent’s response to submissions;
- the EPA’s own inquiries;
- Environmental Assessment Guideline No. 8 *Environmental Principles, Factors and Objectives* (EPA, 2015a); and
- Environmental Assessment Guideline No. 9 *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA, 2015b),

the EPA confirmed that these factors were the key environmental factors during the course of its assessment of the proposal.

Other environmental factors relevant to the proposal which the EPA determined not to be key environmental factors are discussed in the proponent's PER document (FMG 2015a).

Appendix 3 contains the environmental factors identified through the course of the assessment and the EPA's evaluation of whether an environmental factor is a key environmental factor for the proposal.

The EPA's assessment of the proposal's impacts on the key environmental factors is provided in Sections 3.1 - 3.6. These sections outline the EPA's conclusions as to whether or not the proposal can be managed to meet the EPA's objective for a particular factor and if so, the recommended conditions and procedures that should apply if the proposal is implemented.

In assessing this proposal, the EPA has also considered relevant published EPA policies and guidelines. Section 3 also identifies the relevant policies and guidance for each key environmental factor.

Appendix 4 lists some of the key policies and guidance documents relevant to each of the key environmental factors for this assessment and identifies the relevant matters discussed in, and principles derived from, each policy and guidance document. The EPA has discussed the application of the relevant policy and guidance for each factor in Section 3.

The EPA notes that the following policy and guidance replaced or amended policy and guidance referred to in the ESD:

- Environmental Assessment Guideline No. 8 *Environmental Principles, Factors and Objectives* (EPA 2015a);
- Environmental Assessment Guideline No. 9 *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA 2015b);
- *Guidelines for preparing mine closure plans* (DMP & EPA 2015);
- Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015).
- WA Environmental Offsets Policy (Government of Western Australia 2011);
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014); and
- Environmental Protection Bulletin No.1 – *Environmental Offsets* (EPA 2014c).

The proponent considered the current policy and guidance in its PER, except for the *Guidelines for preparing mine closure plans* and Environmental Protection Bulletin No. 19 as the latest versions were published after the PER was finalised. The EPA considered the above current policy and guidance in its assessment.

The EPA notes that other published policies and guidelines were also considered.

As the EPA is assessing the proposal on behalf of the Commonwealth Government under the Bilateral Agreement, this report also includes Section 4 which addresses MNES.

The EPA has also considered how the proponent has applied the mitigation hierarchy (avoid, minimise, rehabilitate and offset) to the proposal. The extent to which the proponent has applied the mitigation hierarchy for the key environmental factors for the proposal is reflected in the recommended environmental conditions and other advice (to key regulators) for the proposal.

3.1 Hydrological Processes / Inland Waters Environmental Quality

EPA Objectives

The EPA's environmental objectives for these factors are to:

- *maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected; and*
- *maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social are protected.*

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Hydrological Processes and Inland Waters Environmental Quality and the relevant considerations are outlined in Appendix 4. The EPA policy and guidance considered by the EPA to be relevant for this factor for this assessment is:

- *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister of the Environment under Section 16(e) of the Environmental Protection Act 1986 (EPA 2013a).*

EPA Assessment

The Christmas Creek Mine is located north of the Fortescue Marsh, which lies in the Upper Fortescue River catchment. The Fortescue Marsh is nationally important and the largest ephemeral wetland in the Pilbara region, a Priority Ecological Community, and is listed on the Directory of Important Wetlands of Australia as a wetland of national significance.

The water-related values of Fortescue Marsh include springs and pools, wetlands, and Mulga, Samphire and Coolibah/River Red Gum vegetation. The

Mine Development Envelope intersects the Fortescue Marsh management zones defined in the EPA's Section 16(e) advice for the Fortescue Marsh (Figure 4) – 1a Northern Flank (highest environmental significance) and 3a Kulbee Alluvial Flank (lowest environmental significance). The proposal is adjacent to zone 1b Marsh which is also of highest environmental significance (EPA 2013a).

Groundwater levels

The proposal to expand mining at Christmas Creek includes:

- an increase in abstraction from the approved 50 GL/a up to 110 giganlitres per annum (GL/a) (increase of 60 GL/a); and
- an increase in injection from the approved 42.5 GL/a up to 110 GL/a (increase of 67.5 GL/a).

The increase in groundwater abstraction for mine dewatering may cause an expansion of the area of drawdown, potentially affecting groundwater dependent ecosystems. The increase in injection of surplus dewater may increase areas of mounding, potentially affecting ecosystems sensitive to water logging.

There is also the potential for cumulative impacts from water management associated with the adjacent Cloudbreak mine, which is authorised to abstract and reinject up to 150 GL/a of groundwater under Ministerial Statement 1010. Ministerial Statement 899 for the Cloudbreak Life of Mine proposal also authorises FMG to transfer water between the Cloudbreak and Christmas Creek mines. Together with the proposed expansion for Christmas Creek, FMG would be managing up to 260 GL/a of groundwater. This is a significant quantity of water – in comparison, Perth's water use is approximately 300 GL/a.

Mulga vegetation is sensitive to water logging. Areas of Mulga vegetation where mounding (rise in water levels) results in groundwater levels rising to within two metres of the surface (where this was previously not the case) may affect the health of Mulga. Drawdown (drop in water levels) may affect groundwater-dependent vegetation, including Samphire and Coolibah / River Red Gum. Samphire vegetation is located on the fringe of, and within, the Fortescue Marsh and may be sensitive to drawdown and mounding. Coolibah / River Red Gum vegetation is found within creeklines and drainage lines and is considered to be partially groundwater dependent.

Groundwater modelling predicts that drawdown along the fringe of the Fortescue Marsh will be no more than 2.3 m during operations. Mounding along the fringe of the Fortescue Marsh is predicted to be no more than two metres during operations. These changes are greater than the changes authorised in conditions 6-1 and 7-1 in Ministerial Statement 871 for the Christmas Creek Water Management Scheme.

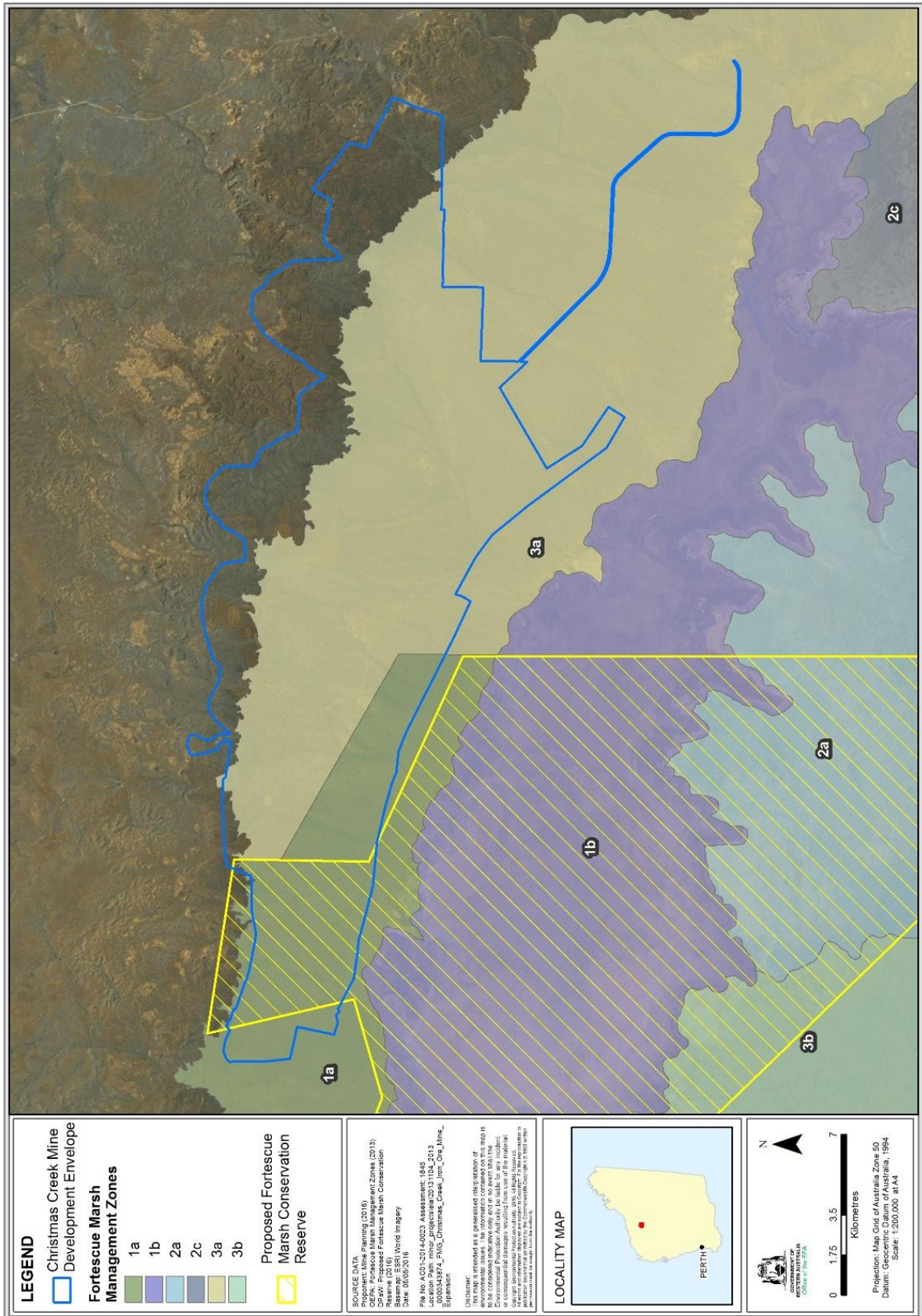


Figure 4: Fortescue Marsh management zones and proposed Fortescue Marsh Conservation Reserve

An independent peer review of the hydrogeological model (for both the Cloudbreak and Christmas Creek mines) was conducted in 2015 (CDM Smith 2015) at the request of the EPA on advice of the Department of Water (DoW), for the assessment of FMG's Increase in abstraction and reinjection at Cloudbreak Mine proposal. An independent peer review of hydrological models to support water and environmental assessments is one of the management strategies in the Section 16(e) advice on the Fortescue Marsh for activities within management zones 1a Northern Flank and 3a Kulbee Alluvial Flank (EPA, 2013a). The peer review concluded that the model is capable of predicting drawdown and mounding of the watertable in environmentally sensitive locations near the Fortescue Marsh. The DoW supported the findings of the Peer Review (EPA 2015a). The EPA also received advice from DoW in late September 2015 that the proponent had adequately addressed the DoW's submissions regarding Hydrological Processes for the Christmas Creek mine expansion.

The proponent will continue the adaptive water strategy to inject surplus dewater into local aquifers of equivalent salinity and redistribute it across the reinjection network, to minimise changes to groundwater levels and quality. This is consistent with the management strategies in the Section 16(e) advice on the Fortescue Marsh.

Conditions 6-1 and 7-1 in Ministerial Statement 871 contain thresholds for groundwater levels, to protect Mulga and Samphire. This Statement relates to the Christmas Creek Water Management Scheme and the assessment focused on the water management scheme part of the mining operations only. Therefore only the indirect impacts to vegetation from changes in groundwater levels were considered, not the total impacts, including direct clearing.

The EPA understands that FMG is required to manage groundwater within defined levels through the Groundwater Operating Strategy, required as part of the *Rights in Water and Irrigation Act 1914* (RiWI Act) water licence regulated by the Department of Water (DoW) for the dewatering, and that these are consistent with the thresholds in Ministerial Statement 871. The EPA also notes that the Department of Environment Regulation (DER) regulates reinjection and discharge for the existing operations under Part V of the EP Act. The EPA received advice from the DoW that once dewatering and injection ceases it does not have a regulatory role, and monitoring of groundwater levels and quality is needed post-mining to ensure that there are no significant impacts to Fortescue Marsh aquifers as groundwater levels recover and reach a new equilibrium.

Therefore, the EPA has not recommended any separate conditions relating to Hydrological Processes (Groundwater) during operations, to avoid regulatory duplication. However, recommended condition 7 does include the requirement to address impacts to conservation significant vegetation from changes in groundwater levels and quality, as part of the outcomes-based condition environmental management plan (Condition EMP) for conservation significant flora and vegetation.

The EPA considers that it is reasonable to use the groundwater level thresholds currently required by conditions 6-1 and 7-1 in Ministerial Statement 871 as a starting point for the provisions required by the Condition EMP, despite the increase in dewatering and injection, consistent with the approach taken for Cloudbreak in Ministerial Statement 1010. The proponent should clearly justify any significant changes from these thresholds as part of the plan preparation. This is also consistent with DoW advice and the s16(e) Fortescue Marsh management area objective to minimise disruption of groundwater in aquifers supporting groundwater dependent ecosystems.

Surface water flows

The proposed expansion will increase the Christmas Creek mine disturbance footprint by up to 7,821 ha, which will include more mine pits and associated infrastructure. Mine infrastructure may modify channel flow patterns and cause erosion, shadowing and changes to surface flow volumes. Alterations to surface water flows can affect downstream vegetation communities, particularly Mulga.

Modelling undertaken by Worley Parsons (2014) for the proposed expansion indicates that, if the mitigation measures (outlined below) are implemented, the greatest change to channel flow flood patterns would occur during the 1 in 20 year rainfall event. Under this scenario 139 ha that would normally be wet would become dry, equivalent to 3% of the 5,484 ha area of inundation. Worley Parsons also predicted that 439 ha (7%) of the 6,142 ha of sheet flow area would be impacted by shadowing (where areas downslope receive less flow than previously, caused by an interruption or diversion of surface water).

The combined effect of the Christmas Creek, Cloudbreak and Roy Hill development is not expected to reduce flows reaching the Fortescue Marsh by more than 1% during mining and 0.8% post mining (FMG 2015).

The proponent will continue to implement various management measures to minimise changes to surface water flow and impacts to the Fortescue Marsh. These management methods include:

- locating infrastructure away from Fortescue Marsh surface water tributaries where possible;
- using mined out pits for tailings storage and overburden to reduce the need for further disturbance for the construction of the tailings storage facilities and waste rock dumps;
- the controlled release of dewater to the surface only during system failures or in exceptional circumstances;
- the diversion of run-off around waste dumps and mine pits;
- the raising or burying pipelines to prevent the obstruction of surface water flow in sheet flow areas;
- progressive backfilling of mine pits and progressive rehabilitation.

The EPA has not recommended any separate conditions relating to Hydrological Processes (Surface Water) during operations. However,

recommended condition 7 does include the requirement to address impacts to conservation significant vegetation from changes in surface water flows, as part of the preparation of the outcomes-based condition environmental management plan (Condition EMP) for conservation significant flora and vegetation.

Groundwater and surface water quality

The proposed expansion will result in the dewatering and injection of large quantities of differing salinity groundwater (saline and brackish). Dewatering may increase the salinity of groundwater near dewatering locations. Injection of saline water may cause alterations to groundwater and surface water quality. There is also the potential for the salinisation of surficial sediments due to over-pressurisation of the confining clay layer between the surficial sediments and the Oakover Formation, which may impact the Fortescue Marsh.

The proponent will continue to minimise potential impacts on groundwater quality in the receiving aquifers through the independent management of saline and brackish dewater. Brackish dewater is injected into the Tertiary Detritals and saline water is injected into the Oakover Formation.

The proponent has observed minor pressurisation of the Oakover Formation in the area fringing the Fortescue Marsh. No impacts are observed at the watertable, where cycles of watertable rise and fall, driven by marsh flooding and recharge, still persist (FMG 2015). The shallow water table along the northern edge of the Fortescue Marsh is naturally saline, with small pockets of shallow brackish water. The proponent will continue to maintain surface water flows to these brackish areas and redistribute injection to avoid salinisation.

One of the objectives of condition 9 in Ministerial Statement 707 is to protect and maintain the quality of the water in the aquifer and condition 11 requires the proponent to minimise the impacts from saline water application on flora, vegetation and fauna. As noted under the subsection on *Groundwater levels*, during operations, the DoW regulates the abstraction of groundwater for dewatering and the DER regulates the injection and discharge of surplus dewater.

Therefore, the EPA has not recommended any separate conditions relating to Inland Waters Environmental Quality during operations, to avoid regulatory duplication. However, recommended condition 10 does include the requirement for a monitoring framework for groundwater levels and quality once dewatering and injection ceases post-mining, as part of the Mine Closure Plan.

Summary

Having particular regard to:

- a) relevant EPA policy and guidance pertaining to Hydrological Processes and Inland Waters Environmental Quality;

- b) the confidence in the proponent's groundwater modelling and the resulting water level predictions;
- c) the ability of the proponent to manage groundwater level change for the existing operations; and
- d) the ability of the proponent to manage the injection of dewater to minimise changes to salinity in aquifers for the existing operations; and
- e) possible significant impacts to Fortescue Marsh aquifers post-mining once dewatering and injection ceases,

the EPA considers that the proposal can be managed to meet the EPA's objectives for Hydrological Processes/Inland Waters Environmental Quality subject to the following:

- Groundwater abstraction and injection is limited to 110 GL/a as defined in Table 2 of Schedule 1 of the recommended environmental conditions;
- Condition 7 is imposed to maintain the health Mulga, Samphire and Coolibah/River Red Gum vegetation (including a plan that addresses impacts from changes to groundwater levels and quality, and changes to surface flows); and
- Condition 10 is imposed which includes a monitoring framework for groundwater levels and groundwater quality post-mining once dewatering and injection ceases.

3.2 Flora and Vegetation

EPA Objective

The EPA's environmental objective for this factor is *to maintain representation, diversity, viability and ecological function at the species, population and community level.*

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Flora and Vegetation and the relevant considerations are outlined in Appendix 4. The EPA policy and guidance considered by the EPA to be relevant for this factor for this assessment are:

- Position Statement No. 2 – *Environmental protection of native vegetation in Western Australia*, (EPA 2000);
- Position Statement No. 3 – *Terrestrial biological surveys as an Element of Biodiversity Protection* (EPA 2002);
- Guidance Statement No. 51 – *Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004a); and

- *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister of the Environment under Section 16(e) of the Environmental Protection Act 1986 (EPA 2013a).*

EPA Assessment

As noted in Section 3.1 the Mine Development Envelope intersects the Fortescue Marsh management zones – 1a and 3a and is adjacent to zone 1b (EPA 2013a). The Mine Development Envelope also intersects the proposed Fortescue Marsh Conservation Reserve (Figure 4), which includes pastoral lease exclusion areas. The EPA recommended that the proposed 2015 pastoral lease exclusion areas within the Pilbara (including near the Fortescue Marsh), identified for management by the Department of Parks and Wildlife, be afforded the highest possible level of conservation tenure in its s16(e) advice on *Cumulative environmental impacts of development in the Pilbara region* (EPA 2014b).

The PER document indicates that the proponent has considered Guidance Statement No. 51 and Position Statement No. 3.

The proposed expansion would clear an additional 7,821 ha of vegetation (total of 17,956 ha including the approved clearing), of which 7,752 ha is native vegetation. The surveys undertaken identified the condition of the vegetation in accordance with the definitions provided in Position Statement No. 2 and identified that 7,468 ha of the native vegetation was considered to be in 'Good to Excellent' condition.

The proposal would also have indirect impacts on flora and vegetation from groundwater abstraction and injection and altered surface water regimes. The cumulative impacts are also important in the context of the extent of clearing proposed for the Christmas Creek Mine and the impacts from nearby operations including FMG's adjacent Cloudbreak Mine, and the Roy Hill Iron Ore Mine.

Flora

No Declared Rare Flora (DRF) were recorded in the Mine Development Envelope. A total of 15 priority flora were recorded in the study area: five Priority 1 species, six Priority 3 species and four Priority 4 species. Of the five Priority 1 species identified, two are located within the Mine Development Envelope - *Calotis squamigera* and *Eremophila spongiorarpa* (Figure 5).

The PER presented information on these two Priority 1 species as populations, stating that there were three known populations of *Calotis squamigera* and 101 known populations of *Eremophila spongiorarpa* based on FMG databases. The PER stated that the current mine plan would avoid the *Calotis squamigera* and would impact two populations of *Eremophila spongiorarpa*. The EPA requested further information on the number of individuals of each species and the regional context of these species.

On review of FMG and Parks and Wildlife databases, the proponent provided updated information on records, not populations, and revised the number of known records of *Eremophila spongiorcarpa* to 255. The proponent also indicated that, due to the various different survey techniques used, the number of individual specimens for each record is not available in a consistent format to enable a meaningful analysis of impacts to individuals.

One of three records of the Priority 1 species *Calotis squamigera* and 31 of 255 records of *Eremophila spongiorcarpa* are located in the Christmas Creek Mine Development Envelope. Another 71 records of *Eremophila spongiorcarpa* are located within the Cloudbreak Mine Development Envelope (Figure 5).

The proponent has indicated that though the implementation of existing approved management plans it intends to continue to avoid known locations of priority flora where possible and progressively rehabilitate disturbed areas with native vegetation (FMG 2015a). Where possible, natural stream and drainage flows would also be re-established to resemble original drainage patterns.

The Priority 1 flora are located in the borefield area of the injection zone in the southern portion of the Christmas Creek Mine Development Envelope (Figure 5). The proponent has confirmed that the additional water infrastructure such as pipelines can be planned to avoid impacts to these species.

Understanding the numbers of individuals of a particular species is important to enable the EPA to judge the impacts of a proposal on flora, a relevant consideration of Guidance Statement 51. Due to the limited number of known records and the lack of information on the number of individuals of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiorcarpa*, the EPA has recommended that condition 7 be imposed to ensure there are no direct and indirect impacts of the known records of these species within the Christmas Creek Mine Development Envelope.

Vegetation

The significant vegetation in the vicinity of the proposal is the Fortescue Marsh Priority 1 Ecological Community (PEC), and Mulga, Samphire and Coolibah / River Red Gum (Figure 5). Mulga vegetation is considered to be significant as this area is the northern extent of Mulga vegetation in Western Australia and is floristically diverse from other Mulga vegetation in the bioregion. Mulga vegetation is identified as a value in the Fortescue Marsh management zones 1a and 3a (EPA 2013a). Samphire vegetation is considered to be unique as it is locally restricted to the Fortescue Marsh and contains conservation significant flora identified as a value for management zone 1b (EPA 2013a). Coolibah / River Red Gum vegetation occurs along creek lines and is locally significant.

The Mine Development Envelope contains approximately 51 ha of the PEC and is partially located within the PEC buffer zone. There would be no or indirect impacts to the Fortescue Marsh PEC from clearing.

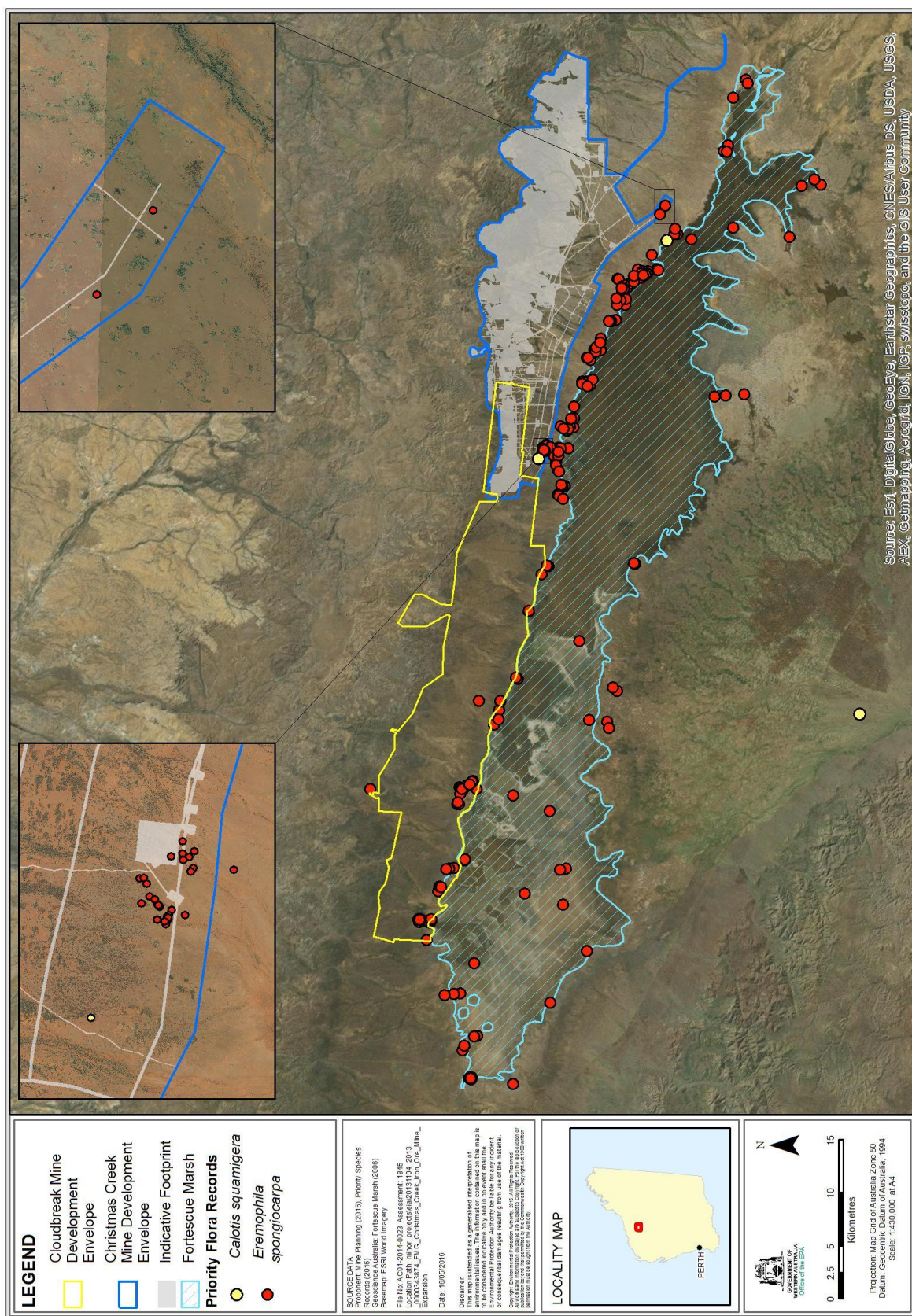


Figure 5: Known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa*

The proposal would result in cumulative impacts to the significant vegetation surrounding the Fortescue Marsh (Table 3). There would be no additional impacts to Samphire vegetation. Up to an additional 4,294 ha of Mulga vegetation would be cleared as a result of the proposal and up to an additional 439 ha of sheet flow dependent Mulga vegetation would be indirectly affected by altered surface water flows. No indirect impacts are predicted to occur to Mulga vegetation as a result of groundwater drawdown or mounding. Additional impacts to Coolibah / River Red Gum vegetation would include clearing of up to 355 ha of groundwater dependent ecosystem and a potential loss of 1.1 ha due to drawdown.

Table 3: Cumulative Impacts to Significant Vegetation

Vegetation community		Samphire	Mulga	Coolibah / River Red Gum
Mapped extent (ha)		31,478	107,773	5,469
Direct impact (ha)	Roy Hill	0	4,145	437
	Cloudbreak	3	5,829	126
	Christmas Creek	0	9,805 (5,511 existing and 4,294 expansion)	497 (142 existing and 355 expansion)
Indirect impact (ha)	Roy Hill	Not known	Not known	Not known
	Cloudbreak	763	315	3
	Christmas Creek	0	439 (0 existing and 439 expansion)	1.1 (0 existing and 1.1 expansion)
Approved impact (ha)		766	15,800	708
Total impact (ha)		766	20,533	1,064
Increase of proposed expansion relative to approved impact (%)		0	30	50
Cumulative impact (%)		2.4	19.1	19.5

The EPA notes that the proponent considers that the proposed expansion would not impact on Samphire vegetation or the Fortescue Marsh PEC. However, this is based on the assumption that this vegetation can tolerate a drop in groundwater level of up to three metres. Although the research this is based on has been peer reviewed by the proponent, it has not undergone an independent peer review and is only based on one of the seven species identified from surveys for the proposal.

To restrict the additional indirect impacts to Samphire, Mulga, and Coolibah / River Red Gum vegetation to those predicted above, the proponent will continue to implement the adaptive water management strategy (see also Hydrological Processes section). This includes injecting groundwater rather than discharging it to surface creeklines (except in exceptional circumstances), to minimise direct impacts to riparian vegetation and the Fortescue Marsh.

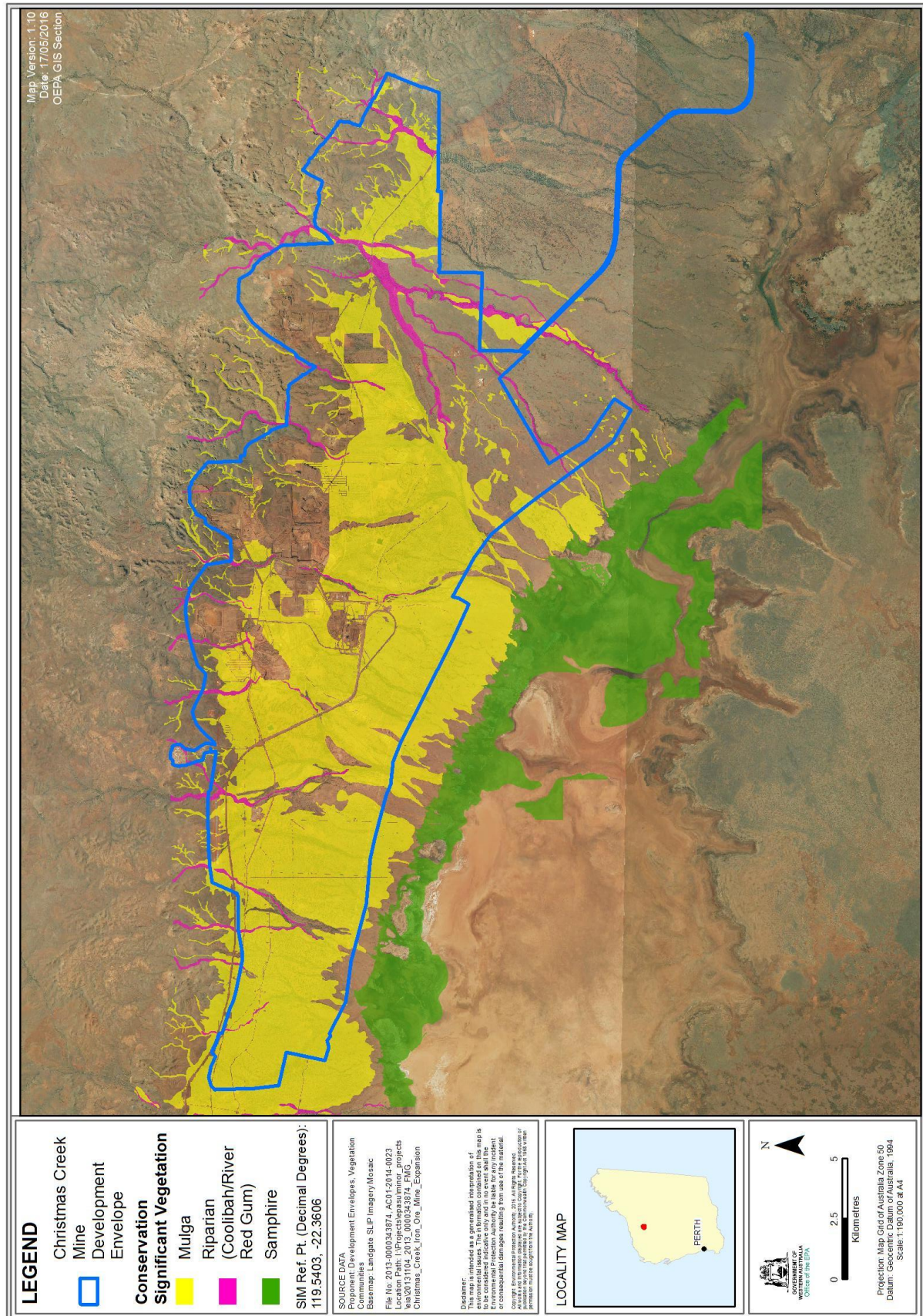


Figure 6: Mulga, Samphire and Coolibah / River Red Gum vegetation

To minimise the predicted indirect impacts to Mulga vegetation from surface water flow to those outlined above, the proponent would continue to manage and minimise surface water impacts through various measures such as the use of diversions, culverts, drainage infrastructure burying or raising pipelines.

The EPA notes that the following management approaches proposed by the proponent are consistent with the strategies in the Section 16(e) Fortescue Marsh management area advice:

- minimising impacts to Mulga and Samphire through avoiding clearing where possible;
- minimising groundwater drawdown impacts to Coolibah/River Red Gum;
- reinjecting groundwater;
- minimising the reduction in surface water flow flows; and
- considering cumulative impacts.

Fortescue Marsh management zone 1a covers 49,932 ha. Indicative clearing approved under existing Ministerial Statements for the existing Christmas Creek (204.4 ha) and Cloudbreak (4676.4 ha) mines is 4,881 ha or 9.8% of the Fortescue Marsh management zone 1a. The proposed Christmas Creek expansion would clear up to an additional 1,640 ha of management zone 1a which would increase the cumulative impact by 3.2% to 13.1%.

Fortescue Marsh management zone 3a covers 60,030 ha. The indicative clearing for the operating Christmas Creek mine is up to 6,062 ha or 10.1% of this management zone. The proposed Christmas Creek expansion would clear up to an additional 3,563 ha of management zone 3a which would increase the cumulative impact by 5.9% to 16%.

There are a number of conditions in Ministerial Statements 707 and 871 to minimise the direct and indirect impacts to vegetation. The proponent has developed and implemented a number of plans related to vegetation, groundwater and surface water required by these conditions.

The EPA notes from Table 3 above, that the indirect impacts to vegetation are very small compared to the direct impacts. The indirect impacts from the Christmas Creek Mine (including the proposed expansion) would contribute to less than 4% of Mulga impacts and less than 1% of Coolibah / River Red Gum impacts.

The EPA has reviewed the existing conditions relating to Flora and Vegetation and has proposed an outcomes-based Condition EMP for conservation significant flora species and vegetation, consistent with the EPA's revised condition framework in EAG 11 (EPA 2015b) and the Condition Environmental Management Plan framework in EAG 17 (EPA 2015c). This would require revision of existing approved management plans. The EPA also proposes that the total clearing (which includes direct and indirect loss) of Mulga, Samphire, and Coolibah / River Red Gum vegetation is limited 10,244 ha, 0 ha and 498 ha

respectively, as defined in Table 2 of Schedule 1 of the recommended environmental conditions.

Conditions 6-1 and 7-1 in Ministerial Statement 871 contain thresholds for groundwater levels, to protect Mulga and Samphire. As noted in Section 3.1, the EPA considers that it is reasonable to use these groundwater level thresholds as a starting point for the provisions required by the Condition EMP, despite the increase in dewatering and injection, consistent with the approach taken for Cloudbreak in Ministerial Statement 1010. The proponent should clearly justify any significant changes from these thresholds as part of the plan preparation.

A relevant consideration of Position Statement No. 2 is that there would be an expectation that a proposal would demonstrate that clearing of any vegetation type would not take it below the “threshold level” of 30% of the pre-clearing extent of the vegetation type. The EPA also considered the more recent Section 16(e) advice - *Fortescue Marsh management area*, which identifies the important values of the Fortescue Marsh.

As the cumulative impact to Mulga and Coolibah / River Red Gum vegetation is approaching 20%, and the scale and lineal extent of the impact is large, particularly for Mulga, the EPA’s view is that the rehabilitation of these communities is very important. Condition 6 in Ministerial Statement 707 requires the plan to specify completion criteria for vegetation. The EPA has included a specific clause as part of the proposed Rehabilitation and Decommissioning condition (condition 10) in addition to the standard clauses, to ensure that the proponent develops and achieves appropriate completion criteria for Mulga and Coolibah / River Red Gum vegetation.

The EPA considers that the proponent has adequately demonstrated how it has avoided and minimised impacts to flora and vegetation through the design of the proposal and associated infrastructure. However, most of the additional impacts relate to the clearing for mine pits and is unavoidable. The EPA notes that no flora species or vegetation association would be impacted to an extent that would significantly affect its diversity, viability or ecological function.

However, given the high value of the Fortescue Marsh vegetation communities and the cumulative impact of clearing within the Fortescue IBRA subregion, the EPA considers that the loss of up to 7,468 ha of native vegetation in ‘Good to Excellent’ condition (including vegetation in the Fortescue Marsh Management Zones and the proposed Fortescue Marsh Conservation Reserve) constitutes a significant residual impact, after taking into account the proponent’s proposed measures to avoid, minimise and rehabilitate impacts and the proposed condition requiring an outcomes-based Condition EMP for conservation significant flora species and vegetation (see Offsets, Section 3.6).

Summary

Having particular regard to the:

- a) relevant EPA policy and guidance pertaining to Flora and Vegetation;

- b) the proponent's existing management approach relating to flora and vegetation;
- c) absence of DRF and no impact to the Fortescue Marsh P1 PEC and Samphire vegetation;
- d) potential impacts to the Priority 1 species *Calotis squamigera* and *Eremophila spongiocarpa*;
- e) the additional loss of 4,733 ha of Mulga vegetation and 356.1 ha of Coolibah / River Red Gum vegetation;
- f) the predicted local cumulative impact of the loss of 19.5% of Mulga vegetation and 19.1% of Coolibah / River Red Gum vegetation; and
- g) the significant residual impact associated with the additional clearing of up to 7,468 ha of 'Good to Excellent' condition native vegetation, including vegetation in the Fortescue Marsh management zones and the proposed Fortescue Marsh Conservation Reserve,

the EPA considers that the proposal can be managed to meet the EPA's objectives for Flora and Vegetation subject to the following:

- the extent of clearing of vegetation is limited to the authorised extent as defined within Table 2 of Schedule 1 of the recommended environmental conditions;
- the extent of clearing (direct and indirect impacts) of Mulga, Samphire and Coolibah / River Red Gum vegetation is limited to the authorised extent as defined within Table 2 of Schedule 1 of the recommended environmental conditions;
- condition 7 is imposed to avoid impacts on Priority 1 flora species and to maintain the health of Mulga, Samphire and Coolibah/River Red Gum vegetation;
- condition 10 is imposed which includes completion criteria for the rehabilitation (including revegetation) of Mulga and Coolibah / River Red Gum vegetation; and
- condition 11 is imposed to counterbalance the significant residual impact of a loss of up to 7,468 ha of 'Good to Excellent' condition native vegetation including vegetation located in the Fortescue Marsh management zones and the proposed Fortescue Marsh Conservation Reserve, and the cumulative loss of Mulga and Coolibah / River Red Gum vegetation.

3.3 Terrestrial Fauna

EPA Objective

The EPA's environmental objective for this factor is *to maintain representation, diversity, viability and ecological function at the species, population and assemblage level.*

EPA policy and guidance

The EPA policy and guidance applicable to Terrestrial Fauna and the relevant considerations are outlined in Appendix 4. The EPA policy and guidance considered by the EPA to be relevant for this factor for this assessment are:

- Position Statement No. 3 – *Terrestrial biological surveys as an Element of Biodiversity Protection*, (EPA 2002);
- Guidance Statement No. 56 – *Terrestrial Fauna Surveys for Environmental Impact Assessment in WA*, (EPA 2004b);
- Technical Guide on *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2010)
- Guidance Statement No. 20 – *Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in WA* (EPA 2009); and
- *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister of the Environment under Section 16(e) of the Environmental Protection Act 1986*, (EPA 2013a).

Commonwealth policy and guidance

As the proposal is being assessed under the bilateral agreement between the Commonwealth and Western Australian governments, Commonwealth policy and guidance also applies to this assessment. Appendix 4 outlines the survey guidelines, conservation advice, species-specific recovery plans, and threat abatement plans for relevant species listed under the EPBC Act that are relevant for this assessment, consistent with the requirements of the ESD for the proposal (see also Section 4 MNES).

EPA assessment

As noted in Sections 3.1 and 3.2, the Mine Development Envelope intersects the Fortescue Marsh management zones 1a and 3a, and is adjacent to zone 1b. The Mine Development Envelope also intersects the proposed Fortescue Marsh Conservation Reserve which the EPA recommends is afforded the highest possible level of conservation tenure (EPA 2014b).

The proposed expansion would disturb up to an additional 7,752 ha of native vegetation which is potential habitat for conservation significant fauna species

(total of 17,777 ha of potential habitat including the 10,025 ha fauna habitat clearing for the existing mine). The expansion may also impact Short Range Endemic (SRE) invertebrate species.

Four habitat types were identified within the Mine Development Envelope which are likely to support the conservation significant terrestrial fauna:

1. Marsh (Low halophytic shrubland) - potential habitat for the Greater Bilby, Night Parrot and migratory birds;
2. Drainage Line and Alluvial Plain (Creekline with shrubland and/or eucalypt open woodland) – potential foraging habitat for Pilbara Olive Python and Pilbara Leaf-nosed Bat, and potential SRE habitat;
3. Low Hill (Spinifex covered hills and ranges) – potential habitat for the Northern Quoll and the Night Parrot, and potential SRE habitat; and
4. Stony Plain (Snakewood and Mulga woodland) – potential SRE habitat.

The proposed expansion would result in the additional clearing of up to:

- 14 ha of Marsh habitat (0.04% of the mapped extent at Christmas Creek and Cloudbreak and cumulative impact of 2.4%);
- 1,117 ha of Drainage Line and Alluvial Plain habitat (6% of the mapped extent and cumulative impact of 17%); and
- 2,255 ha of Low Hill habitat (6% of the mapped extent and cumulative impact of 15%); and
- 4,366 ha of Stony Plain habitat (6% of the mapped extent at Christmas Creek and Cloudbreak and cumulative impact of 20%).

The PER document indicates that the proponent has considered Guidance Statement No. 56, Position Statement No. 3 and Guidance Statement No. 20 in conducting surveys for the proposal.

Vertebrate species

Surveys recorded 313 vertebrate fauna species: 43 mammals; 165 birds; 99 reptiles; and six amphibians. This included seven species protected under the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Western Australia Wildlife Conservation Act 1950* (WC Act). The most significant is the Pilbara Olive Python (*Liasis olivaceus barroni*) which is listed as Vulnerable under the EPBC Act, and Schedule 1 under the WC Act.

Based on databases and survey results there is potential for a further 16 species of conservation significant vertebrate fauna to occur within the Mine Development Envelope including:

- Northern Quoll (*Dasyurus hallucatus*) – Endangered under the EPBC Act and Schedule 1 under the WC Act.
- Night Parrot (*Pezoporus occidentalis*) – Endangered under the EPBC Act and Schedule 1 under the WC Act.

- Greater Bilby (*Macrotis lagotis*) – Vulnerable under the EPBC Act and Schedule 1 under the WC Act.
- Pilbara Leaf-nosed Bat (*Rhynonictoris aurantia*) - Vulnerable under the EPBC Act and Schedule 1 under the WC Act.

The Northern Quoll, Night Parrot and Greater Bilby are identified as values in the Fortescue Marsh management zones 1a and 1b (EPA 2013a).

The proposed expansion would result in the additional clearing of up to 3,386 ha of potential habitat for conservation significant vertebrate fauna (14 ha of Marsh habitat, 1,117 ha of Drainage Line and Alluvial Plain habitat and 2,255 ha of Low Hill habitat).

One individual of the Pilbara Olive Python was recorded in the Mine Development Envelope (ENV 2012). The Response to Submissions document (FMG 2015b) indicates that three pythons have been relocated. A technical report (Ecologia 2014) noted that the Mine Development Envelope did not contain habitat with rocky gorges and gullies with permanent water pools that would support permanent populations, but did contain habitat suitable for the python to move through the landscape (large eucalypt-lined creeklines with semi-permanent pools). The proponent considers that there is a low likelihood of the python permanently occurring in the Mine Development Envelope due to the lack of preferred rocky habitat (FMG 2015a). This is supported by the recent survey (Ecologia 2014) where no pythons were detected (FMG 2015b).

The EPA notes that Pilbara Olive Python has been recorded in low numbers in the Cloudbreak (one) and the Mine Development Envelopes (three) and that the proposed expansion would include additional clearing of up to 1,117 ha of potential foraging habitat (Drainage Line and Alluvial Plain), but not habitat to support permanent populations.

To mitigate impacts to native fauna, the proponent has committed to avoiding the 74 ha of rocky escarpment habitat (located with the Low Hill habitat type) which is potential denning habitat for the Northern Quoll. The proponent would also continue to implement mechanisms including the management of groundwater levels and surface water flows (see Section 3.1) and the staged clearing of vegetation, progressive rehabilitation, and restriction of vehicle movements, outlined in the *Conservation Significant Fauna Management Plan* required under Ministerial Statement 707.

The plan also contains mechanisms to control fire, weeds and feral animals which are relevant considerations in Commonwealth Department of the Environment (DotE) policies relating to this proposal (see Section 4 and Appendix 4). The management of surface and groundwater levels outlined in Section 3.1 is consistent with Commonwealth Conservation Advice on the Pilbara Olive Python and Pilbara Leaf-nosed Bat.

Short Range Endemic invertebrate species

Surveys and DNA sequencing identified two potential SRE species within the Mine Development Envelope.

The potential SRE Spider *Karaops* sp. 'Christmas' is considered to inhabit cracks and crevices in rocky outcrops or under the bark of trees. The specimen was located within Stony Plain habitat. An additional specimen was identified in a previous survey at Bonney Downs over 18 km north-west of the Mine Development Envelope in Low Hill habitat (FMG 2015). The proponent considers that the habitat types in which it was found are widely distributed outside of the Mine Development Envelope with aerial imagery indicating that Low Hill habitat type extends further northwards outside of areas mapped by the proponent.

The potential SRE millipede *Antichiropus* sp. 'Christmas' was found in the Stony Plains and Drainage Line and Alluvial Plain habitats. One of the four areas in which the species was identified is located outside the Mine Development Envelope. The proponent's view is that, as the species has been identified across different habitat types, impacts to the species are not likely to be significant.

The proposed expansion would result in the additional clearing of up to 7,738 ha of potential habitat for SREs (1,117 ha of Drainage Line and Alluvial Plain habitat, 2,255 ha of Low Hill habitat and 4,366 ha of Stony Plain habitat).

The EPA considers that these species are likely to be short range endemic fauna. However, the EPA's view is that significant impacts to the species are unlikely as approximately 82% of the mapped extent of the potential habitat would remain.

The EPA has reviewed the existing conditions relating to Terrestrial Fauna and has proposed a management-based Condition EMP for conservation significant terrestrial fauna, consistent with the EPA's revised condition framework in EAG 11 (EPA 2015b) and the Condition Environmental Management Plan framework in EAG 17 (EPA 2015c). This would require revision of existing approved management plans.

The EPA notes that no terrestrial fauna species would be impacted to an extent that would significantly affect its diversity, viability or ecological function. However, given the cumulative impact of clearing of the Drainage Line and Alluvial Plain habitat (which contains Coolibah /River Red Gum vegetation) and the Stony Plains habitat (which is dominated by Mulga vegetation), the EPA considers that the loss of up to 7,752 ha of native terrestrial fauna habitat constitutes a significant residual impact, after taking into account the proponent's proposed measures to avoid, minimise and rehabilitate impacts and the proposed condition requiring a management-based Condition EMP for conservation significant terrestrial fauna (see Offsets, Section 3.6).

The EPA notes that the proposed conditions relating to Flora and Vegetation, Rehabilitation and Decommissioning, and Offsets would also address the impacts to terrestrial fauna habitat.

Summary

Having particular regard to:

- a) relevant EPA policy and guidance pertaining to Terrestrial Fauna and relevant Commonwealth policy and guidance related to conservation significant terrestrial fauna species of MNES;
- b) the proponent's existing management approach relating to terrestrial fauna;
- c) one species of threatened terrestrial fauna (Pilbara Olive Python) and two potential SREs being recorded within the Mine Development Envelope;
- d) the additional loss of 14 ha of Marsh habitat, 1,117 ha of Drainage Line and Alluvial Plain habitat type, 2,255 ha of Low Hill habitat type; and 4,366 ha of Stony Plain habitat;
- e) the cumulative impact to habitat; and
- f) the significant residual impact associated with the additional clearing of up to 3,386 ha of habitat for conservation significant fauna,

the EPA considers that the EPA's objective for Terrestrial Fauna can be met subject to the following:

- condition 8 is imposed which requires a revised management plan to minimise impacts to significant terrestrial fauna;
- condition 10 is imposed which includes completion criteria for the rehabilitation (including revegetation) of Mulga and Coolibah / River Red Gum vegetation communities; and
- condition 11 is imposed to counterbalance the significant residual impact of the loss of habitat for conservation significant fauna.

3.4 Subterranean Fauna

EPA Objective

The EPA's environmental objective for this factor is *to maintain the representation, diversity, viability and ecological function at the species, population and assemblage level.*

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Subterranean Fauna and the relevant considerations are outlined in Appendix 4. The EPA policy and

guidance considered by the EPA to be relevant for this factor for this assessment are:

- Guidance Statement No. 54a – *Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia*, (EPA 2007);
- Environmental Assessment Guideline No. 12 – *Consideration of subterranean fauna in environmental impact assessment in Western Australia* (EPA 2013b);
- Section 16(e) - *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area*, (EPA 2013a).

EPA assessment

The proposal has the potential to impact troglofauna from the loss of habitat from the excavation of mine pits above the water table, the placement of mine infrastructure such as waste rock dumps, and from groundwater mounding. Impacts to stygofauna may occur from the excavation of mine pits below the water table and from drawdown from groundwater dewatering.

Subterranean fauna are identified as values in the Fortescue Marsh management zones 1a and 3a (EPA 2013a).

The PER document indicates that the proponent has considered Guidance Statement No. 54a for the subterranean fauna surveys.

Stygofauna sampling yielded 69 species from 13 higher level taxonomic groups. Five stygofauna species were recorded from the likely impact areas associated with the proposed expansion. Four of these species were only recorded within the additional drawdown impact area and three of these may be restricted in range (*Bathynella* sp. B02, *Goniocyclops* sp. B02 and *Canthocamptidae* sp. B02). The proponent considers that the threat to *Bathynella* sp. B02 and *Goniocyclops* sp. B02 is likely to be low based on the knowledge of their biology and habitat preferences as the aquifers in this area are not markedly stratified and the level of additional drawdown is not likely to result in the loss of significant amounts of habitat (FMG 2015a). The remaining species, a copepod *Canthocamptidae* sp. B02, may belong to an undescribed genus. There are 19 other species of copepods that have been collected in the area, 15 of which are known to be widespread.

Having regard to Environmental Assessment Guideline No. 12, the proponent used these other copepods as a surrogate and considers that this species could have a range extending beyond the proposal impact area.

Troglofauna sampling yielded 29 species from 13 orders. Of the 20 species currently known only from the survey area, 12 were restricted to the proposed impact area. Eight of these are considered likely to extend beyond the impact areas, while the remaining four comprise three diplurans (*Anajapygidae* sp B02, *Parajapygidae* sp. B24, and *Projapygidae* sp. B12) and an isopoda (*Troglarmadillo* sp. B30). *Anajapygidae* sp. B02 and *Projapygidae* sp. B12

would be affected by habitat loss resulting from pit excavation and the other two species that may be exposed to minor habitat loss as a result of groundwater mounding.

All four of these species are found in the colluvium which stretches along the northern flank of the Fortescue Marsh. Of these species, *Anajapygidae* sp. B02 was found over a range of 18 km within the colluvium, indicating that it is potentially more widespread. The other three species *Parajapygidae* sp. B24, *Projapygidae* sp. B12, and *Troglarmadillo* sp. B30 were found at single locations within the colluvium. It appears likely that the apparently restricted ranges of these species are artefacts of them occurring at low abundance. Other *Troglarmadillo* and *Diplura* species have been found in multiple geological units along the northern flank of the marsh.

The proponent has indicated that it intends to continue to implement the management measures outlined in the *Subterranean Fauna Survey Plan* (required under Ministerial Statement 707). The condition requires the proponent to survey areas within and outside the project impact area, and avoid or manage impacts to subterranean fauna where species or communities are at risk.

The proponent has considered Environmental Assessment Guidelines No. 12 and has applied surrogates to indicate that the potentially restricted stygofauna species and troglafauna species may have a wider distribution.

Condition 10 of Ministerial Statement 707 which authorises the existing Christmas Creek Mine, requires the proponent to undertake subterranean fauna surveys in accordance with a subterranean fauna plan. The condition also requires the proponent to develop and implement a Subterranean Fauna Management Plan, should the results of the surveys indicate that there is a risk of loss of subterranean fauna species. The EPA notes that subterranean fauna surveys undertaken for the existing operations to date have not triggered the need for a Subterranean Fauna Management Plan.

To confirm the distribution of restricted subterranean fauna species and the connectivity and extent of suitable habitat, the EPA has recommended condition 9 requiring the proponent to undertake further targeted survey for the proposed expansion.

If the survey indicates that one or more subterranean fauna species has a restricted distribution and / or a restricted habitat, the condition would also require the preparation and implementation of a management-based Condition EMP for potentially restricted subterranean fauna, consistent with the EPA's revised condition framework in EAG 11 (EPA 2015b) and the Condition Environmental Management Plan framework in EAG 17 (EPA 2015c).

While the cumulative impact of mining on the northern flank of the Fortescue Marsh is considered to be an additional threat to conservation of subterranean fauna, some of the impacted areas contain surface infrastructure that does not significantly impact subterranean habitat and there are large areas that will not

be impacted. However, as for the other biodiversity factors, the scale of the impact has approached a level where future proposals could cause significant impacts to subterranean fauna on the northern fringe of the Fortescue Marsh (management zones 1a and 3a).

Summary

Having particular regard to:

- a) relevant EPA policy and guidance pertaining to Subterranean Fauna;
- b) the evidence of stygofauna and troglofauna species that may be restricted within impact areas;
- c) the possibility of the colluvium providing potential habitat for troglofauna outside the impact area;
- d) the high likelihood of remaining habitat due to the lack of stratification of aquifers and limited change in groundwater levels from additional dewatering; and
- e) the areas of habitat within the proposed expansion that will not be impacted by mine pits, waste landforms, and other infrastructure that may affect subterranean fauna habitat;

the EPA considers that the objective for Subterranean Fauna can be met subject to the following:

- condition 9 is imposed which requires further surveys, and a management plan, if required.

3.5 Rehabilitation and Decommissioning

EPA Objective

The EPA's environmental objective for this factor is *to ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner.*

Relevant EPA policy and guidance

The EPA policy and guidance considered by the EPA to be relevant for Rehabilitation and Decommissioning for this assessment are:

- *Guidelines for preparing mine closure plans* (DMP & EPA 2015);
- Guidance Statement No. 6 – *Rehabilitation of terrestrial ecosystems* (EPA 2006); and
- Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015).

Since the ESD and PER were released, the EPA and DMP revised the 2013 version of the *Guidelines for preparing mine closure plans*. The EPA considered the current 2015 version in its assessment.

EPA assessment

The proposal is subject to the *Iron Ore (FMG Chichester Pty Ltd) Agreement Act 2006* and therefore mine closure would not be subject to regulation under the *Mining Act 1978*. In accordance with the *Guidelines for Preparing Mine Closure Plans* (DMP/EPA 2015), Guidance Statement No. 6 and Environmental Protection Bulletin No. 19, the EPA has assessed Rehabilitation and Decommissioning for this proposal. It is also an important factor for this proposal because of the potential long-term impacts to Fortescue Marsh, an important environmental asset.

The proposed expansion includes large-scale additional clearing (7,821 ha), which will require rehabilitation. There is also the potential for acid or metalliferous drainage from the oxidation of potentially acid forming (PAF) from tailings storage facilities (TSFs), waste rock storage facilities (WRSFs) and open pit walls to affect surface and groundwater quality.

The proponent has committed to backfilling all pits (Table 2). The proponent will partially backfill mine voids with waste materials and tailings to above the pre-mining groundwater table. Some waste will be stored in permanent external waste rock storage facilities (WRSF). This strategy minimises the footprint of the proposal and avoids the formation of pit lakes. Backfilling would be done sequentially where possible as part of progressive rehabilitation. Disturbed areas would be progressively rehabilitated with native vegetation and, where appropriate, natural stream and drainage flows will be re-established to resemble original drainage patterns.

Geochemical characterisation and acid-base analysis undertaken by the proponent indicates that the risk of acid and metalliferous drainage (AMD) is low. Should any potential impacts occur these will be minimised through the design of waste rock storage facilities and Tailings Storage Facilities under its existing design guides, procedures and management plans. The DoW and the DER advised the EPA that the proponent should develop appropriate strategies for the management of potential AMD impacts. The EPA notes that the DER regulates discharges of waste under Part V of the *Environmental Protection Act 1986*, which would include monitoring of groundwater. The EPA considers that the risk of AMD is low and can be readily managed through the development and implementation of a Mine Closure Plan consistent with the *Guidelines for Preparing Mine Closure Plans*.

Due to the large scale of clearing and excavation for mine pits, progressive backfilling and revegetation is important to achieve successful rehabilitation. As outlined in the Flora and Vegetation section, the extent of impacts to Mulga vegetation in this area is of concern and mitigation through rehabilitation is important. Therefore the EPA considers that revegetation of Mulga vegetation should be specifically addressed in the Mine Closure Plan. The EPA also considers that the Mine Closure Plan should be developed in consultation with

Parks and Wildlife - the future land manager of the proposed Fortescue Marsh Conservation Reserve.

The EPA notes that the proponent submitted a Mine Closure Plan during the assessment, however the EPA considers that the proponent's document requires further work to fully meet the relevant considerations of Guidance Statement No. 6 and the *Guidelines for Preparing Mine Closure Plans* (DMP/EPA 2015). While it follows the format recommended in the guidelines, it does not contain enough specific detail.

The EPA has reviewed the existing conditions relating to Rehabilitation and Decommissioning and has proposed that the number of conditions is reduced to one (recommended condition 10), reflecting the current EPA practice to recommend the development and implementation of a Mine Closure Plan consistent with the *Guidelines for Preparing Mine Closure Plans*.

However, due to the scale of the clearing of conservation significant vegetation requiring rehabilitation, and the magnitude of the groundwater managed at the mine, the EPA has included specific clauses in addition to the standard clauses, to ensure that the proponent develops and achieves appropriate completion criteria for Mulga and Coolibah / River Red Gum vegetation, and develops and implements an appropriate monitoring framework for groundwater levels and quality once dewatering and injection ceases post-mining. The proposed condition also requires the proponent to provide a performance report to demonstrate progress against key requirements of the Mine Closure Plan.

Summary

Having particular regard to the:

- a) relevant EPA policy and guidance pertaining to Rehabilitation and Decommissioning;
- b) the project occurring on State Agreement Act tenements;
- c) up to an additional 7,752 ha of cleared native vegetation requiring rehabilitation including an additional 4,294 ha of Mulga vegetation;
- d) the proponent committing to backfill mine voids to above the pre-mining water table and progressively rehabilitating disturbed areas; and
- e) the results of the waste testing indicating that the risk of AMD is low,

The EPA considers that the objective for Rehabilitation and Decommissioning can be met subject to recommended condition 10 which requires a Mine Closure Plan be developed consistent with the *Guidelines for Preparing Mine Closure Plans*.

3.6 Offsets

EPA Objective

The EPA's environmental objective for this factor is *to counterbalance any significant residual environmental impacts or uncertainty through the application of offsets.*

Relevant policy and guidance

The EPA policy and guidance applicable to Offsets and the relevant considerations are outlined in Appendix 4. The State and EPA policy and guidance considered by the EPA to be relevant for this factor for this assessment are:

- *WA Environmental Offsets Policy* (Government of Western Australia 2011);
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014); and
- Environmental Protection Bulletin No.1 – *Environmental Offsets* (EPA 2014c).

The ESD referred to Position Statement 9 *Environmental Offsets* (EPA 2006) which was revoked following the EPA adoption of the above Government offsets policy and guideline. The ESD also referred to the 2008 version of Environmental Protection Bulletin No.1, which was updated in 2014. The EPA required the proponent to prepare the PER having regard to current policy and guidance.

EPA Assessment

Consistent with the relevant offset policies and guidance, the proponent has addressed the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate environmental impacts through:

- minimising impacts to Priority flora;
- minimising indirect impacts to Mulga, Samphire and Coolibah / River Red Gum through the design of surface water infrastructure and management of groundwater drawdown and mounding; and
- avoiding the 74 ha of rocky escarpment habitat which is potential denning habitat for the Northern Quoll.

Following the implementation of all mitigation measures, the proposed expansion would have a residual impact from the clearing of up to an additional 7,752 ha of native vegetation, including:

- the clearing of up to 7,468 ha of native vegetation in 'Good to Excellent' condition in the Pilbara IBRA region including 3,386 ha of potential habitat for MNES fauna species;

- the loss of up to 4,733 ha of Mulga vegetation and 356.1 ha of Coolibah / River Red Gum vegetation (direct and indirect impacts);
- impacts to vegetation located in the Fortescue Marsh management zones and the proposed Fortescue Marsh Conservation Reserve; and
- the cumulative loss of Mulga vegetation and Coolibah / River Red Gum vegetation, when considering other approved and operating projects in the area.

The clearing of native vegetation in 'Good to Excellent' condition in the Pilbara IBRA bioregion is considered to be significant when considered in a cumulative context (*Cumulative environmental impacts of development in the Pilbara region – Advice of the Environmental Protection Authority to the Minister for Environment under Section 16(e) of the Environmental Protection Act 1986* EPA 2014b).

The proposal is located mainly within the Fortescue IBRA subregion, with a small portion in the Chichester subregion. Only 0.55% of the Fortescue subregion and four per cent of the Chichester subregion are currently reserved for conservation.

Given the cumulative impact of clearing in the Fortescue and Chichester IBRA subregions, including the impact to high value of the Fortescue Marsh vegetation and habitat for MNES species, the EPA considers that the loss of up to 7,468 ha of native vegetation in 'Good to Excellent' condition (including vegetation in the Fortescue Marsh Management Zones and the proposed Fortescue Marsh Conservation Reserve) constitutes a significant residual impact, after taking into account the proponent's proposed measures to avoid, minimise and rehabilitate impacts and the proposed conditions.

Consistent with the Residual Impact Significance Model in the *WA Environmental Offsets Guidelines*, where the cumulative impact is already at a critical level, a significant residual impact relating to cumulative impacts will require an offset. The EPA has determined that the cumulative impact of clearing within the Fortescue and Chichester IBRA subregions is at a critical level and that an offset would be required counterbalance the significant residual impact of the clearing of native vegetation.

Conservation areas in the Pilbara bioregion total approximately eight per cent of the area, with the remainder mostly Crown Land, covered with mining tenements and pastoral leases. As such, the potential for traditional land acquisition and management offsets are limited. The *WA Offsets policy* states that Environmental Offsets will be focussed on longer term strategic outcomes (Principle 6). Strategic approaches, such as the use of a fund, can provide a coordination mechanism to implement offsets across a range of land tenures (Government of Western Australia 2014).

In its advice *Cumulative Environmental Impacts of Development in the Pilbara Region – advice under Section 16e of the EP Act* (EPA 2014b), the EPA proposed the establishment of a strategic conservation initiative for the Pilbara as a mechanism to pool offset funds to achieve biodiversity conservation

outcomes. The EPA has stated that the type of environmental offsets in the Pilbara that contribute to a strategic conservation initiative will ensure a consistent and transparent approach and contribute to longer term strategic outcomes (as outlined in the *WA Environmental Offsets Guidelines*), with contributions based on an assessment of the significance of environmental impacts.

Commensurate with other decisions within the Fortescue and Chichester IBRA subregions, the EPA recommends that an offset of \$1,500 per ha for clearing of 'Good to Excellent' condition vegetation (as defined in Position Statement No. 2 (EPA 2000)), in the Fortescue IBRA subregion, and an offset of \$750 per ha for clearing of 'Good to Excellent' condition vegetation in the Chichester IBRA subregion should apply in the form of a contribution to a Pilbara strategic conservation initiative. Where there are other important values that will be impacted, the rate may be higher.

A higher rate of \$3,000 per ha was applied to the adjacent Cloudbreak Life of Mine Project (Ministerial Statement 899) for additional impacts to Mulga and Samphire vegetation in the proposed Fortescue Marsh Conservation Reserve within the Project Area. Consistent with this approach, the EPA considers that it is appropriate to recommend the higher rate of \$3,000 per ha for additional clearing within the proposed Fortescue Marsh Conservation Reserve within the Mine Development Envelope. The EPA also considers that it is appropriate to apply the higher rate of \$3,000 per ha for clearing within the Fortescue Marsh management zone 1a as this has the highest environmental significance (EPA 2013). The proposed offsets condition (condition 11) reflects these rates.

The EPA notes that of the 3,386 ha of MNES habitat that may be impacted by the expansion, clearing of up to 291 ha of potential MNES habitat that is located within the proposed Fortescue Marsh Conservation Reserve and Fortescue Marsh management zone 1a would receive the higher offset rate of \$3,000 per ha. Clearing of up to 2911.4 ha of potential MNES habitat that is located within the 'Good to Excellent' condition vegetation outside of these areas would receive \$1,500 per ha offset. The remaining 183.6 ha of potential MNES habitat to be impacted is located within vegetation considered to be poor or degraded and will therefore not be offset.

As stated in Environmental Protection Bulletin No. 1, if a proponent is seeking a change to, or an expansion of, a proposal under an existing approval, these changes would be subject to the current offsets practice. Therefore, consistent with this, the EPA is only assessing whether additional offsets are appropriate for the change (i.e. expansion of the Christmas Creek Mine) to the approved Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B proposal.

However, the EPA notes that under Ministerial Statement 707 there are outstanding offset commitments, including funding of a position in Parks and Wildlife to manage offset programs, funding for a weed management program and funding for Fortescue Marshes Management Plan. A key role of the position is to implement annual works programs for the proposed Fortescue Marsh

Conservation Reserve including pest animal control, and fire management. This is consistent with relevant considerations in Commonwealth policy and guidance for MNES species and offsets. The EPA considers that the intent of the outstanding commitments should be retained and has incorporated the relevant outstanding commitments into recommended condition 11.

The EPA considers that the proposal can be managed to meet the EPA's objectives for Flora and Vegetation, Terrestrial Fauna (including MNES species) and Offsets provided a condition (condition 11) is imposed to counterbalance the significant residual impacts of the additional clearing of up to 7,468 ha of 'Good to Excellent' condition native vegetation, including impacts to vegetation located in the Fortescue Marsh management zones and the proposed Fortescue Marsh Conservation Reserve and 3,386 ha of potential habitat for MNES fauna.

Summary

Having particular regard to the:

- a) relevant EPA policy and guidance pertaining to Offsets;
- b) outstanding proponent commitments relating to offsets in Ministerial Statement 707;
- c) significant residual impacts of additional clearing of up to 7,468 ha of 'Good to Excellent' condition native vegetation, including impacts to the proposed Fortescue Marsh Conservation Reserve and to the Fortescue Marsh management zone 1a and impacts to up to 3,386 ha of potential MNES habitat,

the EPA considers that the proposal can be managed to meet the objective for Flora and Vegetation, Terrestrial Fauna and Offsets subject to the following:

- a condition (condition 11) is imposed to counterbalance the significant residual impacts of the additional clearing of up to 7,468 ha of 'Good to Excellent' condition native vegetation (including impacts to vegetation located in the Fortescue Marsh management zones and the proposed Fortescue Marsh Conservation Reserve, and impacts to and potential MNES habitat); and
- the condition incorporates outstanding proponent commitments relating to offsets in Ministerial Statement 707.

4 Matters of National Environmental Significance

The Commonwealth Minister for the Environment has determined that the proposal is a controlled action under the EPBC Act as it is likely to have a significant impact on one or more Matters of National Environmental Significance (MNES). It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and communities (sections 18 & 18A); and

- Listed migratory species (sections 20 & 20A).

This proposal is being assessed by way of an accredited process with the EPA under the bilateral agreement with the Commonwealth Government made under section 45 of the EPBC Act. The bilateral agreement allows the State of Western Australia to use the PER process to assess the action under the EPBC Act on behalf of the Commonwealth Minister for the Environment.

The proposed action has been assessed by the EPA in a manner consistent with Schedule 1 of that bilateral agreement and this assessment report satisfies clauses 5.6 and 6 of Schedule 1.

The assessment report on the proposed action prepared by the EPA and provided to the Western Australia Minister for Environment is forwarded to the Commonwealth Minister for Environment who will then make a decision as to whether or not the proposal should be approved under the EPBC Act. This is separate from any Western Australia approval that may be required.

Commonwealth policy and guidance

As the proposal is being assessed under the bilateral agreement between the Commonwealth and Western Australian governments, Commonwealth policy and guidance also applies to this assessment (see Appendix 4). Consistent with the requirements of the ESD for the proposal, the following survey guidelines, conservation advice, species-specific recovery plans, and threat abatement plans for relevant species listed under the EPBC Act are relevant for this assessment.

- *Survey guidelines for Australia's threatened birds*, (Australian Government 2010);
- *Survey guidelines for Australia's threatened bats*, (Australian Government 2010);
- *Survey guidelines for Australia's threatened mammals*, (Australian Government 2010);
- *Commonwealth Conservation Advice on Liasis olivaceus barroni (Olive Python (Pilbara subspecies))* (Threatened Species Scientific Committee 2008);
- *Commonwealth Conservation Advice on Pezoporus occidentalis (Night Parrot)* (Threatened Species Scientific Committee 2008);
- *Commonwealth Conservation Advice on Rhinonictis aurantia (Pilbara form)* (Threatened Species Scientific Committee 2008);
- *Commonwealth Listing Advice on Northern Quoll (Dasyurus hallucatus)* (Threatened Species Scientific Committee 2005);
- *National Recovery Plan For the Northern Quoll Dasyurus hallucatus* (Hill, B. & S. Ward 2010);
- *National Recovery Plan for the Greater Bilby Macrotis lagotis* (Pavey, C. 2006);

- *Threat Abatement Plan for Predation by the European Red Fox* (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008); and
- *Threat Abatement Plan for predation by feral cats* (Department of the Environment 2015).

EPA assessment

As noted in Section 3.3, the proposed expansion would result in the additional clearing of up to 3,386 ha of potential habitat for MNES species:

1. 14 ha of Marsh habitat – potential habitat for the Greater Bilby, Night Parrot and Migratory birds;
2. 1,117 ha of Drainage Line and Alluvial Plain habitat - potential foraging habitat for the Pilbara Olive Python and Pilbara Leaf-nosed Bat; and
3. 2,255 ha of Low Hill habitat - potential habitat for the Northern Quoll and potential foraging habitat for the Night Parrot.

To mitigate impacts to native fauna the proponent has committed to avoiding the 74 ha of rocky escarpment habitat (located with the Low Hill habitat type) which is potential denning habitat for the Northern Quoll. The proponent will also continue to implement a number of mechanisms including the management of surface water and groundwater levels as outlined (see Section 3.1) the staged clearing of vegetation, progressive rehabilitation, and restriction of vehicle movements, outlined in the *Conservation Significant Fauna Management Plan* approved under Ministerial Statement 707.

The plan also contains mechanisms to control fire, weeds and feral animals which are relevant considerations in Commonwealth Department of the Environment (DotE) policies relating to this proposal (see Appendix 4). The management of surface and groundwater levels outlined in Section 3.1 is consistent with Commonwealth Conservation Advice on the Pilbara Olive Python and Pilbara Leaf-nosed Bat.

The EPA has recommended the following in the revised environmental conditions to minimise the impacts on conservation significant fauna:

- limit the location and authorised extent of the clearing of vegetation to 17,956 ha (additional 7,821 ha, of which 7,752 ha is native vegetation) in Table 2 of Schedule 1;
- limit the extent of clearing (direct and indirect impacts) of Mulga, Samphire and Coolibah / River Red Gum to the authorised extent defined in Table 2 of Schedule 1;
- condition 8 which requires a revised management plan to minimise impacts to significant terrestrial fauna; and
- condition 10 which includes completion criteria for the rehabilitation (including revegetation) of Mulga and Coolibah / River Red Gum vegetation communities.

Impacts from the proposal on the above-listed MNES are therefore not expected to result in an unacceptable or unsustainable impact on the conservation status of listed species.

However, given the cumulative impact of clearing of terrestrial vertebrate fauna habitat, the EPA considers that the loss of up to 3,386 ha (a total of 8,373 ha for Christmas Creek existing and proposed) of potential habitat for MNES species constitutes a significant residual impact. The EPA has recommended an offset in Condition 11 which takes into account the significant residual impact to potential habitat for MNES species. The EPA has also considered relevant Commonwealth policy and guidance to develop the offset (see Section 3.6 Offsets).

5 Conditions

Section 44 of the EP Act requires that this assessment report must set out:

1. what the EPA considers to be the key environmental factors identified in the course of the assessment; and
2. the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA has concluded that the proposal to expand the Christmas Creek Mine (part of the approved Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B) can be managed to meet the EPA's objectives and therefore recommends that the proposal may be implemented.

5.1 Recommended conditions

Section 45B of the EP Act provides that if a proposal is revised (i.e. the amalgamation of the existing approved proposals and this proposal) after implementation conditions have been agreed, each of those implementation conditions (in this case, implementation conditions in Ministerial Statements 707 and 871) continue to apply to the revised proposal, subject to revised conditions or procedures being applied to the revised proposal.

In its assessment of this proposal (for the expansion of the Christmas Creek Mine), the EPA has also reviewed the implementation conditions and recommends revised implementation conditions be imposed to the revised proposal (i.e. the amalgamation of the existing approved proposals and this proposal), if the Minister decides that it may be implemented. Appendix 5 sets out the EPA's review of the Ministerial Statements for the approved proposals and Appendix 6 sets out the EPA's recommended environmental conditions for the revised proposal.

Matters addressed in the conditions for this proposal (for the expansion of the Christmas Creek Mine) include the following:

- condition 7 is imposed which requires a revised management plan to avoid impacts on Priority 1 flora species and to maintain the health of Mulga, Samphire and Coolibah/River Red Gum vegetation, including from impacts from changes to groundwater levels and surface water flows;
- condition 8 is imposed which requires a revised management plan to minimise impacts to significant terrestrial fauna;
- condition 9 is imposed which requires further subterranean fauna surveys, and a management plan, if required.
- condition 10 is imposed which requires a Mine Closure Plan and includes completion criteria for the rehabilitation of Mulga and Coolibah / River Red Gum vegetation, an appropriate monitoring framework for groundwater levels and quality once dewatering and injection ceases post-mining, and a performance report to demonstrate progress; and
- condition 11 is imposed to counterbalance the significant residual impact of a loss of up to 7,468 ha of 'Good to Excellent' condition native vegetation (including vegetation located in the Fortescue Marsh management zones and the proposed Fortescue Marsh Conservation Reserve, the cumulative loss of Mulga and Coolibah / River Red Gum vegetation and the loss of potential habitat for conservation significant (MNES) fauna).

5.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the Commonwealth Department of the Environment, Department of Parks and Wildlife, Department of Water, Department of Environment Regulation, Department of Mines and Petroleum and Department of Aboriginal affairs on matters of fact, technical feasibility and potential difficulties with implementation.

6 Other advice

Cumulative impacts

The Fortescue Marsh is locally and regionally significant and it therefore has a high level of government focus through mechanisms such as the proposed Fortescue Marsh Conservation Reserve and the EPA's s16e advice relating to the Fortescue Marsh management area (EPA 2013a). The EPA notes that cumulative environmental impacts to the northern flank of the Fortescue Marsh are increasing and taking into account this proposal, would increase cumulative impacts to:

- the northern extent of the proposed Fortescue Marsh Conservation Reserve (11,105.3 ha) from 1241 ha (11%) to 2,406.41 (21%);
- the Fortescue Marsh management zone 1a from 10% to 13%;
- the Fortescue Marsh management zone 3a from 10% to 16%;
- Mulga and Coolibah / River Red Gum vegetation communities (and associated terrestrial fauna habitats) from 15% to 19% and from 13% to 19% respectively; and
- subterranean fauna habitat.

As outlined in the EPA's s16e advice relating to the Fortescue Marsh management area (EPA 2013a), strategies include assessing the cumulative impacts relating to flora and vegetation, and hydrology. The EPA considers that all proponents of future proposals in the Fortescue Marsh catchment should clearly explain how the incremental impacts of the proposal will be managed, when added to the past, present and reasonably foreseeable future proposals.

7 Recommendations

That the Minister for Environment notes:

1. that the proposal assessed is a change (for the expansion of the Christmas Creek Mine) to the Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B;
2. the key environmental factors identified by the EPA in the course of its assessment set out in Section 3;
3. that the EPA has concluded that the proposal may be implemented to meet the EPA's objectives, provided the implementation of the proposal is carried out in accordance with the recommended revised conditions and procedures set out in Appendix 6 and summarised in Section 5. The EPA's review of the Ministerial Statements is provided in Appendix 5; and
4. the EPA's other information, advice and recommendations set out in Section 6 in relation to cumulative impacts in the Fortescue Marsh area.

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Appendix 1

List of Submitters

Organisations:

- Commonwealth Department of the Environment
- Department of Parks and Wildlife
- Department of Water
- Department of Mines and Petroleum
- Department of Environment Regulation
- Wildflower Society

Individuals:

1. Roy Hill Iron Ore Mine
2. Two confidential/anonymous submissions

Appendix 2

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EPA 2014c, *Environmental Protection Bulletin No. 1 – Environmental Offsets*, Environmental Protection Authority, Revised August 2014.

EPA 2015, *Environmental Protection Bulletin No. 19 – EPA involvement in mine closure*, Environmental Protection Authority, Revised January 2015.

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Appendix 3

Summary of identification of key environmental factors and principles

Summary of identification of key environmental factors

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
WATER			
Hydrological processes	Surface water Surface water flow processes at Christmas Creek include channel flow and sheet flow. The mine voids and infrastructure would alter surface water flows. After the implementation of management measures 139 ha of inundation areas would become dry and 43 ha of sheet flow areas would be impacted. Groundwater The proposal would require increase in dewatering of up to 60 GL/a and increase in	Surface water <u>Department of Parks and Wildlife</u> The proponent should ensure that potential impacts of altered surface water sheet flow and altered stream flow are minimised. The impacts proposed by the development should be made clear and confined, as closely as possible, to an agreed footprint of proposed impact, particularly in areas within the Proposed Conservation Reserve areas. <u>Roy Hill Iron Ore (RHIO)</u> There is the potential for altered flow regimes and volumes. This may impact surface water flows on the currently operating Roy Hill mine and affect RHIO's ability to meet its conditions. Groundwater <u>Department of Water (DoW)</u> FMG should provide clarification on their intended dewatering and injection regime over the Life of Mine and	Hydrological Processes was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. Having regard to the scale of dewatering and injection that would be undertaken and the potential for impact to groundwater and surface water, the EPA identified Hydrological Processes as a key environmental factor.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	injection of up to 67.5 GL/a.	the potential drawdown and mounding impacts that are predicted as a result. <u>Department of Parks and Wildlife</u> The proponent should ensure that potential impacts of groundwater abstraction on flora and vegetation communities and the Fortescue Marsh as a result of groundwater drawdown, mounding, ponding and discharge are minimised. The impacts proposed by the development should be made clear and confined, as closely as possible, to an agreed footprint of proposed impact, particularly in areas within the Proposed Conservation Reserve areas. <u>Wildflower Society</u> The expansion will involve a significant increase in groundwater extraction and reinjection; however, the proponent's modelling shows that groundwater will rise no more than 2 m at the fringe of the marsh. It is critical that baseline data from groundwater quality and natural hydrological cycles are maintained. <u>Roy Hill Iron Ore (RHIO)</u> RHIO acknowledges that consultation between FMG and RHIO in regards to groundwater management and water	

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		supply issues under the Chichester Joint Water Management Group Terms of Reference has occurred and is ongoing. RHIO wishes to ensure that consultation continues so that drawdown as a result of the proposed expansion does not impact the currently operating and conditioned Roy Hill mine. <u>Other Public Submitters</u> • FMG has not demonstrate learnings from their prior undertakings (that of Cloudbreak) and applying them to a similar scenario. • Management is reactive rather than proactive. • The proponent is not transparent with Government regulators. Regular visual observations by a suitably qualified professional need to support the trigger warning system. • A full and independent groundwater bore audit is required of the reinjection areas. • Re-calibration and re-running of the groundwater model should be undertaken with the new dewatering and reinjection volumes. • Visual observations of the Marsh looking for expression of saline groundwater at the surface should be part of ongoing monitoring.	

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		Identification of management of the Yintas to preserve cultural and environmental values including monitoring and reporting on hydrology and environmental objectives should be included.	
Inland waters environmental quality	Salinity Reinjection of saline and brackish water into could alter the quality of the receiving aquifers. Acid Sulphate and Metalliferous drainage Testing (FMG 2015) indicates that the risk of oxidise potential acid sulphate soils (ASS) in the Fortescue Marsh is low. No significance impacts are expected in relation to acid and/or metalliferous drainage (AMD).	<u>DoW and Department of Environmental Regulation (DER)</u> Short-term leaching tests indicate that leachate from some waste rock materials may present potential impacts to surface water or groundwater quality. Additional leaching tests which reflect groundwater conditions would be required to be able to assess the potential for contaminated runoff to affect sensitive environmental receptors in the Fortescue Marsh.	Inland Waters Environmental Quality was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. Having regard to the scale of brackish and saline water reinjection, potential AMD and the potential for impact to groundwater quality, the EPA identified Inland Waters Environmental Quality as a key environmental factor.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
LAND			
Flora and Vegetation	The proposal requires an additional disturbance up to 7,752 ha of native vegetation for the mine expansion and associated infrastructure. Direct and indirect impacts could result in a loss of Mulga, Samphire and Coolabah / River Red Gum vegetation as well as Priority 1 flora species.	<u>Department of Parks and Wildlife</u> Detailed information should be provided to determine the impact to the Potential Conservation Reserve. Clear quantitative information should be provided demonstrating avoidance and minimisation of impacts to the Proposed Conservation Reserve thorough location and design. <u>Department of the Environment (DotE)</u> The full extent of potential impacts to vegetation and habitat for MNES are not fully considered. The Department suggests that the recommendations from both peer reviews are addressed by the proponent. <u>The Wildflower Society</u> The proponent addresses impacts to the Fortescue Marsh management zone 3a; however, impacts to the adjacent management zones 1a and 1b should also be considered. In accordance with the EPA's s16e advice (2013a) impacts to Fortescue Marsh tributaries including Christmas Creek, Kulbee Creek, Unnamed Creek 1, Unnamed Creek 2 and Unnamed Creek 3 should be avoided.	Flora and Vegetation was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. Having regard to the scale of vegetation clearing that will be undertaken and the potential for conservation significant flora and vegetation to be impacted, the EPA identified Flora and Vegetation as a key environmental factor.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		Mine pits and miscellaneous infrastructure for the Proposal have been located on or near many of the various Marsh tributaries. There is uncertainty that surface flows would be maintained to the Marsh.	
Terrestrial Fauna	The proposal would result in the clearing of up to 7,752 ha of native fauna habitat. The proposal has the potential to impact up to 23 species of significance and two potential Short Range Endemic species.	<u>Department of the Environment</u> The acceptability of the proposal impacts on MNES largely centres on understanding the impacts to vegetation from drawdown/mounding and other changes to hydrology. The full extent of potential impacts to vegetation and habitat for MNES are not fully considered. <u>Private Submission</u> The monitoring project for the Pilbara Olive Python is inadequate. This report describes a targeted survey with minimum survey effort.	Terrestrial Fauna was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. Having regard to the scale of clearing of potential terrestrial fauna habitat that will be undertaken and the potential for conservation significant terrestrial fauna to be impacted, the EPA identified Terrestrial Fauna as a key environmental factor.
Subterranean Fauna	Stygofauna There is the potential for loss of five stygofauna species. Four of these species have only been recorded within the drawdown impact area	No comments were received.	Subterranean Fauna was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	and three are considered to be possibly restricted in range. Troglofauna There is the potential for a loss of 12 species. Four species are considered to be possibly restricted in range.		Having regard to the scale of ground disturbance that will be undertaken and the potential restricted species to be impacted, the EPA identified Subterranean Fauna as a key environmental factor.
AIR			
Air Quality and Atmospheric Gases	The production of 85 Mtpa of iron ore is predicted to result in 826,440 tonnes of greenhouse gas emissions per annum.	No comments were received.	Air Quality and Atmospheric Gases was not identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. However, during the assessment, it appeared that additional greenhouse gas emissions from the proposed expansion could significantly increase the State's greenhouse gas emissions as outlined in the EPA's <i>Environmental Protection Bulletin</i>

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			<i>No. 24: Greenhouse gas emissions and consideration of projected climate change impacts in the EIA process (EPA, 2015d).</i> The proponent confirmed during the consultation on conditions that the figure of 826,440 tonnes of greenhouse gas emissions per annum was the cumulative total for the Christmas Creek Mine, not just for the expansion. Consistent with the EPA's Environmental Protection Bulletin No. 24, the EPA considers that greenhouse gas emissions for the revised proposal would not significantly increase the State's greenhouse gas emissions. Having regard to EPA Environmental Protection Bulletin No. 24 and Environmental Assessment Guideline 9 - <i>Application of a Significance Framework in the Environmental</i>

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			<i>Impact Assessment Process</i> (EPA, 2015b) the EPA considers that it is unlikely that the proposal would have a significant impact on Air Quality and Atmospheric Gases and the proposal can meet the objectives for this factor. Accordingly, the EPA did not identify Air Quality and Atmospheric Gases as a key environmental factor at the conclusion of its assessment.
People			
Heritage	Approximately 530 archaeological heritage place and one ethnographic heritage place remains in situ within the proposed disturbance area of the Mine Development Envelope. Where identified aboriginal heritage sites meeting	No comments were received.	Heritage was not identified as a preliminary environmental factor at level of assessment or in the Environmental Scoping Document. Having regard to Guidance Statement No. 41 – <i>Assessment of aboriginal heritage</i> (EPA 2004) and EAG 9 - <i>Application of a Significance Framework in the Environmental Impact</i>

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	<i>Aboriginal Heritage Act 1972</i> criteria cannot be avoided by mining operations, FMG will apply for permission under section 18 of the <i>Aboriginal Heritage Act 1972</i> to use the land containing the Aboriginal Heritage site. If consent is received FMG will undertake required mitigation prior to disturbance work		<i>Assessment Process</i> (EPA 2015b), the EPA considers that the it is unlikely that the proposal would have a significant impact on the physical and biological surroundings that would affect Aboriginal Heritage and that the proposal can meet the objectives for this factor. Accordingly, the EPA did not identify Heritage as a key environmental factor at the conclusion of its assessment. The EPA notes that there is a Land Access Agreement in place between FMG and the Nyiyaparli People for the existing mine.
Integrating Factors			
Rehabilitation and Decommissioning	The proposal occurs on tenements granted under a State Agreement Act and is not subject to the <i>Mining Act 1978</i>.	<u>Department of Mines and Petroleum</u> Information has been provided relating to the rehabilitation of three waste rock dumps at FMG's Cloudbreak operations and monitoring of these sites commenced in 2014. The results of these trials and those	Rehabilitation and Decommissioning was identified as a preliminary key environmental factor in the

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	Mine pits will be progressively opened and backfilled this allows for progressive closure and rehabilitation. Pits will be backfilled to above the pre-existing groundwater levels to ensure pit lakes are not formed. Geochemical characterisation and acid-base analysis undertaken by the proponent indicates that the risk of acid and metalliferous drainage (AMD) is low.	planned for 2015-2017 are critical in the development of specific completion criteria and closure implementation plans. A Mine Closure Plan has been included as an appendix to the PER. The document generally follows the DMP guidelines for the preparation of mine closure plans, but many of the closure criteria and commitments are non-specific and of a general nature. Some of the closure criteria refer to internal FMGL guidelines which are not available in the Plan or attached to the PER making an assessment of the suitability of the closure criteria provided difficult. <u>DoW and DER</u> Short-term leaching tests indicate that leachate from some waste rock materials may present potential impacts to surface water or groundwater quality. Additional leaching tests which reflect groundwater conditions would be required to be able to assess the potential for contaminated runoff to affect sensitive environmental receptors in the Fortescue Marsh. The AMD Management Plan focuses on rock that is excavated and relocated or exposed on pit walls. It does not appear to consider the potential impacts to water	Environmental Scoping Document for the proposal. Having regard to the proposal being subject to the <i>Iron Ore (FMG Chichester Pty Ltd) Agreement Act 2006</i> and therefore not subject to regulation under the <i>Mining Act 1978</i>, the scale of clearing of native vegetation associated with the Fortescue Marsh that would need to be rehabilitated following the cessation of mining, the EPA identified Rehabilitation and Decommissioning as a key integrating factor.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		quality due to the dewatering of potential acid forming material. Contingency actions proposed for metalliferous leachates should offer tangible strategies for the management/remediation of potential impacts. <u>Department of Parks and Wildlife</u> Rehabilitation requirements should take into account the Proposed Conservation Reserve areas, with potential for conservation to be the 'end land use'.	
Offsets	The proposal would result in significant residual impacts from the clearing of up to 7,552 ha of native vegetation, of which 7,468 ha is considered to be in 'Good to Excellent' condition. The clearing for the proposal would also impact conservation significant vegetation and terrestrial Fauna (including MNES) habitat.	<u>DotE</u> For this proposal the proponent intends to expand the offsets program required by existing approvals issued under the <i>Environmental Protection and Biodiversity Act 1999</i> (EPBC). Any proposed approach to offsets should be produced in accordance with the EPBC Act environmental offsets policy.	Offsets was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. Consistent with the <i>WA Environmental offsets guidelines</i> (Government of Western Australia, 2014) and the <i>WA Environmental Offsets Policy</i> (Government of Western Australia, 2011), where the cumulative impact is already at a critical level a significant residual impact relating to cumulative

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			impacts will require an offset. The EPA considers that the clearing of 'Good to Excellent' condition vegetation in the Pilbara region is a significant residual environmental impact which requires an offset to counterbalance the impacts. Having regard to the residual impact from the clearing of 7,752 ha of native vegetation which includes 7,468 ha of native vegetation in 'Good to Excellent' condition, conservation significant vegetation and potential MNES habitat, the EPA identified Offsets as a key integrating factor

Summary of identification of principles

Principle	Consideration
Environmental principles of the EP Act	
1. The precautionary principle <i>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.</i> <i>In application of this precautionary principle, decisions should be guided by –</i> <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i> <i>an assessment of the risk-weighted consequences of various options.</i>	In considering this principle, the EPA notes that Hydrological Processes, Inland waters Environmental Quality, Flora and Vegetation, Terrestrial Fauna and Subterranean Fauna could be significantly impacted by this proposal (for the expansion of the Christmas Creek Mine). Investigations on the biological and physical environment undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts. The EPA has recommended conditions to ensure relevant measures are undertaken by the proponent. From its assessment of this proposal, the EPA has concluded that there is not a threat of serious or irreversible harm.
2. The principle of intergenerational equity <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i>	In considering this principle, the EPA notes that the proponent has taken measures to avoid, minimise, rehabilitate (and offset) impacts in accordance with the mitigation hierarchy in the <i>WA Environmental offsets guidelines</i> (Government of Western Australia, 2014). In assessing this proposal (for the expansion of the Christmas Creek Mine) the EPA has recommended that conditions be imposed on the proponent in relation to managing impacts on Flora and Vegetation, Terrestrial Fauna, Subterranean Fauna, Rehabilitation and Decommissioning. This includes a condition for a Mine Closure Plan consistent with the <i>Guidelines for preparing mine closure plans</i> (DMP & EPA 2015) to ensure that the post-mine environment is ecologically sustainable. A condition to offset significant residual impacts to clearing of 'Good to Excellent' condition vegetation has also been recommended.

	From its assessment of this proposal, the EPA has concluded that the health, diversity and productivity of the environment can be maintained and enhanced for the benefit of future generations
3. The principle of the conservation of biological diversity and ecological integrity <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i>	In considering this principle, the EPA notes that the proposal would result in impacts to vegetation communities particularly Mulga, Samphire and Coolibah River Red Gum, which also provide habitat for State and Commonwealth listed terrestrial fauna species. In assessing the proposal the EPA has considered these impacts and has taken into account measures proposed by the proponent to minimise impacts to the affected species and has recommended a condition to manage the impacts. The EPA has concluded that the proposal would not compromise the biological diversity or ecological integrity within the Fortescue and Chichester IBRA subregions. Through this assessment, the EPA has demonstrated that the conservation of biological diversity and ecological integrity was a fundamental consideration.
4. Principles relating to improved valuation, pricing and incentive mechanisms • <i>Environmental factors should be included in the valuation of assets and services.</i> • <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i> • <i>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 waste.</i> • <i>Environmental goals, having been established, should be pursued in the most cost effective way, by</i>	In considering this principle, the EPA notes that the proponent would bear the cost relating to waste and pollution, including avoidance, containment, decommissioning, rehabilitation and closure. The proponent would also be responsible for the costs relating to rehabilitation and decommissioning. The EPA has demonstrated due regard to this principle during the assessment of this proposal.

<i>establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solution and responses to environmental problems.</i>	
5. The principle of waste minimisation <i>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</i>	In considering this principle, the EPA notes that waste from the proposal is proposed to be used to backfill pits. The proponent would be expected to address the waste hierarchy and minimise the generation of unavoidable wastes. Liquid and solid waste created as a result of implementation of the proposal would be disposed of according to relevant regulations and legislation. The EPA notes that the discharge of atmospheric pollutants and liquid and solid wastes can be adequately regulated by the DER via appropriate Works Approval and Licence conditions under Part V of the <i>Environmental Protection Act 1986</i>. The EPA has demonstrated due regard to this principle during the assessment of this proposal.
Environmental principles of the EPA	
a) Best practice <i>When designing proposals and implementing environmental mitigation and management actions, the contemporary best practice measures available at the time of implementation should be applied.</i>	In considering this principle, the EPA notes that, the proponent has developed design considerations and mitigation measures to manage the potential risks, particularly related to groundwater management. These reflect measures already in place for the existing Christmas Creek operations. The EPA has demonstrated due regard to this principle during the assessment of this proposal.
b) Continuous Improvement	The proponent operates under a management system which sets out a framework of adaptive management.

<i>The implementation of environmental practices should aim for continuous improvement in environmental performance.</i>	The EPA has recommended conditions requiring the development of environmental management plans. As outlined in EAG 17 - <i>Preparation of management plans under Part IV of the Environmental Protection Act 1986</i> (EPA, 2015c), the EPA encourages adaptive management and continual improvement through environmental management plans. The EPA has demonstrated due regard to this principle during the assessment of this proposal.
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Appendix 4

Relevant EPA Policies and Guidance and considerations

The EPA's evaluation of policies and guidance documents that are applicable to the key environmental factors of this proposal are detailed below.

1. Hydrological Processes and Inland Waters Environmental Quality

The EPA considers that the policy and guidance that is relevant for Hydrological Processes/Inland Waters Environmental Quality in this assessment is:

1. *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister of the Environment under Section 16(e) of the Environmental Protection Act 1986 (EPA 2013a).*

Section 16(e) - Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area

The relevant consideration for the Section 16(e) Fortescue Marsh management area is:

1. Proponents of new projects, expansions or upgrades should address the relevant strategies to avoid impacts and achieve the relevant objectives for each management zone where their operations have the potential to impact the values of the Fortescue Marsh.

2. Flora and Vegetation

The EPA considers that the policies and guidances that are relevant for flora and vegetation for this assessment are:

1. Guidance Statement No. 51 – *Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004a);
2. Position Statement No. 2 – *Environmental protection of native vegetation in Western Australia*, (EPA 2000);
3. Position Statement No. 3 – *Terrestrial biological surveys as an Element of Biodiversity Protection* (EPA 2002); and
4. *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister of the Environment under Section 16(e) of the Environmental Protection Act 1986 (EPA 2013a).*

Guidance Statement No. 51 – Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia

The relevant considerations for Guidance Statement No. 51 are:

1. Surveys are planned and designed appropriately.
2. The analysis, interpretation and reporting is of a suitable quality and consistent methodology to enable the EPA to judge the impacts of proposals on flora and vegetation.
3. The environment, in particular significant flora and vegetation biodiversity is identified and protected.

Position Statement No. 2 - Environmental protection of native vegetation in Western Australia

The relevant considerations for Position Statement No. 2 are outlined below:

1. No known species of plant or animal is caused to become extinct as a consequence of the development and the risks to threatened species are considered to be acceptable.
2. No association or community of indigenous plants or animals ceases to exist as a result of the project.
3. There would be an expectation that a proposal would demonstrate that the vegetation removal would not compromise any vegetation type by taking it below the “threshold level” of 30% of the pre-clearing extent of the vegetation type.
4. Where a proposal would result in a reduction below the 30% level, the EPA would expect alternative mechanisms to be put forward to address the protection of biodiversity.
5. There is comprehensive, adequate and secure representation of scarce or endangered habitats within the project area and/or in areas which are biologically comparable to the project area, protected in secure reserves.
6. The on-site and off-site impacts of the project are identified and the proponent demonstrates that these impacts can be managed.

Position Statement No. 3 – Terrestrial biological surveys as an Element of Biodiversity Protection

The relevant considerations in Position Statement No. 3 for this assessment are:

1. The EPA adopts the definition of Biological Diversity and the Principles as defined in the National Strategy for the Conservation of Australia’s Biological Diversity (Commonwealth of Australia 1996) and will have regard for these in undertaking its role. Note the strategy has since been replaced by Australia’s *Biodiversity Conservation Strategy 2010-2030* (Natural Resource Management Ministerial council 2010).
2. The EPA expects proponents to demonstrate that all reasonable measures have been undertaken to avoid impacts on biodiversity. Where some impact on biodiversity cannot be avoided, it is for the proponent to demonstrate that the impact will not result in unacceptable loss.
3. In the absence of information that could provide the EPA with assurance that biodiversity will be protected, the EPA will adopt the precautionary principle.

Section 16(e) - Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area

The relevant consideration for the Section 16(e) Fortescue Marsh management area is:

1. Proponents of new projects, expansions or upgrades should address the relevant strategies to avoid impacts and achieve the relevant objectives for each management zone where their operations have the potential to impact the values of the Fortescue Marsh.

3. Terrestrial Fauna

EPA policy and guidance

The EPA considers that the policy and guidance relevant for Terrestrial Fauna for this assessment are:

1. Position Statement No. 3 – *Terrestrial biological surveys as an Element of Biodiversity Protection*, (EPA 2002);
2. Guidance Statement No. 56 – *Terrestrial Fauna Surveys for Environmental Impact Assessment in WA* (EPA 2004b);
3. Guidance Statement No. 20 – *Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in WA* (EPA 2009);
4. Technical Guide on *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2010); and
5. *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister of the Environment under Section 16(e) of the Environmental Protection Act 1986*, (EPA 2013a).

Position Statement No. 3 – Terrestrial biological surveys as an Element of Biodiversity Protection

The relevant considerations for Position Statement No. 3 are:

1. The EPA adopts the definition of Biological Diversity and the Principles as defined in the National Strategy for the Conservation of Australia's Biological Diversity (Commonwealth of Australia 1996) and will have regard for these in undertaking its role. Note the strategy has since been replaced by Australia's Biodiversity Conservation Strategy 2010-2030 (Natural Resource Management Ministerial council 2010).
2. The EPA expects proponents to demonstrate that all reasonable measures have been undertaken to avoid impacts on biodiversity. Where some impact on biodiversity cannot be avoided, it is for the proponent to demonstrate that the impact will not result in unacceptable loss.
3. In the absence of information that could provide the EPA with assurance that biodiversity will be protected, the EPA will adopt the precautionary principle.

Guidance Statement No. 56 – Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia

The relevant considerations for Guidance Statement No. 56 are:

1. Survey effort and methods are planned and designed appropriately.
2. The analysis, interpretation and reporting is of a suitable quality and consistent methodology to enable the EPA to judge the impacts of proposals on fauna and faunal assemblages.
3. The environment, in particular significant fauna and faunal assemblages, is identified and protected through best practice.

Guidance Statement No. 20 – Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in WA

The relevant considerations for Guidance Statement No. 20 are:

1. The proponent provides sufficient information through habitat assessment, sampling, and within the constraints of reasonably available knowledge, to assess the risk that the conservation status of a SRE taxon would be adversely affected as a result of the proposal.
2. Where a SRE taxon is listed as Specially Protected, the risk assessment and sampling data would need to provide sufficient contextual information on habitat, distribution and abundance to allow a decision to be made as to whether or not approval could be given for the species to be 'taken' pursuant to the *Wildlife Conservation Act 1950*.

Technical Guide on Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2010)

The relevant conditions of the Technical Guide are:

1. Ensure adequate data of a high standard is obtained for environmental impact assessment; and
2. Surveys need to be conducted by practitioners with the appropriate level of expertise to conduct an acceptable survey.

Section 16(e) - Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area

The relevant consideration for the Section 16(e) Fortescue Marsh management area is:

1. Proponents of new projects, expansions or upgrades should address the relevant strategies to avoid impacts and achieve the relevant objectives for each management zone where their operations have the potential to impact the values of the Fortescue Marsh.

Commonwealth policy and guidance

As the proposal is being assessed under the bilateral agreement between the Commonwealth and Western Australian governments, Commonwealth policy and guidance also applies to this assessment. Consistent with the requirements of the ESD for the proposal, the following survey guidelines, conservation advice, species-specific

recovery plans, and threat abatement plans for relevant species listed under the EPBC Act are considered relevant for this assessment:

1. *Survey guidelines for Australia's threatened birds*, (Australian Government 2010);
2. *Survey guidelines for Australia's threatened bats*, (Australian Government 2010);
3. *Survey guidelines for Australia's threatened mammals*, (Australian Government 2010);
4. *Approved Conservation Advice on Liasis olivaceus barroni (Olive Python (Pilbara subspecies))* (Threatened Species Scientific Committee 2008);
5. *Approved Conservation Advice on Pezoporus occidentalis (Night Parrot)* (Threatened Species Scientific Committee 2008);
6. *Listing Advice on Northern Quoll (Dasyurus hallucatus)* (Threatened Species Scientific Committee 2005);
7. *National Recovery Plan For the Northern Quoll Dasyurus hallucatus* (Hill, B. & S. Ward 2010);
8. *National Recovery Plan for the Greater Bilby Macrotis lagotis* (Pavey, C. 2006);
9. *Threat Abatement Plan for Predation by the European red fox* (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008);
10. *Threat Abatement Plan for predation by feral cats* (Department of the Environment 2015);

Summary of Commonwealth conservation advice, national recovery plans and threat abatement plans.

The purpose of these Commonwealth policies is to:

1. Provide conservation advice on the Pilbara Olive Python, Night Parrot, Pilbara Leaf-nosed Bat and Northern Quoll
2. Minimise the rate of decline of the Northern Quoll in Australia, and ensure that viable populations remain in each of the major regions of distribution into the future; and
3. Improve and at least maintain the national conservation status of the Greater Bilby.

The relevant considerations for these policies are:

1. Manage any changes to hydrology which may result in changes to the water table levels, increased run-off, sedimentation or pollution;
2. Implement Threat Abatement Plans for the control of feral cats and the European red fox; and
3. Develop and implement a suitable fire management strategy.

4. Subterranean Fauna

The EPA has determined that the policy and guidance that are relevant for subterranean fauna for this assessment are:

1. Guidance Statement No. 54a – *Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia*, (EPA 2007);
2. Environmental Assessment Guidelines No. 12 – *Consideration of subterranean fauna in environmental impact assessment in Western Australia* (EPA 2013b);
3. Section 16(e) - *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area*, (EPA 2013a).

Guidance Statement No. 54a - Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia

The relevant considerations for Guidance Statement No. 54a are:

1. Surveys should be planned and designed appropriately including preliminary investigations (desktop review and pilot study) and if required comprehensive surveys;
2. The use of appropriate sampling methods, effort and survey design, including both within and outside the area of impact, employing a reasonable sampling effort that will collect most species and provide sufficient information to demonstrate whether the project is likely to impact on species of conservation concern;
3. Reporting should be clearly written and contain all relevant information presented at a sufficient quality to enable the EPA to judge the impacts of proposals.

Environmental Assessment Guideline No. 12 - Consideration of subterranean fauna in environmental impact assessment in Western Australia

The relevant considerations for EAG 12 are:

1. Appropriate level of survey required based on the likely presence of subterranean fauna and the potential impact on its habitat.
2. Survey design, including:
 - Sufficient survey using the most contemporary techniques and standards, to ensure that the subterranean fauna is adequately understood in the context of the project footprint and surrounding areas;
 - the amount of sampling required being based on the site characteristics, likely significance of impacts, and existing sampling information;
 - the use of genetics to resolve uncertainty regarding species identification and distribution; and
 - the use of surrogates based on the biological features of species or species group and/or physical characteristics of a habitat, on a local scale to infer the likely distribution of another poorly sampled species.
3. Specimen vouchering and lodgment of data and DNA sequences with State collections to improve the knowledge of subterranean fauna.

4. Adequate interpretation and reporting of the results to allow an understanding of the subterranean fauna present in the project area, and analysis to consider the significance of the predicted impact on subterranean fauna.

Section 16(e) - Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area

The relevant consideration for the Section 16(e) Fortescue Marsh management area is:

1. Proponents of new projects, expansions or upgrades should address the relevant strategies to avoid impacts and achieve the relevant objectives for each management zone where their operations have the potential to impact the values of the Fortescue Marsh.

5. Rehabilitation and Decommissioning

The EPA has determined that the policy and guidance that are relevant for Rehabilitation and Decommissioning for this assessment are:

1. *Guidelines for preparing mine closure plans* (DMP & EPA 2015);
2. Guidance Statement No. 6 – *Rehabilitation of terrestrial ecosystems* (EPA 2006); and
3. Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015).

Guidelines for Preparing Mine Closure Plans

The relevant considerations in the Mine Closure Plan Guidelines for this assessment are:

1. Proponents should prepare a Mine Closure Plan in accordance with these guidelines to meet Western Australian regulatory requirements.
2. Where the EPA concludes that Rehabilitation and Closure is a Key Integrating Factor in its EPA report on the proposal, the EPA will recommend a condition requiring a Mine Closure Plan to be prepared that is consistent with these guidelines.

Guidance Statement No. 6 - Rehabilitation of Terrestrial Ecosystems

The relevant considerations for Guidance Statement No. 6 are:

1. Information about the diversity of plants and their capacity to recruit from seeds.
2. The setting of rehabilitation objectives that take into account the complexity of constraints to effective rehabilitation.
3. The setting of completion criteria that are attainable in realistic timeframes and ensure rehabilitation objectives have been met.
4. The use of similar rehabilitation objectives and completion criteria within particular industries and within geographical regions when appropriate.
5. Life of mine approaches are required where financial and logistical planning required for effective rehabilitation occurs early in the life of projects (ANZMEC 2000).

Environmental Protection Bulletin No. 19 – EPA involvement in mine closure

The relevant considerations for Environmental Protection Bulletin No. 19 are:

1. DMP and the EPA may both assess mine closure when an impact or risk is significant. The EPA is most likely to consider an impact or risk significant when an environmental asset with special or unique characteristic is being impacted, or a certain aspect of mine closure poses a high environmental risk.
2. The EPA will assess and regulate all mining projects that are not subject to the *Mining Act 1978*.

6. Offsets

The EPA has determined that the policy and guidance that are relevant for offsets for this assessment are:

1. *WA Environmental Offsets Policy* (Government of Western Australia 2011)
2. *WA Environmental Offset Guidelines* (Government of Western Australia 2014)
3. Environmental Protection Bulletin No.1 – *Environmental Offsets Policy* (EPA 2014c)

WA Environmental Offsets Policy – Government of Western Australia

The relevant considerations for the Offsets Policy are the six principles in the Offsets Policy:

1. Environmental offsets will only be considered after avoidance and mitigation options have been pursued.
2. Environmental offsets are not appropriate for all projects (circumstances).
3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.
4. Environmental offsets will be based on sound environmental information and knowledge.
5. Environmental offsets will be applied within a framework of adaptive management.
6. Environmental offsets will be focussed on longer term strategic outcomes.

WA Environmental Offset Guidelines - Government of Western Australia

The WA Environmental Offsets Guidelines complement the Offsets Policy by clarifying the determination and application of environmental offsets in Western Australia, with reference to the offsets principles in the Offsets Policy.

In addition to guidance on the application of the principles contained within the offsets policy, the relevant considerations in the offsets guidelines for this assessment are:

1. Environmental offsets will only be applied where the residual impacts of a project are determined to be significant, after avoidance, minimisation and rehabilitation have been pursued.
2. Proponents must apply the mitigation hierarchy (avoid, minimise, rehabilitate and offset) to reduce the potential impacts of a proposal on the environment.

3. The Residual Impact Significance model outlines how significance is determined and when an offset is likely to be required, or may be required, in relation to the relevant EPA environmental factors.
4. In determining the significance of an impact (and the requirement for an offset) it is important to consider the impacts in a regional context. Where cumulative impacts are considered to be already significant and these are published, impacts will normally be considered as requiring an offset.
5. Strategic approaches to offsets, such as a fund, provide a coordination mechanism to implement offsets across a range of land use tenures and can achieve better environmental outcomes by considering offsets at a landscape scale.

Environmental Protection Bulletin No. 1 – Environmental Offsets

The relevant considerations in Environmental Protection Bulletin No. 1 for this assessment are:

1. The EPA adopts the *WA Offsets Policy* and *WA Environmental Offsets Guidelines* for application through the environmental impact assessment process.
2. Where the EPA is of the view that a significant residual impact remains after avoidance, minimisation and rehabilitation efforts, the EPA will ensure that any offsets are recommended as conditions of approval in the EPA's report to the Minister for Environment, as well as including details on the rationale for the offset.
3. As part of an Environmental Review document, proponents must include a section discussing how it has applied the mitigation hierarchy to its proposal. Offsets should be addressed in a separate section of the document, after the assessment of environmental factors.
4. If a proponent is seeking a change to, or an expansion of, a proposal under an existing approval, these changes will be subject to the current offsets practice. Consideration will be given to any offsets that were a requirement of the existing proposal.

Appendix 5

Review of existing Ministerial Statements

Proposed Implementation Agreement (Ministerial Statement)

The EPA recommends that the proposal may be implemented and further recommends that the implementation of the proposal be subject to the Implementation Agreement (Ministerial Statement) set out in Appendix 6. See Section 5 of this report regarding the recommended conditions.

The recommended Ministerial Statement has been developed in accordance with Environmental Assessment Guideline No. 11 *Recommending Environmental Conditions* (EPA 2015b) and Environmental Assessment Guideline No. 17 *Preparation of management plans under Part IV of the Environmental Protection Act 1986* (EPA 2015c) and includes a review of the following implementation conditions:

- Ministerial Statement 707: Pilbara Iron Ore Infrastructure Project: East-West Railway Mine Sites Stage B, issued on 16 December 2005; and
- Ministerial Statement 871: Christmas Creek Water Management Scheme Pilbara Region, issued on 1 August 2011.

The main changes between the proposed new Ministerial Statement (Appendix 6) and the existing Ministerial Statements relate to:

- removal of clauses relating to standard reporting and data availability in individual conditions as these duplicate clauses in the standard Compliance Reporting and Public Availability of Data conditions;
- removing conditions that have been met;
- removing regulatory duplication where another agency can adequately regulate the impacts to that factor;
- updating conditions to reflect contemporary conditions and the requirements of Environmental Assessment Guidelines 11 and 17; and
- organising the statement according to the separate components of the proposal (Christmas Creek Iron Ore Mine, East-West Railway and Mindy Mindy Iron Ore Mine).

Recommended environmental conditions

The EPA notes the following:

Christmas Creek Iron Ore Mine

- Ministerial Statements 707 and 871 contain specific water-related conditions. The EPA considers that these conditions are no longer required where water-related issues can be adequately regulated and managed by other agencies during operations.
- The EPA has rationalised biodiversity conditions in Ministerial Statements 707 and 871 and has clarified which are the important species that are the focus of the conditions for Flora and Vegetation, Terrestrial Fauna and Subterranean Fauna;
- Ministerial Statement 707 contains a number of conditions relating to rehabilitation and decommissioning. The EPA has consolidated existing conditions, and applied the contemporary mine closure plan condition, with additional clauses addressing rehabilitation of vegetation, groundwater monitoring and performance reporting;

- The EPA has rationalised outstanding offsets in Ministerial Statement 707 and proposed a new offset for the additional clearing, applying the contemporary approach of a per hectare rate for the clearing of native vegetation in 'Good to Excellent' condition.

East-West Railway

- The EPA has limited the conditions to those applicable to a railway, that has been constructed (i.e. operations and decommissioning).
- The EPA has clarified in the conditions which factors are relevant to the railway (Hydrological Processes / Inland Waters Environmental Quality (surface water), Flora and Vegetation, and Rehabilitation and Decommissioning) and which management plans would need to be revised.

Mindy Mindy Iron Ore Mine

- The EPA has clarified in the conditions that the Mindy Mindy mine has not been constructed;
- The EPA has proposed that baseline surveys should occur prior to ground disturbing activities for groundwater levels and quality and surface water flows and quality, flora and vegetation, terrestrial fauna and subterranean fauna.
- The EPA has consolidated existing conditions into one for each factor.

Recommended proposal details (Schedule 1)

The revised proposal details contained in Schedule 1 have been amended to include an updated description which reflects the EPA's contemporary approach to project descriptions detailed in Environmental Assessment Guideline No. 1 *Defining the Key Characteristics of a Proposal* (Appendix 6, Table 2). This includes adding the Christmas Creek Mine and Mindy Mindy Mine into the title, as the current proposal title *Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B* is not specific.

The location and authorised extent of physical and operational elements in Schedule 1 is for the total proposal (i.e. includes the additional clearing and groundwater abstraction/injection). The proponent has also defined the development envelopes (Appendix 6, Table 2).

Appendix 6

**Identified Decision-making Authorities
and
Recommended Environmental Conditions**

Identified Decision-making Authorities

Section 44(2) of EP Act specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Minister for Environment	<i>Environmental Protection Act 1986</i>
2. Minister for State Development	<i>Iron Ore (FMG Chichester Pty Ltd) Agreement Act 2006</i>
3. Minister for Water	<i>Rights in Water and Irrigation Act 1914</i>
4. Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>
5. Minister for Mines and Petroleum	<i>Mining Act 1978</i>
6. CEO Department of Environment Regulation	Part V of the <i>Environmental Protection Act 1986</i>
7. State Mining Engineer, Department of Mines and Petroleum	<i>Mines Safety and Inspection Act 1994</i>
8. Chief Dangerous Goods Officer, Department of Mines and Petroleum	<i>Dangerous Goods Safety Act 2004</i>

Note: In this instance, agreement is only required with DMAs 1 to 5 since these DMAs are Ministers.

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A REVISED PROPOSAL MAY BE IMPLEMENTED
(Environmental Protection Act 1986)

PILBARA IRON ORE AND INFRASTRUCTURE PROJECT (CHRISTMAS CREEK MINE, EAST-WEST RAILWAY MINDY MINDY MINE) - REVISED PROPOSAL:

Proposal: Proposal to revise Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B, the subject of Statement No. 707 dated 16 December 2005 and Statement No. 871 dated 01 August 2011.

Proponent: Fortescue Metals Group Ltd
Australian Company Number 002 594 872

Proponent Address: Level 2/87 Adelaide Terrace, East Perth WA 6004

Assessment Number: 1989

Report of the Environmental Protection Authority: 1567

Previous Reports of the Environmental Protection Authority: 1202 and 1402

Previous Statement Numbers: 707 and 871

Pursuant to section 45, read with section 45B of the *Environmental Protection Act 1986*, it has been agreed that:

1. the proposal described and documented in Table 2 of Schedule 1 may be implemented;
2. the implementation of the proposal, being the Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B as amended by this proposal, is subject to the following implementation conditions; and
3. from the date of this Statement each of the implementation conditions in Statements 807 and 946 no longer apply in relation to the Proposal:

1 Proposal Implementation

- 1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Table 2 in Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.

2 Contact Details

- 2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Compliance Reporting

- 3-1 The proponent shall prepare, submit and maintain a Compliance Assessment Plan to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 3-6, or prior to implementation, whichever is sooner.
- 3-2 The Compliance Assessment Plan shall indicate:
- (1) the frequency of compliance reporting;
 - (2) the approach and timing of compliance assessments;
 - (3) the retention of compliance assessments;
 - (4) the method of reporting of potential non-compliances and corrective actions taken;
 - (5) the table of contents of Compliance Assessment Reports; and
 - (6) public availability of Compliance Assessment Reports.
- 3-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 3-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 3-1.
- 3-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 3-1 and shall make those reports available when requested by the CEO.
- 3-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.
- 3-6 The proponent shall submit to the CEO Compliance Assessment Reports addressing compliance in the previous calendar year. Compliance Assessment Reports shall be submitted by the submission date defined in the Compliance Assessment Plan required by condition 3-1, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;
- (2) include a statement as to whether the proponent has complied with the conditions;
- (3) identify all potential non-compliances and describe corrective and preventative actions taken;
- (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and

- (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 3-1.

4 Public Availability of Plans and Reports

4-1 Subject to condition 4-2, within a reasonable time period approved in writing by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved in writing by the CEO, all environmental plans and reports required under this Statement.

4-2 If any parts of the plans and reports referred to in condition 4-1 contains particulars of:

- (1) a secret formula or process; or
- (2) confidential commercially sensitive information;

the proponent may submit a request for approval from the CEO to not make those parts of the plans or reports publicly available. In making such a request, the proponent shall provide the CEO with an explanation and reasons why those parts of the plans or reports should not be made publicly available.

5 Outcome-based Condition Environmental Management Plans

5-1 The proponent shall prepare and submit Condition Environmental Management Plans:

- (1) within 6 months of issue of this Statement or as otherwise agreed in writing by the CEO, to demonstrate that the environmental outcomes in condition 7-1 for the Christmas Creek Iron Ore Mine will be met; and
- (2) prior to the commencement of ground disturbing activities, to demonstrate that the environmental outcome in condition 16-1 for the Mindy Mindy Iron Ore Mine will be met.

5-2 The Condition Environmental Management Plans shall:

- (1) specify the **environmental outcomes** to be achieved, as specified in conditions 7-1 and 16-1;
- (2) specify **trigger criteria** that must provide an early warning that the threshold criteria identified in condition 5-2(3) may not be met;
- (3) specify **threshold criteria** to demonstrate compliance with the environmental outcomes specified in conditions 7-1 and 16-1. Exceedance of the threshold criteria represents non-compliance with these conditions;
- (4) specify **monitoring** to determine if trigger criteria and threshold criteria are exceeded;
- (5) specify **trigger level actions** to be implemented in the event that trigger criteria have been exceeded;
- (6) specify **threshold contingency actions** to be implemented in the event that threshold criteria are exceeded;
- (7) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that conditions 7-1 and

16-1 have been met over the reporting period in the Compliance Assessment Report required by condition 3-6; and

5-3 After receiving notice in writing from the CEO that the Condition Environmental Management Plans satisfy the requirements of condition 5-2 for conditions 7-1 and 16-1 the proponent shall:

- (1) implement the provisions of the Condition Environmental Management Plans; and
- (2) continue to implement the Condition Environmental Management Plans until the CEO has confirmed by notice in writing that the proponent has demonstrated the outcomes specified in conditions 7-1 and 16-1 have been met.

5-4 In the event that monitoring indicates exceedance of threshold criteria specified in the Condition Environmental Management Plans, the proponent shall:

- (1) report the exceedance in writing to the CEO within 7 days of the exceedance being identified;
- (2) implement the threshold contingency actions specified in the Condition Environmental Management Plans within 24 hours and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required;
- (3) investigate to determine the cause of the threshold criteria being exceeded;
- (4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; and
- (5) provide a report to the CEO within 21 days of the exceedance being reported as required by condition 5-4(1). The report shall include:
 - (a) details of threshold contingency actions implemented;
 - (b) the effectiveness of the threshold contingency actions implemented, against the threshold criteria;
 - (c) the findings of the investigations required by condition 5-4(3) and 5-4(4);
 - (d) measures to prevent the threshold criteria being exceeded in the future; and
 - (e) measures to prevent, control or abate the environmental harm which may have occurred.
 - (f) justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that outcomes will continue to be met.

5-5 The proponent:

- (1) may review and revise the Condition Environmental Management Plans, or
- (2) shall review and revise the Condition Environmental Management Plans as and when directed by the CEO.

5-6 The proponent shall implement the latest revision of the Condition Environmental Management Plans, which the CEO has confirmed by notice in writing, satisfies the requirements of condition 5-2.

6 Management-based Condition Environmental Management Plans

6-1 The proponent shall prepare and submit Condition Environmental Management Plans:

- (1) within 12 months of issue of this Statement or as otherwise agreed in writing by the CEO, to demonstrate that the **environmental objectives** in conditions 8-1 and 9-1 for the Christmas Creek Iron Ore Mine will be met;
- (2) within 24 months of issue of this Statement or as otherwise agreed in writing by the CEO, to demonstrate that the **environmental objectives** in conditions 12-1 and 13-1 for the East-West Railway will be met;
- (3) within 12 months of the Minister (for State Development) giving notice under Clause 32 (2)(a) of the TPI Agreement Act or as otherwise agreed in writing by the CEO, or at least 3 years prior to the planned cessation of Railway Operations by the proponent, whichever occurs first, to demonstrate that the **environmental objective** in condition 14-1 for the East-West Railway will be met; and
- (4) prior to the commencement of ground disturbing activities, to demonstrate that the **environmental objectives** in conditions 17-1, 18-1, 19-1 and 20-1 for the Mindy Mindy Iron Ore Mine will be met.

6-2 The Condition Environmental Management Plans shall:

- (1) specify the **environmental objectives** to be achieved, as specified in conditions 8-1, 9-1, 12-1, 13-1, 14-1, 17-1, 18-1, 19-1 and 20-1;
- (2) specify risk-based **management actions** that will be implemented to demonstrate compliance with the environmental objectives specified in 8-1, 9-1, 12-1, 13-1, 14-1, 17-1, 18-1, 19-1 and 20-1. Failure to implement one or more of the management actions represents non-compliance with these conditions;
- (3) specify measurable **management target(s)** to determine the effectiveness of the risk-based management actions;
- (4) specify **monitoring** to measure the effectiveness of management actions against management targets, including but not limited to, parameters to be measured, baseline data, monitoring locations, and frequency and timing of monitoring;
- (5) specify a process for **revision** of management actions and changes to proposal activities, in the event that the management targets are not achieved. The process shall include an investigation to determine the cause of the management target(s) being exceeded;
- (6) provide the format and timing to demonstrate that 8-1, 9-1, 12-1, 13-1, 14-1, 17-1, 18-1, 19-1 and 20-1 have been met for the reporting period in the Compliance Assessment Report required by condition 3-6 including, but not limited to:
 - (a) verification of the implementation of management actions; and
 - (b) reporting on the effectiveness of management actions against management target(s).

- 6-3 After receiving notice in writing from the CEO that the Condition Environmental Management Plan(s) satisfies the requirements of condition 6-2 for conditions 8-1, 9-1, 12-1, 13-1, 14-1, 17-1, 18-1, 19-1 and 20-1, the proponent shall:
- (1) implement the provisions of the Condition Environmental Management Plan(s); and
 - (2) continue to implement the Condition Environmental Management Plan(s) until the CEO has confirmed by notice in writing that the proponent has demonstrated the objectives specified in conditions 8-1, 9-1, 12-1, 13-1, 14-1, 17-1, 18-1, 19-1 and 20-1 have been met.
- 6-4 In the event that monitoring, tests, surveys or investigations indicate exceedance of management target(s) specified in the Condition Environmental Management Plan(s), the proponent shall:
- (1) report the exceedance in writing to the CEO within 21 days of the exceedance being identified;
 - (2) investigate to determine the cause of the management targets being exceeded;
 - (3) provide a report to the CEO within 90 days of the exceedance being reported as required by condition 6-4(1). The report shall include:
 - (a) cause of management targets being exceeded;
 - (b) the findings of the investigation required by conditions 6-4(2);
 - (c) details of revised and/or additional management actions to be implemented to prevent exceedance of the management target(s);
 - (d) relevant changes to proposal activities.
- 6-5 In the event that monitoring, tests, surveys or investigations indicate that one or more management actions specified in the Condition Environmental Management Plan have not been implemented, the proponent shall:
- (1) report the failure to implement management action/s in writing to the CEO within 7 days of identification;
 - (2) investigate to determine the cause of the management action(s) not being implemented;
 - (3) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to the failure to implement management actions;
 - (4) provide a report to the CEO within 21 days of the reporting required by condition 6-5(1). The report shall include:
 - (a) cause for failure to implement management actions;
 - (b) the findings of the investigation required by conditions 6-5(2) and 6-5(3);
 - (c) relevant changes to proposal activities; and
 - (d) measures to prevent, control or abate the environmental harm which may have occurred.
- 6-6 The proponent:
- (1) may review and revise the Condition Environmental Management Plan(s),
or

- (2) shall review and revise the Condition Environmental Management Plan(s) as and when directed by the CEO.
- 6-7 The proponent shall implement the latest revision of the Condition Environmental Management Plan(s), which the CEO has confirmed by notice in writing, satisfies the requirements of condition 6-2.

Christmas Creek Iron Ore Mine

7 Flora and Vegetation – conservation significant flora species and vegetation

- 7-1 The proponent shall manage the implementation of the proposal to meet the following **environmental outcomes**:
 - (1) ensure there is no disturbance (direct and indirect impacts) within the buffers of the known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiorcarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2.
 - (2) maintain the health of Mulga, Samphire and Coolibah / River Red Gum vegetation as delineated in Figure 3 and defined by the geographic coordinates in Schedule 2, that is not authorised to be cleared in Schedule 1.
- 7-2 The proponent shall consult with Parks and Wildlife in the preparation of the plan/s required by condition 5-1 that satisfies the requirements of condition 5-2, to meet the outcomes required by condition 7-1.
- 7-3 The plan/s required by condition 5-1 shall include provisions required by condition 5-2 to address impacts on conservation significant flora and vegetation health including from, but not limited to: changes to groundwater levels and groundwater quality; changes to surface flows; dust; and weeds.
- 7-4 The proponent shall continue to implement the versions most recently approved by the CEO of the Christmas Creek Water Management Scheme, Vegetation Health Monitoring and Management Plan (CC-PL-EN-0004), the Significant Flora and Vegetation Management Plan (45-PL-EN-0017), the Fortescue Marshes Management Plan (45-PL-EN-0009) and the Surface Water Management Plan (100-PL-EN-1015) until the CEO has confirmed by notice in writing that the plan required by condition 5-1 satisfies the requirements of condition 5-2 to meet the outcomes required by condition 7-1.

8 Terrestrial Fauna – conservation significant fauna

- 8-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
 - (1) minimise direct and indirect impacts on conservation significant fauna species and their habitat, including, but not limited to the Pilbara Olive Python, Northern Quoll, Greater Bilby, Night Parrot and migratory birds.
- 8-2 The plan/s required by condition 6-1 shall include provisions required by 6-2 to manage impacts on conservation significant fauna including from, but not limited to loss of habitat, changes in surface water flows and open trenches.

- 8-3 The proponent shall continue to implement the versions most recently approved by the CEO of the *Conservation Significant Fauna Management Plan* (100-PL-EN-0022), the *Fortescue Marshes Management Plan* (45-PL-EN-0009) and the *Surface Water Management Plan* (100-PL-EN-1015) until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objective required by condition 8-1.

9 Subterranean Fauna

- 9-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) minimise impacts to troglafauna species, including *Anajapygidae* sp B02, *Parajapygidae* sp B24, *Projapygidae* sp B12 and *Troglarmadillo* sp B30, and to stygofauna species including *Bathynella* sp. B02, *Goniocyclops* sp. B02 and *Canthocamptidae* sp. B02, which have been identified through baseline surveys to have potentially restricted distributions or potentially restricted habitat.
- 9-2 To verify that the requirements of condition 9-1 are met, the proponent shall prepare and submit a survey plan within 3 months of the issue of this Statement or as otherwise agreed in writing by the CEO.
- 9-3 The survey plan shall detail the proposed methodology for the targeted subterranean fauna and subterranean fauna habitat survey.
- 9-4 The proponent shall undertake the targeted survey required by condition 9-2 in accordance with the survey plan, within 3 months of receiving notice in writing from the CEO that the survey plan satisfies the requirements of condition 9-3 or as otherwise agreed by the CEO;
- 9-5 On completion of the targeted survey, the proponent shall report to the CEO on the following within 3 months of completion of the survey or as otherwise agreed in writing by the CEO:
- (1) completion of the targeted survey in accordance with the survey plan; and
 - (2) the results of the targeted survey, including maps which show:
 - (a) locations of all known records of the troglafauna species *Anajapygidae* sp B02, *Parajapygidae* sp B24, *Projapygidae* sp B12 and *Troglarmadillo* sp B30, and the stygofauna species *Bathynella* sp. B02, *Goniocyclops* sp. B02 and *Canthocamptidae* sp. B02; and
 - (b) likely suitable habitat for the troglafauna species *Anajapygidae* sp B02, *Parajapygidae* sp B24, *Projapygidae* sp B12 and *Troglarmadillo* sp B30, and the stygofauna species *Bathynella* sp. B02, *Goniocyclops* sp. B02 and *Canthocamptidae* sp. B02.
- 9-6 In the event that the CEO determines from the report required by 9-5 that one or more subterranean fauna species has a restricted distribution and / or a restricted habitat, the proponent shall within 3 months or as otherwise agreed in writing from the CEO, prepare and submit a Management-based Condition Environmental Management Plan to the CEO that satisfies the requirements of condition 6-2 to meet the objective required by condition 9-1.

- 9-7 The proponent shall continue to implement the version most recently approved by the CEO of the *Subterranean Fauna Survey Plan* (45-PL-EN-0010) until the CEO has confirmed by notice in writing that:
- (1) based on the results of the targeted survey required by 9-5, the objective required by condition 9-1(1) has been met; or
 - (2) the plan required under condition 9-6 satisfies the requirements of condition 6-2 to meet the objective required by condition 9-1.

10 Rehabilitation and decommissioning

- 10-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) ensure that the proposal is rehabilitated and decommissioned in an ecologically sustainable manner.
- 10-2 Within six months of the issue of this Statement or as otherwise agreed in writing from the CEO, the proponent shall prepare and submit a Mine Closure Plan in accordance with the *Guidelines for Preparing Mine Closure Plans*, May 2015 (or any subsequent revisions of the guidelines), on advice of the DMP, Parks and Wildlife and the DoW.
- 10-3 The proponent shall continue to implement the *Conceptual Closure Plan; Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites (Stage B)* (30-0086F, December 2004) until the CEO has confirmed by notice in writing that the Mine Closure Plan satisfies the requirements of condition 10-2 to meet the objective required by condition 10-1.
- 10-4 The plan shall include quantitative completion criteria for each domain of the mine to enable the proponent to demonstrate that closure objectives will be met, including, but not limited to rehabilitation (including revegetation) of Mulga and Coolibah / River Red Gum vegetation communities within the Christmas Creek Mine Development Envelope, as delineated in Figure 1 and defined by the geographic coordinates in Schedule 2.
- 10-5 The plan shall include a monitoring framework for the monitoring of groundwater levels and groundwater quality to enable the proponent to demonstrate that the cessation of groundwater dewatering and injection for the proposal will not have a detrimental impact on the Fortescue Marsh aquifers and aquifers that support the function of terrestrial and subterranean ecological communities, to demonstrate that the outcome in condition 7-1 and the objectives in conditions 8-1, 9-1 and 10-1 will be met.
- 10-6 The plan shall include a performance report for the period since the last revision of the plan, including, but is not limited to:
- (1) a gap analysis and risk assessment to determine what further information is required in relation to rehabilitation and decommissioning of each domain or feature;
 - (2) progress towards meeting information gaps, including results of research activities and rehabilitation trials;
 - (3) identification of actual progressive rehabilitation against schedule of progressive rehabilitation;

- (4) progress against agreed completion criteria; and
 - (5) demonstration that the cessation of groundwater dewatering and injection for the proposal has not had a detrimental impact on the Fortescue Marsh aquifers.
- 10-7 The proponent shall review and revise the Mine Closure Plan required by condition 10-2 on advice of the DMP, the DoW and the Parks and Wildlife, at intervals not exceeding three years, or as otherwise specified by the CEO, and submit the plan to the CEO at the agreed interval.
- 10-8 The proponent shall implement the latest revision of the Mine Closure Plan, which the CEO has confirmed by notice in writing, satisfies the requirements of condition 10-2.

11 Offsets

- 11-1 The proponent shall provide direct funding to the Parks and Wildlife for the following:
- (1) a contribution to a position within Parks and Wildlife of \$250,000 AUD (excluding GST) per annum (indexed to the Perth All Groups consumer price index (CPI)) from 2016 until the end of 2024, to manage a Fortescue Marsh conservation program;
 - (2) contribution to a Weed Management Extension Program of \$50,000 AUD (excluding GST) per annum (indexed to the Perth All Groups consumer price index (CPI)) until the end of 2024, to manage and reduce the weed populations within the Fortescue Marsh Management Area; and
 - (3) a one-off payment of \$100,000 AUD (excluding GST) within 6 months of the issue of this Statement, for a Fortescue Marsh conservation area management plan to be developed by Parks and Wildlife.
- 11-2 In view of the significant residual impacts and risks as a result of implementation of the proposal, the proponent shall contribute funds for the clearing of 'Good to Excellent' condition native vegetation in the Chichester and Fortescue IBRA subregions, the Fortescue Marsh Management Zone 1a and the proposed Fortescue Marsh Conservation Reserve, and calculated pursuant to condition 11-3. This funding shall be provided to a government-established conservation offset fund or an alternative offset arrangement providing an equivalent outcome as determined by the Minister.
- 11-3 The proponent's contribution to the initiative identified in condition 11-2 shall be paid biennially, the first payment due on 31 May in the second year following the issue of this statement. The amount of funding will be made on the following basis and in accordance with the approved Impact Reconciliation Procedure required by condition 11-4:
- (1) \$750 AUD (excluding GST) per hectare of 'Good to Excellent' condition native vegetation cleared within the Christmas Creek Mine Development Envelope (delineated in Figure 1 and defined by the geographic coordinates in Schedule 2) within the Chichester IBRA subregion;
 - (2) \$1500 AUD (excluding GST) per hectare of 'Good to Excellent' condition native vegetation cleared within the Christmas Creek Mine Development

- Envelope (delineated in Figure 1 and defined by the geographic coordinates in Schedule 2) within the Fortescue IBRA subregion; and
- (3) \$3000 AUD (excluding GST) per hectare of native vegetation cleared within the Fortescue Marsh Management Zone 1a and the proposed Fortescue Marsh Conservation Reserve (delineated in Figure 4 and defined by the geographic coordinates in Schedule 2).
- 11-4 The 10,135.5 ha of clearing in the Christmas Creek Mine Development Envelope approved under Ministerial Statement 707 is exempt from the requirement to offset under condition 11-3.
- 11-5 Within twelve months of the date of this Statement, the proponent shall prepare an Impact Reconciliation Procedure to the satisfaction of the CEO.
- 11-6 The Impact Reconciliation Procedure required pursuant to condition 11-5 shall:
- (1) include a methodology to identify clearing of 'Good to Excellent' condition native vegetation in the Chichester and Fortescue IBRA subregions, and the Fortescue Marsh Management Zone 1a and the proposed Fortescue Marsh Conservation Reserve;
 - (2) require the proponent to submit spatial data identifying areas of 'Good to Excellent' condition native vegetation that has been cleared;
 - (3) include a methodology for calculating the amount of clearing undertaken during each biennial time period; and
 - (4) state that the biennial time period commences on the 1 March prior to commencing ground disturbance. State that the due date for submitting the results of the Procedure for approval of the CEO is 31 March following the end of the first biennial period.
- 11-7 The real value of contributions described in condition 11-3 will be maintained through indexation to the Perth Consumer Price Index (CPI), with the first adjustment to be applied to the first contribution.

East-West Railway

12 Hydrological Processes and Inland Waters Environmental Quality – surface water

- 12-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) minimise direct and indirect impacts on flora, vegetation and fauna from activities associated with the management of surface water, including, but not limited to, modifications to surface water drainage.
- 12-2 The proponent shall prepare a plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 12-1.
- 12-3 The proponent shall continue to implement the version most recently approved by the CEO of the *Surface Water Management Plan* (100-PL-EN-1015) until the CEO has confirmed by notice in writing that the plan/s required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objective required by condition 12-1.

13 Flora and Vegetation – Vegetation health

- 13-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) minimise impacts to Mulga vegetation communities.
- 13-2 The proponent shall consult with the Parks and Wildlife in the preparation of the plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 13-1.
- 13-3 The plan/s required by condition 6-1 shall include provisions required by condition 6-2 to address potential impacts on conservation significant flora and vegetation health including from, but not limited to, changes to surface flows and weeds.
- 13-4 The proponent shall continue to implement the versions most recently approved by the CEO of the *Vegetation Health Monitoring and Management Plan* (CC-PL-EN-0004), the *Significant Flora and Vegetation Management Plan* (45-PL-EN-0017), the *Fortescue Marshes Management Plan* (45-PL-EN-0009) and the *Surface Water Management Plan* (100-PL-EN-1015) until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the outcomes required by condition 13-1.

14 Rehabilitation and decommissioning

- 14-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) ensure that the proposal is decommissioned and rehabilitated consistent with the requirements of the TPI Agreement Act.
- 14-2 The proponent shall prepare a plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 14-1.

Mindy Mindy Iron Ore Mine

15 Baseline Survey and Monitoring

- 15-1 Prior commencement of ground disturbing activities, the proponent shall prepare and submit a Baseline Survey and Monitoring Plan/s to the CEO to demonstrate that conditions 16-1, 17-1, 18-1, 19-1 and 20-1 will be met.
- 15-2 The Baseline Survey and Monitoring Plan/s shall:
- (1) detail the proposed methodology for the baseline surveys and monitoring;
 - (2) identify and spatially define the proposed survey locations and monitoring/reference/control sites, and provide rationale for the location of the sites; and
 - (3) detail the proposed frequency and timing of the surveys and monitoring.
- 15-3 After receiving notice in writing from the CEO that the Baseline Survey and Monitoring Plan/s satisfies the requirements of condition 15-2, the proponent shall undertake the baseline surveys and monitoring in accordance with the

requirements of the Baseline Survey and Monitoring Plan/s to CEO to demonstrate that conditions 16-1, 17-1, 18-1, 19-1 and 20-1 will be met.

15-4 On completion of the baseline surveys and monitoring the proponent shall report to the CEO on the following:

- (1) completion of the baseline surveys and monitoring in accordance with the Baseline Survey and Monitoring Plan/s; and
- (2) the results of the baseline surveys and monitoring.

16 Hydrological Processes and Inland Waters Environmental Quality – groundwater levels and quality

16-1 The proponent shall manage the abstraction of groundwater for dewatering and the disposal of surplus dewater to meet the following **environmental outcome**:

- (1) maintain groundwater levels and groundwater quality within a defined range, based on the results of the Baseline Survey required by condition 15-3 having regard for climatic trends and seasonal variation.

16-2 The proponent shall consult with the DoW in the preparation of the plan/s required by condition 5-1 that satisfies the requirements of condition 5-2, to meet the outcome required by condition 16-1.

17 Hydrological Processes and Inland Waters Environmental Quality – surface water

17-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:

- (1) minimise direct and indirect impacts flora, vegetation and fauna from surface water activities including from, but not limited to, modifications to surface water drainage.

17-2 The proponent shall prepare a plan/s required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 17-1.

18 Flora and Vegetation – conservation significant flora and vegetation

18-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:

- (1) minimise impacts to conservation significant flora species and vegetation communities.

18-2 In the event that the baseline survey and monitoring required by condition 15 records conservation significant flora and/or vegetation that may be impacted by the proposal, the proponent shall consult with the Parks and Wildlife in the preparation of the plan/s required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 18-1.

18-3 The plan/s required by condition 6-1 shall include provisions required by condition 6-2, to address potential impacts on conservation significant flora and vegetation health including from, but not limited to: changes to groundwater levels; changes to surface flows; dust; and weeds.

19 Terrestrial Fauna – conservation significant fauna

- 19-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) minimise direct and indirect impacts on conservation significant fauna species and their habitat.
- 19-2 In the event that the baseline survey and monitoring required by condition 15 records conservation significant terrestrial fauna that may be impacted by the proposal, the proponent shall consult with the Parks and Wildlife in the preparation of the plan/s required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 19-1.

20 Subterranean Fauna

- 20-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective**:
- (1) minimise impacts on subterranean fauna.
- 20-2 The proponent shall prepare a plan(s) required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 20-1.

21 Rehabilitation and Decommissioning

- 21-1 The proponent shall manage the construction and operation of the proposal to meet the following **environmental objective**:
- (1) The proponent shall ensure that the proposal is decommissioned and rehabilitated in an ecologically sustainable manner.
- 21-2 Prior to the commencement of ground disturbing activities, the proponent shall prepare and submit a Mine Closure Plan in accordance with the *Guidelines for Preparing Mine Closure Plans*, May 2015 (or any subsequent revisions of the guidelines), to the requirements of the CEO on advice of the DMP.
- 21-3 The proponent shall review and revise the Mine Closure Plan required by condition 21-2 on advice of the DMP, at intervals not exceeding three years, or as otherwise specified by the CEO, and submit the plan to the CEO at the agreed interval.
- 21-4 The proponent shall implement the latest revision of the Mine Closure Plan, which the CEO has confirmed by notice in writing, satisfies the requirements of condition 21-2.

Schedule 1**Table 1: Summary of the Proposal**

Proposal Title	Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B
Short Description	The proposal is to revise the existing Pilbara Iron Ore and Infrastructure Project: East-West Railway and Mine Sites Stage B located approximately 70 to 100 km north of Newman in the Pilbara region of Western Australia. The proposal includes mines and associated infrastructure at Christmas Creek and Mindy Mindy, and an east-west railway to link the Stage A north-south railway (to Port Hedland) to the Christmas Creek Mine. The revision includes modification/expansion or development of additional mine pits and associated infrastructure; processing facilities; water management infrastructure; and power station and associated infrastructure at the Christmas Creek Mine.

Table 2: Location and authorised extent of physical and operational elements

Column 1	Column 2	Column 3
Element	Location	Authorised Extent
Christmas Creek Mine		
Mine pits and associated infrastructure	Figure 1 and Figure 3	Clearing of no more than 17,956 ha of vegetation within the 32,868 ha Christmas Creek Mine Development Envelope The total clearing of 17,956 ha of vegetation includes clearing of conservation-significant vegetation (direct and indirect impacts) of no more than: • 10,244 ha of Mulga vegetation • 0 ha of Samphire vegetation • 498 ha Coolibah/River Red Gum vegetation
Dewatering		Abstraction of no more than 110 GL/a of groundwater
Surplus dewater management		Injection of no more than 110 GL/a of groundwater
Water supply		No more than 35 GL/a, supplied from mine dewatering, desalination,

Column 1	Column 2	Column 3
Element	Location	Authorised Extent
		transfer from nearby mine sites and an external water supply borefield.
Backfilling of mine pits	Figure 1	Mine pits will be backfilled to a level to prevent the formation of permanent pit lakes.
East-West Railway		
Railway and associated infrastructure	Figure 1	Clearing of no more than 1,702 ha within the 2,218 ha East-West Rail Corridor Development Envelope.
Mindy Mindy Mine		
Mine pits and associated infrastructure	Figure 1	Clearing of no more than 852 ha within the 10,341 ha Mindy Mindy Mine Development Envelope.
Dewatering		Abstraction of up to 0.4 GL/a of groundwater.
Backfilling		Mine pits will be backfilled to a level to prevent the formation of permanent pit lakes.

Table 3: Abbreviations and Definitions

Acronym or Abbreviation	Definition or Term
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <i>Environmental Protection Act 1986</i> , or his delegate.
Clearing	As defined in the <i>Environmental Protection Act 1986</i> .
Conservation significant fauna	Any terrestrial fauna species listed under the <i>Commonwealth Environmental Protection and Biodiversity Conservation Act 1999</i> or the <i>Western Australia Wildlife Conservation Act 1950</i> .
Conservation significant flora	Any terrestrial flora species listed under the <i>Commonwealth Environmental Protection and Biodiversity Conservation Act 1999</i> or the <i>Western Australia Wildlife Conservation Act 1950</i> or are considered by Parks and Wildlife to be Priority Species.
DoW	Department of Water or the Department of the Public Service of the State through which the <i>Rights in Water and Irrigation Act 1914</i> is administered.
Parks and Wildlife	Department of Parks and Wildlife or the Department of the Public Service of the State through which the <i>Conservation and Land Management Act 1984</i> is administered.
EPA	Environmental Protection Authority

Acronym or Abbreviation	Definition or Term
EP Act	<i>Environmental Protection Act 1986</i>
Fortescue Marsh Management Area	As defined in <i>Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area: Advice of the Environmental Protection Authority to the Minister for Environment under Section 16(e) of the Environmental Protection Act 1986</i> (EPA Report 1484, July 2013)
ha	Hectare
OEPA	Office of the Environmental Protection Authority
TPI Agreement Act	Railway and Port (The Pilbara Infrastructure Pty Ltd) Agreement Act 2004

Figures (attached)

The following figures are representations of the co-ordinates in Schedule 2:

- Figure 1 Christmas Creek Mine, East-West Rail Corridor and Mindy Mindy Mine development envelopes
- Figure 2 *Calotis squamigera* and *Eremophila spongiorcarpa* records and buffers within the Christmas Creek Development Envelope
- Figure 3 Mulga, Samphire and Coolibah / River Red Gum vegetation
- Figure 4 Fortescue Marsh Management Zones and proposed Conservation Reserve

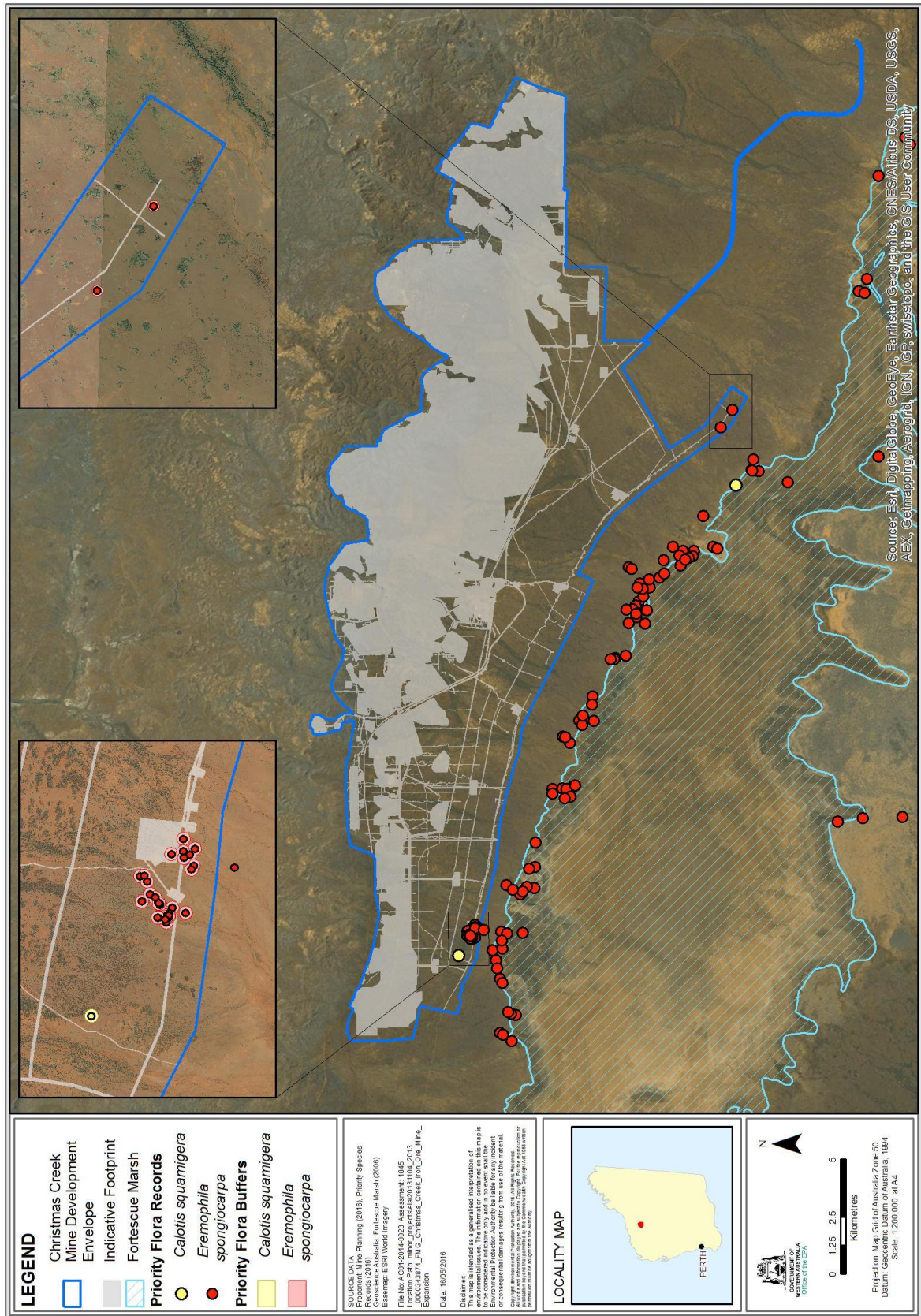


Figure 2 *Calotis squamigera* and *Eremophila spongiocarpa* records and buffers within the Christmas Creek Development Envelope

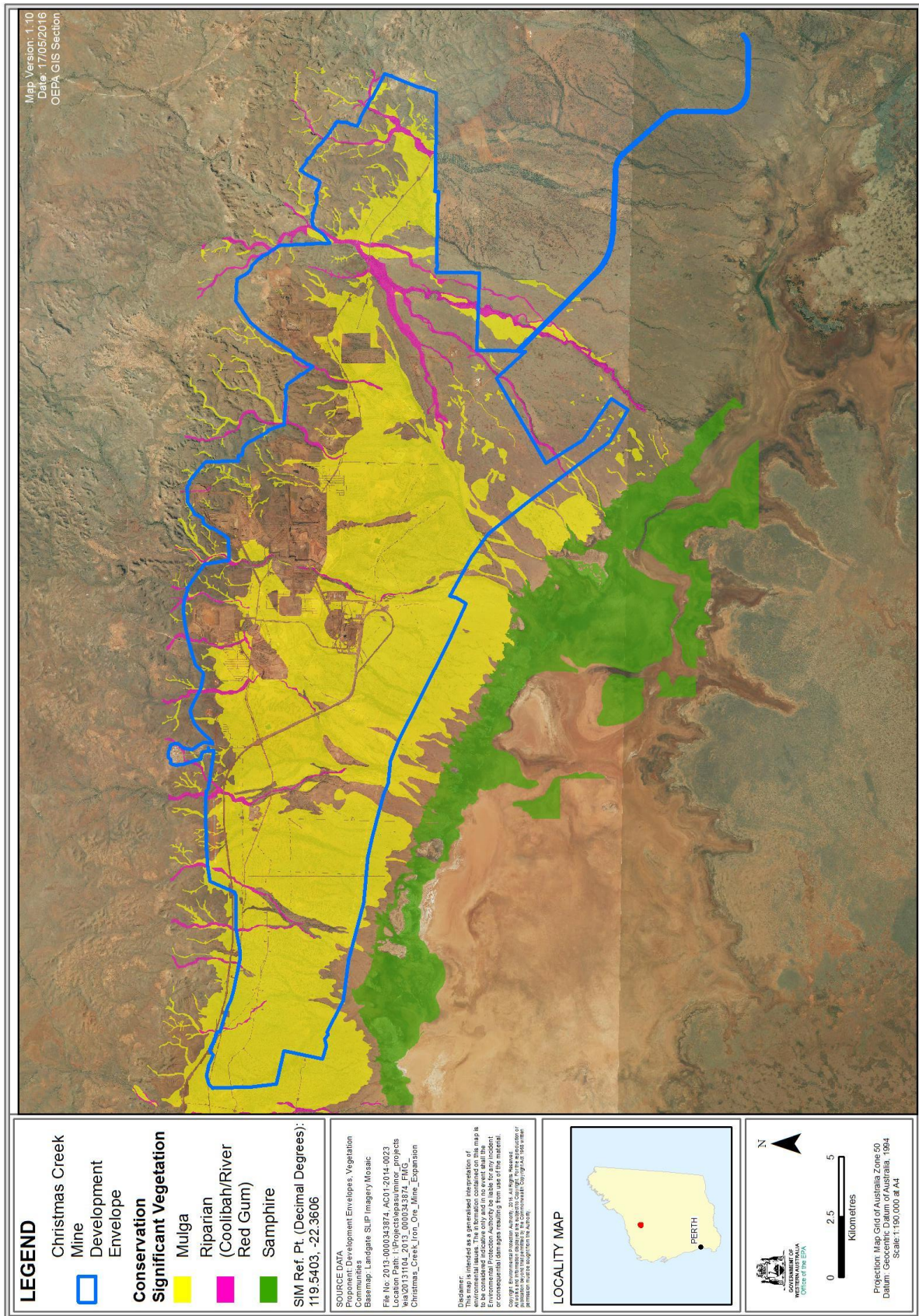


Figure 3 Mulga, Samphire and Coolibah / River Red Gum vegetation

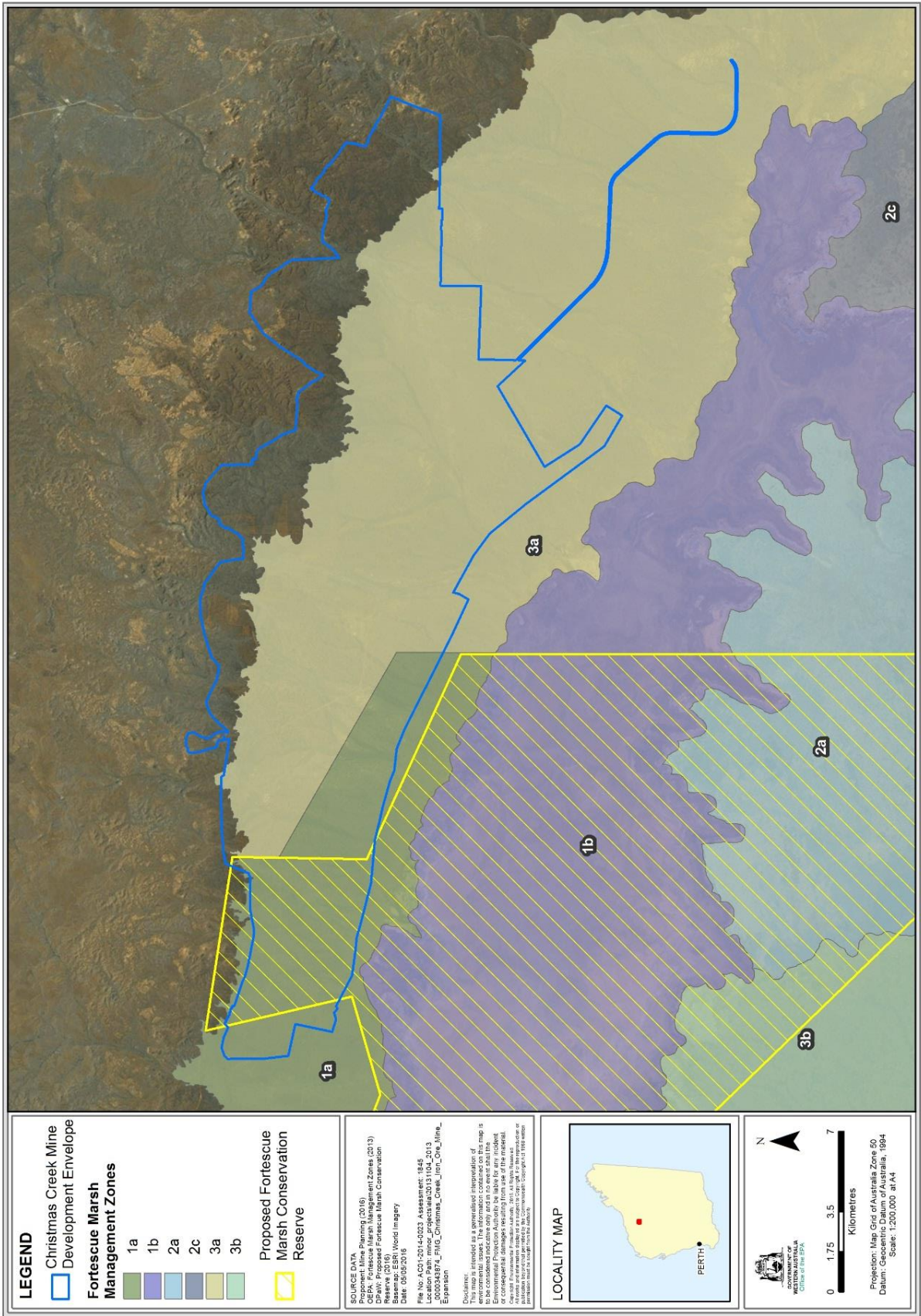


Figure 4 Fortescue Marsh Management Zones and proposed Conservation Reserve

Schedule 2

Coordinates defining the following are held by the Office of the Environmental Protection Authority:

1. Christmas Creek Mine Development Envelope (Document Reference Number 2016-1456205988990)
2. The *Calotis squamigera* and *Eremophila spongiorcarpa* buffers are defined as the area within a 50 m radius of each of the co-ordinates for the known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiorcarpa* within the Christmas Creek Mine Development Envelope (Document Reference Number 2016-1462776696347)
3. Mulga, Samphire and Coolibah / River Red Gum vegetation (Document Reference Number 2016-1462852443776)
4. Fortescue Marsh Management Zones and proposed Conservation Reserve (Document Reference Number 2016-1456205988990)
5. East-West Rail Corridor Development Envelope (Document Reference Number 2016-1457504230642)
6. Mindy Mindy Mine Development Envelope (Document Reference Number 2016-1457579262673)

Appendix 7

Summary of Submissions and Proponent's Response to Submissions