



Environmental Protection Authority

Environmental offsets reporting form

See *EPA Guidance Statement No. 19: environmental offsets - biodiversity*
Please note that the EPA may request additional information.

Section A: Administrative information
1. Proposal or scheme name: Flinders Mines Limited - Pilbara Iron Ore Project (Stage 1) – Blacksmith Tenement
2. Summary of proposal or scheme: <p>Flinders Mines Limited (FMS) proposes to develop an iron ore mining project on the Blacksmith tenement in the Hamersley Range, West Pilbara Region of Western Australia (the PIOP). The project includes development and operation of six deposits that would be mined separately, with some associated infrastructure within the tenement. Annual ore production would be 15 million tonne per annum (Mtpa).</p> <p>All areas within the Blacksmith tenement which are suitable to locate mining infrastructure are mineralised, meaning that the iron ore processing plant, administration buildings, ore stockpiles, accommodation village and all associated mining infrastructure must be located off-tenement.</p> <p>In addition, the successful development of the PIOP will require FMS to negotiate a transport and export arrangement with a rail and port service provider. As FMS has not finalised an ore transport or port arrangement, it has been agreed that the PIOP can be referred for environmental impact assessment in two stages, namely:</p> <ul style="list-style-type: none">• PIOP Stage 1: Iron ore mining operations; and• PIOP Stage 2: Iron ore processing, transport and associated mining infrastructure.
Section B: Type of environmental asset (s) – State whether Critical or High Value, describe the environmental values and attributes
<p>The environmental referral for the PIOP Stage 1 (WorleyParsons, 2011a) and EPA scoping guideline identified the key environmental factors considered relevant to the PIOP Stage 1 as:</p> <ul style="list-style-type: none">• Vegetation and flora – Declared Priority Flora;• Vegetation and flora – Threatened Ecological Communities;• Vegetation and flora – Groundwater Dependent Ecosystems• Fauna – Conservation significant fauna;• Fauna – Troglifauna;• Fauna – Stygofauna;• Groundwater; and• Rehabilitation and mine closure. <p>Each of these relevant factors is addressed in the Sections below.</p> <p>FMS also referred the PIOP Stage 1 under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) on 20 October 2011. On 25 November 2011, the DSEWPaC deemed the activity a Controlled Action (EPBC/6152) likely to have a significant impact on the following controlling provisions, which are protected under</p>



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Part 3 of the EPBC Act:

- Sections 18 and 18A (listed threatened species and ecological communities).

In FMS response to the DSEWPaC the following listed threatened species were identified as potentially impacted by the project:

- Northern Quoll;
- Pilbara Olive Python; and
- Pilbara Leaf-nosed Bat.

The Commonwealth environmental assessment process will run in parallel to the State EP Act assessment process.



Declared Priority Flora	Threatened Ecological Communities (TECs)	Groundwater Dependent Ecosystems	Conservation Significant Fauna	Troglofauna	Stygofauna	Groundwater	Rehabilitation and mine closure
Section C: Significant impacts (describe the significant adverse environmental impacts related to the proposal or scheme before mitigation measures are applied)							
<p>As detailed in Section 4.9.4 of the Environmental Review document five Priority Flora species (three Priority 3 species and two Priority 4 species) were recorded within the study area (Ecoscape, 2011b). A new <i>Josephinia</i> sp. was recorded in a gorge within the Champion resource, which is in the process of being recognised as a new species.</p> <p>The potential impacts to Declared Priority Flora are discussed in Section 6.1.3 of the Environmental Review document.</p> <p>At this point it is difficult to measure potential impacts on the new <i>Josephinia</i> sp as it is an unknown species that so far appears to be widely scattered. It is also likely this species is ephemeral and is present when seasonal conditions favour its growth (Ecoscape, 2012).</p> <p>Based on the preferred habitat (gorges and riparian areas) of the priority flora species there is little overlap with the delineated ore-bodies in the tenement and the location of the recorded Priority Listed flora. Therefore, it is unlikely that the development and operation of the PIOP will have a significant impact on the known populations of these species</p>	<p>The flora and vegetation surveys did not identify any TECs in or adjacent to the study area (Ecoscape, 2011b); therefore no impacts on TECs are expected to occur as a result of the development and operation of the PIOP Stage 1.</p>	<p>Ecoscape (2012a) recorded 12 vegetation types (refer to Section 4.9.9 of the Environmental Review document) considered to be GDEs from the study area. These vegetation types are associated with a tributary of Weelumurra Creek, and Caliwingina Creek and its tributaries.</p> <p>The potential impacts to GDEs are detailed in Section 6.3.3 and Figure 26 of the Environmental Review document.</p> <p>The PIOP Stage 1 has the potential to impact on GDEs if the availability of groundwater to vegetation types within the GDEs is decreased. Decreased availability of groundwater may result from the PIOP Stage 1 through:</p> <ul style="list-style-type: none"> groundwater abstraction; decreases in groundwater recharge caused by alterations in terrain and terrain permeability; and decreases in groundwater recharge caused by alterations of surface water flows. <p>In the absence of scientific evidence to the contrary and using a precautionary approach, FMS has assumed that the GDEs in the vicinity of the PIOP Stage 1 could be affected by drawdown of groundwater from the mining activities.</p>	<p>Evidence of six conservation significant vertebrate fauna species, or their habitat, was identified within the study area (Ecoscape, 2011a) (refer to Section 4.10.4 of the Environmental Review document).</p> <p>No significant SRE invertebrate fauna species were recorded from the survey (Ecoscape, 2011a).</p> <p>Potential impacts to conservation significant fauna are associated with:</p> <ul style="list-style-type: none"> Land disturbance; Introduced flora and fauna species; Alteration to the frequency of fires; The increased presence and movement of vehicles; Drill holes left uncapped; Power lines, fences and trenches; Noise, light, dust and vibrations associated with blasting and drilling activities; and Inappropriate waste management (Ecoscape, 2011c). <p>Ecoscape (2011a) assessed impacts to vertebrate fauna from the development and operation of the PIOP Stage 1 as moderate to low. Conservation significant fauna species habitat is predominantly on the slopes and in the gorges of the PIOP Stage 1, i.e. outside the valley areas that constitute the main areas of disturbance associated with the development of the PIOP</p>	<p>The PIOP Stage 1 has the potential to directly impact troglofauna through the excavation of the proposed mine pits. The removal of the mineral rich ore lithologies (i.e. DID, CID, and BID) which has been identified as troglofauna habitat is likely to impact upon restricted troglofauna species (Bennelongia, 2011).</p> <p>The potential impacts to troglofauna are discussed in Section 6.5.3 of the Environmental Review document.</p> <p>Mining activities that may potentially result in an indirect loss of subterranean fauna habitat include:</p> <ul style="list-style-type: none"> De-watering below troglofauna habitat may alter subterranean humidity and therefore the quality of troglofauna habitat; A localised reduction in rainfall recharge and associated entry of dissolved organic matter and nutrients as overburden stockpiles prevent the infiltration of runoff; Percussion from blasting may have indirect effects through altering underground structure (i.e. rock fragmentation and collapse of voids). Any effects of blasting are likely to dissipate rapidly with distance from the pits and are not considered to be a significant risk to troglofauna outside the proposed pits; and Rock break up and soil 	<p>The PIOP Stage 1 has the potential to directly impact stygofauna through the dewatering of on tenement aquifers to prevent the flooding of the mine pits resulting in the loss of habitat (Bennelongia, 2011). The potential impacts to stygofauna are discussed in Section 6.6.3 of the Environmental Review document.</p>	<p>Although the majority of the mineable resource is above the groundwater table, the development of the PIOP Stage 1 has the potential to impact groundwater.</p> <p>The PIOP Stage 1 water requirements are 4 GL/yr over the life of the mine. It is planned to pump approximately 1.33 GL/yr from each of the Champion, Eagle and Delta deposits to make up the total water requirement, with any excess mine dewater returned to the aquifer off tenement in order to minimise potential drawdown impacts.</p> <p>A hydrogeological assessment (WorleyParsons, 2012) to assess the potential groundwater impacts on and off the tenement associated with the development of the PIOP Stage 1 is discussed in Section 6.7.3 and Appendix 3 of the Environmental Review document.</p>	<p>Overlooking the requirement to adequately plan for the rehabilitation and closure of the PIOP Stage 1 could lead to ongoing environmental impacts. The potential impacts of rehabilitation and mine closure are discussed in Section 6.8.3 of the Environmental Review document.</p>



Declared Priority Flora	Threatened Ecological Communities (TECs)	Groundwater Dependent Ecosystems	Conservation Significant Fauna	Troglofauna	Stygofauna	Groundwater	Rehabilitation and mine closure
(Ecoscape, 2011b).		Given the limited extent to which the area of drawdown overlaps the mapped area of GDEs shown on Figure 26 in the Environmental Review document, the potential impact to GDEs is considered to be small in a regional context.	Stage 1.	disturbance during and after mining operations may affect the quality of the aquifer recharge; and <ul style="list-style-type: none"> Contamination of groundwater by hydrocarbons is likely to be localised (Bennelongia, 2011). 			
Section D: Mitigation measures (describe all measures to Avoid, Minimise, Rectify and Reduce)							
The general vegetation and flora management strategies for the PIOP Stage 1 are discussed in Section 6.1.4 of the Environmental Review.	No specific management actions are required for TECs as none were recorded on or adjacent to the PIOP Stage 1.	The general GDE management strategies are discussed in Section 6.3.4 of the Environmental Review document.	The general management strategies for conservation significant fauna are discussed in detail in Section 6.4.4 of the Environmental Review document.	The general troglofauna management strategies are discussed in Section 6.5.4 of the Environmental Review document.	The general stygofauna management strategies are discussed in Section 6.6.4 of the Environmental Review document.	The general groundwater management strategies for the PIOP Stage 1 are discussed in Section 6.7.4 of the Environmental Review document.	The general rehabilitation and mine closure management strategies for the PIOP Stage 1 are discussed in Section 6.8.4 of the Environmental Review document.
Section E: Significant residual impacts (describe all the significant adverse residual impacts that remain after all mitigation attempts have been exhausted)							
The preferred habitat of the Priority Listed Flora is not considered to be associated with the targeted ore bodies. It is considered unlikely that the development of the PIOP Stage 1 will have a significant impact on the Priority Listed Flora species. The identified management measures that will be implemented further reduce any potential impacts. Therefore, it is considered unlikely that there would be significant residual adverse impacts on Declared Priority Flora.	Not Applicable given no TECs were recorded on or adjacent to the PIOP Stage 1.	The potential impacts to GDEs are not considered to be significant in a local or regional context. The conceptual hydrogeological model (refer to Section 6.7 of the Environmental Review document) suggests that it is likely the vegetation is making use of perched groundwater and is not connected to the deeper confined aquifer. It is anticipated that the EPA objective for flora, including GDEs, will be met. Therefore, it is considered unlikely that there would be significant residual adverse impacts on GDEs.	Potential impacts to conservation significant fauna species are likely to be limited to the loss of habitat and some habitat fragmentation at a local scale. The study area is not considered to be necessary for the ongoing maintenance of any species. It is likely that the development of the PIOP Stage 1 will not have a significant impact on any conservation significant fauna species which may be present in the region. Progressive rehabilitation of disturbed areas, not required for ongoing operations, will lead to the re-establishment of fauna habitat. Therefore, it is considered unlikely that there would be significant residual adverse impacts on conservation significant fauna.	The troglofauna habitat characterisation provides good evidence to support the proposition that the proposed mine pits do not represent isolated troglofauna habitats. Based on the sampling it seems likely that the troglofauna habitat is not restricted to the mine pits in the valley floors and that the ranges of most species extend onto the ridges. It is considered likely that the development and operation of the PIOP Stage 1 will not have a significant impact on troglofauna. Therefore, it is considered unlikely that there would be significant residual adverse impacts on troglofauna.	The stygofauna habitat characterisation provides good evidence to support the proposition that the dewatering at Blacksmith tenement does not encompass an aquifer that is isolated to the Blacksmith tenement or the zone of dewatering. In fact, the aquifers and stygofauna habitat at Blacksmith tenement are part of the wider groundwater systems of the Weelumurra and Caliwingina creeks. It is considered likely that the development and operation of the PIOP Stage 1 will not have a significant impact on stygofauna. Therefore, it is considered unlikely that there would be significant residual adverse impacts on stygofauna.	With the implementation of groundwater management measures, including the return of excess dewater, of suitable quality, to the aquifer off-tenement the potential drawdown impacts will be minimised. FMS will undertake ongoing groundwater monitoring. Therefore, it is considered unlikely that there would be significant residual adverse impacts on groundwater.	Adhering to the closure planning process, including ongoing consultation with relevant stakeholders, will ensure that successful and achievable completion criteria are set. Therefore, it is considered unlikely that there would be significant residual adverse impacts associated with rehabilitation and mine closure.



Section F: Proposed offsets for each significant residual impact (identify direct and contributing offsets). Include a description of the land tenure and zoning / reservation status of the proposed offset site. Identify any encumbrances or other restrictions on the land that may impact the implementation of the proposed offset and provide evidence demonstrating how these issues have been resolved.
Not applicable
Section G: Spatial data relating to offset site/s (see <i>EPA Guidance Statement No. 19: environmental offsets- biodiversity, Appendix 4</i>)
Not applicable
Section H: Relevant data sources and evidence of consultation (consultation with agencies, relevant stakeholders, community and references to sources of data / information). Include details of specific environmental, technical or other relevant advice and information obtained to assist in the formulation of the offset.
Not applicable