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# Executive Summary

## *The Project*

Midwest Corporation Limited (Midwest) proposes the Koolanooka/Blue Hills Direct Shipping Iron Ore (DSO) Mining Project (the Project). The Koolanooka mine site is located approximately 160 km south east of Geraldton and 21 km east of Morawa, and the Blue Hills mine site is located 60 km to the east of Koolanooka, Figure 1-1.

The Project involves the recommencement of open pit mining activities at Koolanooka, with similar activities commencing 1.5 years into the project at the Mungada East and Mungada West pits at Blue Hills. This work will involve a maximum of five mining campaigns during the project. These three mines were previously operated by the Geraldton Operations Joint Venture (GOJV) from 1966–1972 as Australia’s first export iron ore operations. Most work will be conducted in existing disturbed areas.

Midwest is currently exporting previously mined material from stockpiles at Koolanooka at the rate of 1.0 Mtpa, through the port of Geraldton. The operational workforce of approximately 50 resides in Morawa and Geraldton, providing a significant economic benefit to the region.

Approval of the Project will allow the continuation and expansion of these regional benefits.

The Project involves:

- A minor extension to the south east of the existing open pit at Koolanooka to access haematite iron ore.
- Cutback and deepening of the existing open pits at Mungada East and Mungada West to access haematite iron ore.
- Reopening of the existing haul road between Koolanooka and Blue Hills to allow the transportation in road trains of ore from the Mungada pits to Koolanooka for processing.
- Stockpiling of mined ore at Koolanooka on existing disturbed areas.
- Installation of a crushing and screening plant at Koolanooka (with relocation to Blue Hills 1.5 years into the project life) to blend and process the ore into lump and fine products at the combined rate of up to 2 Mtpa.
- Establishment of infrastructure at Koolanooka and Blue Hills, including an office, two workshops, warehouse and magazine buildings, power, water supply and communications, and an accommodation facility at old Karara Homestead.

Iron ore from the existing operations is currently transported by road to Geraldton. Transition of this transport task from road to rail is well advanced. It is anticipated that from late 2008 onwards, iron ore will be transported 20 km by road to a rail siding at Tilley siding north of Morawa and then loaded onto trains for railing to the Geraldton Port. There the ore will be stockpiled in the existing covered storage facility then loaded onto ships for

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export. The Koolanooka/Blue Hills DSO Mining Project is expected to run for up to 5 years, with development scheduled to commence in the second quarter of 2009.

This Public Environmental Review (PER) has been developed by the Midwest Corporation in order to fulfil submission requirements of the Western Australian environmental approvals process.

The implementation of the proposed Project is dependent on successful resolution of any associated issues, through effective application and assessment of environmental approval processes. Baseline surveys and investigations for environmental aspects of the Project are currently being conducted, with management plans for significant aspects of the project to be developed in compliance with regulatory guidelines. Ongoing consultation with regulators, relevant stakeholders and interested members of the public is also being undertaken to incorporate community concerns as part of the assessment process.

The works proposed with this Project will be largely conducted within existing pits and previously disturbed areas. The Project has been designed to minimise environmental impacts and as such all haul roads, waste dumps, ore stockpiles and most infrastructure will be located on previously disturbed land that will require minimal clearance activity. The extension to the south east of the existing open pit at Koolanooka will require the disturbance of 4.46 ha within the Koolanooka System Threatened Ecological Community (TEC), and work at Blue Hills will involve 40.8 ha of vegetation clearance in a proposed conservation reserve. Of the 4.46 ha of TEC disturbance required, it has been calculated that only 2.68 ha will actually involve clearance of vegetation, as a significant portion of the nominated area has already been disturbed by previously approved exploration activities, as demonstrated in Figure 6-13.

The project will require the creation of four waste rock dumps totalling 6.152 million m<sup>3</sup> of waste rock material. This will be comprised of waste rock generated from mining at Koolanooka (1.62M m<sup>3</sup>), Mungada East (2.33M m<sup>3</sup>) and Mungada West (2.2M m<sup>3</sup>)

Potential impacts in implementing the Project include disturbance to flora and fauna, heritage sites, the generation of dust and gases, alteration of visual amenity and social factors, noise and vibration issues, waste material control and influence on surface and ground water bodies. This PER discusses these issues and additionally highlights decommissioning and rehabilitation commitments and discusses issues such as principles of sustainability.

Midwest is aware of other proposed mining operations which if approved will be developed in close proximity to the Midwest operations in the Blue Hills area. Due to significant variations in project timelines of the proposed surrounding developments, Midwest is unable to reasonably assess the cumulative impacts of combined regional developments. Midwest feels that sufficient information is provided in this PER to enable the EPA to conduct their own cumulative impacts assessment on the combined impacts of the proposed projects.

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## **Existing Environment**

The Koolanooka study area is located within the Avon-Wheatbelt Bioregion of Australia (Thackaway and Cresswell, 1995), in relatively close proximity to the intersection of the South-Western and Eremaean Botanical Provinces of Western Australia. The study area is located within the Perenjori Botanical District (Beard, 1976c).

The Blue Hills area occurs within the Yalgoo Bioregion on the boundary between the Austin Botanical District of the Eremaean Botanical Province and the Avon Botanical District of the South-Western Botanical Province (Beard, 1990).

### **Physical Environment**

The Koolanooka mine site is at the north-western end of Koolanooka Hills which rise approximately 140 m above the surrounding undulating plain striking north north-west to south south-east for 13 km. These hills are composed of banded iron formations (BIF).

The Blue Hills range also consists of BIF: the ridge line is known as the Windaning Ridge. Dips are generally steep and where the BIF outcrops the topography is often rugged.

The regional area has low topography, with elevations being generally between 250 and 400 m Australian Height Datum (AHD). Prominent ridges such as Koolanooka Hills attain 450 m AHD; highest elevations exceeding 500 m AHD occur in the eastern sector, e.g. at Blue Hills and Mount Mulgine.

Drainage is mainly weak and low-gradient, predominantly to the Mongers Lake palaeodrainage system which passes a few kilometres to the north of Koolanooka Hills and includes the Yarra Yarra Lakes to the west of Carnamah (Rockwater, 2004b).

Koolanooka Spring, an ephemeral creek line is located to the south-east of the Koolanooka pit but to the west of the Mungada pits between two granite hills, draining northwards. Within the Blue Hills region is a Gilgai system located approximately 700 m due south of the Mungada East pit.

### **Vegetation and Flora**

The vegetation associated with the Koolanooka System is described as consisting of several vegetation types (Beard, 1976): Open woodland of Sheoak; Mallee *Eucalyptus ebbanoensis*, *Acacia acuminata* and *Dodonaea inaequifolia* interspaced with thickets of *Allocasuarina campestris*; *Acacia acuminata* thicket with *Grevillea stenostachya*, *Melaleuca cordata*, *M. nematophylla* and *M. radula*; *Eucalyptus loxophleba* (York Gum) woodland interspaced with the same thicket, which forms the vegetation pattern on the foot slopes of Koolanooka Hills, while the granite outcrops support mixed *Acacia* spp. (*A. tetragonophylla*, *A. quadrimarginea* and *A. ramulosa*) (Beard, 1976).

The plant assemblages of the Koolanooka System have been defined as a Threatened Ecological Community (TEC). The vegetation of these areas is dominated by Sheoak and mixed shrub land of *Allocasuarina campestris* (hilltops) and *Acacia exocaroides* (on granite). The zone of impact at Koolanooka Hills falls within the mapped areas for the

TEC, and makes up a small proportion of this. The Koolanooka Hills TEC covers two areas totalling 5444 ha. The Koolanooka Hills area is 3496 ha and the Perenjori Hills area 1948 ha.

The Blue Hills area falls within the Yalgoo sub-region. The major vegetation types of this sub-region include:

- heath on granite outcrops (*Borya*, *Thryptomene*, *Baeckea* and *Calycopeplus*);
- acacia scrub (*Acacia acuminata*, *A. ramulosa* and *A. quadrimarginea*);
- acacia-Melaleuca thicket (*Acacia ramulosa*, *A. acuminata*, *Melaleuca uncinata* with variations including *M. nematophylla*);
- scrub with scattered trees (*Acacia ramulosa*, *A. acuminata*, *Hakea preissii*, *Eucalyptus loxophleba*, *E. oleosa*, *Callitris columellaris*, *Bursaria spinosa* and *A. aneura*) and;
- salt flats surrounded by samphire (*Halosarcia* spp., teatree e.g. *Melaleuca* / *Leptospermum*, and *Acacia-Eremophila* scrub).

One Declared Rare Flora (DRF) taxa, *Acacia woodmaniorum*, protected under the Western Australian *Wildlife Conservation Act 1950*, has been recorded in the zone of impact at Blue Hills during the surveys.

No priority flora were recorded within the areas surveyed at Koolanooka. However, the record of the taxon *Acacia sclerosperma* subsp. *sclerosperma* is of interest, as this represents a southerly range extension from its previously known distribution.

Three species of conservation significance were recorded at the Mungada East and Mungada West proposal impact areas. These taxa are *Micromyrtus acuta* (P1), *Micromyrtus trudgenii* (P3) and *Persoonia pentasticha* (P3).

No rare or priority flora have been recorded within the existing Mungada Haul road footprint that is proposed to be reinstated.

### ***Fauna***

Two species of Commonwealth conservational significance have been recorded within the Koolanooka or Blue Hills regions. These are the Malleefowl (*Leipoa ocellata*) from Koolanooka, Blue Hills and haul road and the Western Spiny-tailed Skink (*Egernia stokesii badia*) from Koolanooka.

Three scheduled species, as listed under the *WA Wildlife Conservation Act 1950*, were recorded at Koolanooka: Malleefowl (*Leipoa ocellata*), Gilled Slender Blue-tongue (*Cyclodomorphus branchialis*) and the Western Spiny-tailed Skink (*Egernia stokesii badia*).

Four scheduled species were recorded at Blue Hills: Malleefowl (*Leipoa ocellata*); Peregrine Falcon (*Falco peregrinus*); Major Mitchell's Cockatoo (*Cacatua leadbeateri*); and Gilled Slender Blue-tongue (*Cyclodomorphus branchialis*).

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Two scheduled species were recorded along the Mt Karara/Mungada haul road: Malleefowl (*Leipoa ocellata*); and; Major Mitchell's Cockatoo (*Cacatua leadbeateri*).

A number of migratory species listed under the Environment Protection and Biodiversity Act (EPBC) 1999 were observed within the Blue Hills and Koolanooka regions, with eight species of migratory conservation significance recorded within the Blue Hills region and 12 species recorded within the Koolanooka region.

Sampling for stygofauna at the existing Koolanooka borefield and in surrounding regional bores yielded only two cosmopolitan copepod stygofauna specimens.

Four phases of troglifauna surveying were conducted for this project. A single troglobitic spider (Family Gnaphosidae) was collected during the survey from outside the TEC cutback impact area and is expected to occur along the entire Koolanooka Range. No additional troglobitic species were recorded.

### ***Heritage***

The Aboriginal groups consulted regarding the proposed project are the Widi Mob, Pandawn Descendants, Yamatji Marpla Barna Baaba Aboriginal Corporation and the Amangu Mob.

Two sites of Aboriginal heritage significance have been recorded within the Koolanooka Hills project impact area (DIA 4496 and DIA 5868). Approval to disturb DIA 4496 has been obtained under Section 18 of the *Aboriginal Heritage Act 1972* (ref 0321145). It has been determined that DIA 5868 is actually a duplicate of DIA 4496.

Two other sites of Aboriginal heritage significance are found within the local area (DIA 20817 and DIA 20816). Should Midwest's project activities call for these sites to be disturbed a full approval for this work will be obtained through Section 18 of the *Aboriginal Heritage Act, 1972* prior to any disturbance.

At Blue Hills, three sites of Aboriginal heritage significance have been recorded near the East Mungada pit; Blue Hills Larger Cave (site ID 20857); Blue Hills Smaller Cave (site ID 20858) and Granite Pavement with rockhole (site ID 20860). If disturbance is required to any of these caves full approval will be gained via a Section 18 approval prior to disturbance.

Lastly, during the reinstatement of the Mt Karara haul road, several heritage sites bordering this location will remain undisturbed as the haul road reinstatement will only involve clearance of up to 3 m in width of predisturbed area on either side of the present road. If disturbance is required to these sites at a later date, full approval will be gained via a Section 18 approval prior to disturbance.

**Table S1 Key Characteristics of the Koolanooka / Blue Hills DSO Project (EPA Assessment No. 1653)**

<b>Key Aspect</b>	<b>Description</b>
<b>Mining Operations</b>	
Proposed operation commencement	Second Quarter 2009
Project life span	Estimated to be 5 years
Anticipated year of decommissioning	2011-2013
Proposed mine locations	Koolanooka and Blue Hills
Size of ore body	3Mt at Koolanooka, 5.5 Mt at Blue Hills
Ore type	Tightly folded sub vertical haematitic banded ironstone
Ore mining rate	Up to 2 Mtpa
Overburden mining rate	Average 1.7 Mtpa
Total estimated production (processed ore)	1.940 M m <sup>3</sup>
Overall stripping ratio (overburden:ore) m <sup>3</sup>	2.35: 1 waste:ore
<b>Koolanooka mine pits</b>	
Depth of new sections	350 m AHD
Depth of water table	Approximately 255 m AHD.
Overburden Stockpiles	External dump volume: 1.622 M m <sup>3</sup> in addition to existing dump areas
Topsoil Stockpiles	Where required, but will be stockpiled within waste dump areas as indicated with this PER
Area of new clearing Koolanooka	2.68 ha, with an additional 3.14 ha being impacted within the dust buffer zone area of potential influence.
Area of predisturbed land Koolanooka	38.2 ha (26 ha for west waste dump, 6.6 ha for south waste dump, 5.6 ha for infrastructure)
<b>Mungada East pit details</b>	
Depth of new section	350 m RL AHD. Mining will not proceed below the level of the water table without further approval
Depth of water table	332-337m RL AHD
Overburden Stockpiles	External dump volume: 2.33 M m <sup>3</sup>
<b>Mungada West pit details</b>	
Depth of new section	355 m RL AHD. Mining will not proceed below the level of the water table without further approval.
Depth of water table	333-334 m RL
Overburden Stockpiles	External dump volume: 2.2 M m <sup>3</sup>
Topsoil Stockpiles	Where required, but will be stockpiled within waste dump areas as indicated with this PER
Area of new clearing Blue Hills	80.3 ha (39.5 ha of this is re-clearing of the regrowth edges of the Mt Karara / Mungada haul road)
Area of predisturbed land Blue Hills	11.7 ha (5.3 ha Mungada West, 6.4 ha Mungada East)
<b>Processing Requirements</b>	
Crushing & Screening	One new semi mobile crushing and screening plant, initially deployed at Koolanooka with relocation after 1.5 years to Blue Hills for the remainder of the project life. Processing capacity of 2 Mtpa rate.
Product characteristics	Average DSO quality threshold of 58% Fe
<b>Mine Site Infrastructure</b>	
Power source	Supplied by diesel generators
Anticipated power requirement	500-1000 kW
Water source	Dust suppression water for Koolanooka and Blue Hills will be sourced from the Koolanooka pit and local Koolanooka bores, water will be trucked from Koolanooka to Blue Hills where necessary. Fresh water will be pumped from a nearby aquifer to the north

Key Aspect	Description
	of the Koolanooka mine site but within Mining Lease M70/1014 and stored on site in a turkey's nest.
Anticipated water requirement	180 kl/day for dust suppression, first at Koolanooka then later at Blue Hills. Also an extra 1000 kl / day will be required for a one year period for the construction of the haul road, and 50 kl of potable water will be required for the combined operation per week.
Anticipated annual water requirement	146.0 Ml pa for dust suppression at Koolanooka then the Blue Hills operation, 365.0 Ml pa for the haul road redevelopment, and 2.6 Ml pa for potable water for the combined workforce.
Ancillary infrastructure	<ul style="list-style-type: none"> <li>• A 72 person accommodation facility is to be built at Old Karara Homestead;</li> <li>• A small workshop is to be developed both at Koolanooka and Blue Hills, which will include bulk diesel storage in double skinned tanks;</li> <li>• Portable offices, ablutions and a first aid facility are to be developed at both locations; and</li> <li>• Secure explosives magazines at both sites.</li> </ul>
Total estimated area of new clearing	82.98 ha, of which: <ul style="list-style-type: none"> <li>• 2.68 ha is from a TEC* at Koolanooka;</li> <li>• 40.8 ha in the Blue Hills locality; and</li> <li>• 39.5 ha of regrowth on the Mt Karara / Mungada Haul road</li> </ul> With an additional 3.14 ha at Koolanooka TEC being within the buffer zone, potential area of influence of dust impacts.
Total estimated area of pre-disturbed land to be used	49.9 ha, of which: <ul style="list-style-type: none"> <li>• 38.2 ha covers waste dumps and infrastructure locations at Koolanooka</li> <li>• 11.7 ha in the Blue Hills area covering infrastructure and pit expansion areas.</li> </ul>

\* TEC = Threatened Ecological Community

Project Characteristics Table Key:

PER - Public Environmental Review	DSO - Direct Shipping Ore
AHD - Australian Height Datum	mm - millimetre
Gl - Gigalitre	Mbcm - Million bank cubic metres
GWh - Giga Watt hour	Mt - Million tonnes
ha - hectares	pa - per annum
km - kilometre	RL - Reduced level
m - metre	t - tonne
Ml - megalitrew	Kl - kilolitres

## Potential Impacts and Proposed Management Strategies

**Table S2 Key Environmental Factors, Project Impacts and Proposed Management for the DSO Project**

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
Ecosystem Integrity and Ecological Sustainability	<ul style="list-style-type: none"> <li>Vegetation clearing for mine site</li> </ul>	<ul style="list-style-type: none"> <li>Maintain the integrity, ecological function and environmental factors associated with the Morawa area.</li> <li>Ensure, as far as practicable, that the Project meets or is consistent with the sustainability principles in the National Strategy for Ecologically Sustainable Development (Commonwealth 1993)</li> </ul>	<ul style="list-style-type: none"> <li>National Strategy for Ecologically Sustainable Development (Commonwealth, 1993).</li> <li>Position Statement No. 6 Towards Sustainability (EPA, 2004).</li> <li>Guidance Statement No. 55 Implementing Best Practice in Proposals submitted to the EIA Process (EPA, 2003)</li> </ul>	<ul style="list-style-type: none"> <li>Changes to wider ecosystem function.</li> <li>Loss of habitat</li> <li>Inadequate design and management of the Project could result in unacceptable environmental, economic and social impacts. Conversely, economic constraints need to be taken into account in the protection of the environment and social values.</li> </ul>	<ul style="list-style-type: none"> <li>The Project design and management will be developed along the sustainability principles outlined in the National Strategy for Ecologically Sustainable Development (Commonwealth 1993).</li> <li>Rehabilitation of disturbed areas to best suit future land use.</li> <li>Stakeholders will be consulted and engaged in identifying and managing issues of significance.</li> </ul>	<ul style="list-style-type: none"> <li>An ecologically sustainable operation.</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>The Project is within the Avon-Wheatbelt and Yalgoo Bioregions.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid adverse impacts on biological diversity, comprising flora and fauna and the ecosystems they form, at the levels of genetic, species, and ecosystem diversity.</li> </ul>	<ul style="list-style-type: none"> <li>Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002).</li> </ul>	<ul style="list-style-type: none"> <li>Significant species, communities or habitats could occur within the Project footprint and be impacted by land clearing, construction or operational activities.</li> </ul>	<ul style="list-style-type: none"> <li>Significant habitats and flora and fauna of conservation significance will be identified and avoided where possible, and/or management strategies implemented to ensure that the conservation status of the communities and species is not materially affected.</li> <li>Rehabilitation of disturbed areas to best suit future land use.</li> </ul>	<ul style="list-style-type: none"> <li>No significant loss of biodiversity.</li> </ul>

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
Vegetation and Flora	<ul style="list-style-type: none"> <li>Clearing for mine site and transport routes.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.</li> <li>Minimise the loss and adverse impacts to native vegetation and plant habitats.</li> <li>Protect Priority Flora species that occur within the proposal area.</li> </ul>	<ul style="list-style-type: none"> <li>EPA Position Statement No. 2 Environmental Protection of Native Vegetation in WA (EPA, 2000).</li> <li>EPA Position Statement No. 3. Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002).</li> <li>EPA Position Statement No. 9 Environmental Offsets (EPA, 2006).</li> <li>EPA Guidance Statement No. 51. Terrestrial Flora and Vegetation Surveys Environmental Impact Assessment in WA (EPA, 2004).</li> <li>CALM Policy Statement No 9, Conserving Threatened Species and Ecological Communities (CALM, 1999).</li> </ul>	<ul style="list-style-type: none"> <li>Clearing of native vegetation.</li> <li>Disturbance to 4.46 ha and clearing of 2.68ha of the Koolanooka Threatened Ecological Community. 6.26 ha of disturbed land currently exists on Midwest tenements in the Koolanooka TEC due to previous exploration activities and access impacts. This represents 0.13% of the total TEC area at Koolanooka. Proposed Project clearing in the Koolanooka TEC (2.68ha) will represent 0.04 % of the remaining TEC area.</li> <li>Exacerbation of the current Ruby Dock (<i>Acetosa vesicaria</i>) and Patterson's Curse (<i>Echium plantagineum</i>) condition and spread of the infestation into other areas.</li> <li>Impact to DRF <i>Acacia woodmaniorum</i> with removal of 84 specimens of at Mungada East and 432 specimens at Mungada East. Total impact of 516 specimens represents an impact approx 0.65% of the total species population.</li> <li>Disturbance to 3 priority flora species at Blue Hills, <i>Micromyrtus acuta</i> (P1) 14 specimens, <i>Micromyrtus trudgenii</i> (P3) approx 1,000 specimens 0.14%, and <i>Persoonia pentasticha</i> (P3) 11 specimens.</li> <li>No rare or priority flora will be impacted at Koolanooka or along the Mungada Haul Road.</li> </ul>	<p>Vegetation Clearing</p> <ul style="list-style-type: none"> <li>Although initial mine plans only include clearing in mine pit expansion areas, careful mine site planning may allow for avoidance, minimization and / or offset impacts from required clearing of flora and vegetation, including impacts to flora of conservation interest.</li> <li>Midwest is committed to addressing the key principals of native vegetation protection as listed in Schedule 5 of the Environmental Protection Act 1986. This will be addressed as part of flora surveys and in the Project Environmental Management System (EMS) and Environmental Management Plan (EMP).</li> <li>Rare flora baseline surveys have been undertaken for all disturbance areas and locations of any Priority Flora taxa have been incorporated into an Environmental Geographical Information System (GIS) and plotted onto maps.</li> <li>Impact to priority flora or of flora of conservation significance will be avoided by using information from flora surveys conducted in the area.</li> <li>Prior to commencement of works, areas to be disturbed will be demarcated in the field by a reference to design/site plans. This will constitute a hold point requiring written approval from the Site Manager prior to disturbance.</li> <li>Liaison with the Department of Environment and Conservation (DEC) will occur regarding the management of priority and significant flora.</li> <li>Where appropriate Midwest will prepare and implementing a Threatened Flora Management and Conservation Plan for the Project area to address management of threatened flora impacted by the proposed development.</li> <li>A two strand wire fence will be erected adjacent the south fold cutback at Koolanooka to restrict access into the Threatened Ecological Community. This fence will be constructed to prevent accidental penetration into the area and will be adequately signposted with warning signs to not</li> </ul>	<ul style="list-style-type: none"> <li>Clearing of 2.68ha of the TEC at Koolanooka</li> <li>One DRF species <i>Acacia woodmaniorum</i> will be impacted, loss of 0.65% of total population due to pit excavation.</li> <li>Three priority flora species recorded at Mungada East and West at Blue Hills will be impacted upon, all very low % impact.</li> <li>No rare or priority flora will be impacted at Koolanooka or along the Mungada Haul Road.</li> <li>With appropriate management as detailed in the EMP, identified priority weed species Patterson's Curse (<i>Echium plantagineum</i>) and Ruby Dock (<i>Acetosa vesicaria</i>) and will not spread into unaffected areas.</li> </ul>

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<p>impact the area beyond the fence.</p> <ul style="list-style-type: none"> <li>• Topsoil and vegetation from all clearance activity will be separately stockpiled in dedicated stockpile areas, with controlled clearance practices concerning soil removal and stockpiling in place.</li> <li>• If required for conservation species preservation, designated “no-entry” sites will be incorporated into a site / project map and communicated to project personnel.</li> <li>• Personnel will be provided with training and tools to assist in their general awareness and understanding of species of conservation significance and in the importance of minimising vegetation clearing and disturbance.</li> <li>• Environmental offsets for necessary clearing of flora and/or vegetation of significance will be investigated and implemented in consultation with stakeholders as discussed in Section 3.</li> <li>• Vehicles and machinery will only use designated tracks/roads: existing roads and tracks will be used in preference to clearing new areas.</li> <li>• Where practicable on tracks, raised blade disturbance will be conducted to minimise vegetation removal.</li> <li>• Vegetation when removed will either be directly placed on rehabilitation areas or mulched and stockpiled for use during later rehabilitation.</li> <li>• Vegetation will not be burnt without written approval of the Site Manager.</li> <li>• Rehabilitation will be undertaken as soon as practicable after land disturbance.</li> </ul> <p>Weeds</p> <ul style="list-style-type: none"> <li>• Weed dispersal will be controlled through establishment of weed hygiene procedures, and with staff being trained on the presence of established weeds within the Project areas, and within the local area.</li> <li>• As Patterson’s Curse (<i>Echium plantagineum</i>) is a Priority</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<p>1 listed weed under the ARR Act 1976, Midwest is required to remove and manage the weed during the life of the mine from the areas disturbed due to mining activities. This can be done with appropriate management controls as outlined in the EMP, such as use of appropriate herbicides including Chlorsulfuron, Metsulfuron methyl, Logran® and Glyphosate + 2,4-D ester.</p> <ul style="list-style-type: none"> <li>Where practicable, the appropriate herbicide will be applied once Ruby Dock (<i>*Acetosa vesicaria</i>) is in full foliage and actively growing, and before it sets seed.</li> <li>If required for management of weed dispersal, designated “no-entry” sites will be incorporated into a site / project map and communicated to project personnel.</li> </ul>	
Fauna	<ul style="list-style-type: none"> <li>Vegetation clearing for the mine site, crushing and screening plant and associated infrastructure.</li> <li>Mine site operation and closure.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.</li> <li>Minimise the impact to fauna.</li> </ul>	<ul style="list-style-type: none"> <li>EPA Position Statement No. 3. Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002).</li> <li>EPA Guidance Statement No. 56. Terrestrial Fauna Surveys for Environmental Impact Assessment in WA (EPA, 2004)</li> </ul>	<ul style="list-style-type: none"> <li>Loss and degradation of fauna habitat and disturbance to fauna activity patterns through the removal of previously undisturbed and re-growth vegetation.</li> <li>Species of native fauna of conservation significance have been recorded in the Koolanooka, Blue Hills and the haul road areas: Malleefowl (<i>Leipoa ocellata</i>) (a Schedule 1 species under the <i>Wildlife Conservation Act</i> and as Vulnerable and a Migratory species under the <i>Environmental Protection and Biodiversity Conservation Act, 1999</i>); and the Western Spiny-tailed Skink (<i>Egernia stokesii badia</i>) ( a Schedule 1 species under the <i>Wildlife Conservation Act 1950</i> and as Endangered under the <i>Environment Protection and Biodiversity Conservation Act, 1999</i>).</li> <li>Three threatening processes were identified as potential impacts arising from the development on invertebrate fauna. With respect to vegetation clearing four impacts were identified, all of which were associated with the</li> </ul>	<p>Vertebrate Fauna</p> <ul style="list-style-type: none"> <li>Impacts to fauna from vegetation clearing will be minimised by reducing the clearing footprint where possible and conducting staged clearing.</li> <li>Measures to limit the extent of vegetation clearing will occur e.g. marking clearing limits.</li> <li>Disturbed areas will be rehabilitated as soon as possible, with ongoing rehabilitation throughout the mine life to facilitate habitat restoration.</li> <li>Rare fauna baseline surveys have been conducted for all disturbance areas and locations of any fauna of conservation significance will be incorporated into an Environmental Geographical Information System (GIS) and plotted onto maps.</li> <li>Efforts to avoid impact to individuals and habitats of fauna of conservation significance will be undertaken by using information from fauna surveys conducted in the area.</li> <li>Liaison with DEC regarding the management of fauna of conservation significance.</li> <li>Implement operational control procedures, site inductions and employee training programs to protect native fauna from intentional harm, and to appropriately manage injured</li> </ul>	<ul style="list-style-type: none"> <li>Being reasonably common in the Blue Hills area, Malleefowl (<i>Leipoa ocellata</i>) may be impacted by the proposed development.</li> <li>It is not expected that implementation of the project will result in significant impact to Short Range Endemic (SRE) species, however a number of potential risks have been identified, as listed in Section 8.2.3.2.</li> <li>Impacts to stygofauna from the Project activities are likely to be minimal, according to current survey</li> </ul>

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				<p>removal of SRE invertebrate fauna habitat. In all four cases, with the implementation of the suggested controls, the residual risk was calculated to be low.</p> <ul style="list-style-type: none"> <li>Similarly the increased risk of dust arising from the proposal could potentially result in damage to SRE fauna habitat via vegetation decline, the implementation of the suggested controls reduces the residual risk to low.</li> <li>Lastly, the increased risk of fire resulting in degradation of SRE fauna habitat is considered low, once the suggested controls are implemented.</li> <li>One specimen of a previously unidentified troglobitic spider was found during troglobitic sampling carried out at Koolanooka and Blue Hills.</li> <li>Two cosmopolitan copepod specimens have been identified during the Project stygofauna sampling program conducted at Koolanooka borefield. No significant impact is anticipated.</li> </ul>	<p>fauna if found.</p> <ul style="list-style-type: none"> <li>Wildfire from accidental ignition will be avoided as far as is possible.</li> <li>Midwest will investigate installing high pitched whistles on the front of road trains working the Blue Hills haul road, in an attempt to scare away fauna and reduce fauna road kills.</li> <li>Dead trees will be regarded as valuable habitat and will be protected. Collection of firewood from the area will be prohibited.</li> <li>Rock hollows and overlays in the Blue Hills are important for some fauna and contain historically significant nests of stick-nest rats. Access to these caves by Project personnel will be controlled.</li> <li>Foundation holes, drill holes and trenches will be covered, fenced, banded or otherwise capped to prevent fauna entrapment. Where appropriate fauna egress matting will be installed.</li> <li>Holes and excavations will be inspected regularly for trapped fauna. Uninjured trapped fauna will be released by a competent person with the appropriate DEC permits.</li> <li>Native fauna will not be captured, taken, fed without the appropriate permits, or harmed.</li> <li>Domestic pets will not be allowed on the Project footprint.</li> <li>Feral animals in the area, having adverse impacts on native wildlife, will not be encouraged by site related refuse.</li> <li>Any death of fauna of conservational significance will be reported to DEC.</li> </ul> <p>In addition, to help protect Malleefowl, Midwest will:</p> <ul style="list-style-type: none"> <li>become a financial member of the Malleefowl Preservation Society;</li> <li>record sightings of nests both active and inactive;</li> <li>limit speeds on haul roads to 90 km /hr;</li> </ul>	<p>results, risk assessments and the lack of need for dewatering or newly developed bores.</p> <ul style="list-style-type: none"> <li>Impacts to troglofauna from DSO project activities are likely to be minimal, according to current survey results and risk assessments. However one currently unclassified species of significance, a spider, may potentially be impacted by project activities. It should be noted that this species has only been located outside of the proposed impact area at Koolanooka, and likely will exist along the entire Koolanooka range.</li> <li>Impact to troglofauna habitat on the Koolanooka Range will be limited to less than 0.05%.</li> </ul>

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					<ul style="list-style-type: none"> <li>install warning signs as necessary; and record sightings of birds in time/number/location.</li> </ul> <p>Short Range Endemics (SRE)</p> <p>The following management items will be implemented to mitigate impacts of the development on SRE fauna</p> <ul style="list-style-type: none"> <li>clearing will be restricted to that which is necessary. Clearing boundaries will be defined in the field.</li> <li>cleared areas will be rehabilitated as soon as practical, southern facing ridge slopes should be avoided where possible.</li> <li>dust suppression measures will be implemented, including management of road speed on unsealed roads.</li> <li>a fire prevention strategy will be implemented; and</li> <li>all vehicles will be fitted with fire extinguishers &amp; all personnel trained in their use.</li> </ul> <p>Stygofauna</p> <p>As only two cosmopolitan copepod specimens have been identified during the Project stygofauna sampling program conducted at Koolanooka borefield, and no new bores or dewatering will be required on the project, water abstraction activities related to exploration and proposed mining activities will likely not impact any stygofauna species or communities. However, if new bores do need to be developed at a later stage, then presence for stygofauna populations will be assessed before the new source is utilised on the project.</p> <p>Troglofauna</p> <p>Management of troglobitic species where found to be required, will be completed by a dedicated Troglofauna Management Plan to be developed by Midwest.</p>	
Surface and Groundwater Hydrology	<ul style="list-style-type: none"> <li>Mine site operation.</li> </ul>	<ul style="list-style-type: none"> <li>Minimise impacts to surface &amp; groundwater resources during</li> </ul>	<ul style="list-style-type: none"> <li>AS 3500: 1 - 2003 Plumbing and Drainage.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts on groundwater sources from drawdown are unlikely to present an issue on this project, as water demands Koolanooka and Blue Hills, will be met</li> </ul>	<p>If the water sources are brought into operation, a monitoring programme will be implemented for each water source. Each program will include monthly pumped volumes, monthly measurement of water levels from operating sources and</p>	<ul style="list-style-type: none"> <li>With appropriate management, the potential impacts of the project on</li> </ul>

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		<p>mining.</p> <ul style="list-style-type: none"> <li>Control and contain contaminated water on site to prevent entry into the natural drainage system and surrounding vegetation.</li> <li>Maintain the quality and quantity of surface &amp; groundwater so that existing and potential environmental values, including ecosystem maintenance, are protected.</li> <li>Maintain the integrity, ecological functions and environmental values of the adjacent Gilgai formation at Blue Hills.</li> </ul>	<ul style="list-style-type: none"> <li>Australian Drinking Water Guidelines (NHMRC, 2004).</li> <li>DoH (Draft) Guidelines for the Use of Recycled Water in Western Australia.</li> <li>Australian New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000).</li> <li>Environmental Water Provisions for Western Australia; Statewide Policy No. 5 (WRC, 2000).</li> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2005).</li> <li>Guidance No. 40 Management of Mosquitoes by Land Developers (EPA, 2000).</li> <li>Erosion and Sediment Control Guidelines (IEAust (Qld), 1996).</li> <li>NSW Department of Conservation and Land Management Urban Erosion and Sediment Control (NSW Department of Land and Water</li> </ul>	<p>through sustainable use of established, licensed bores and by the use of water from the Koolanooka pit. At Koolanooka, water sources are already being utilised on the Transportation of Stockpile of Fines project, and similar extraction rates will be required for the DSO proposal activities. Therefore this project is unlikely to cause a significantly larger level of drawdown effect than this area is currently experiencing under current licensing arrangements. This source water will also supply operations at Blue Hills where this is necessary, as water resources identified at Koolanooka (Rockwater, 2007) have been confirmed as being adequate to supply the needs of the full Midwest workforce, whether they are working at Koolanooka or Blue Hills. Water required at Blue Hills for dust suppression will be transported to the site by water truck.</p> <ul style="list-style-type: none"> <li>Midwest is the only landholder utilising these sources. With Midwest's compliance with all approval conditions, the likelihood of significant impacts to groundwater sources is considered low.</li> <li>There is a potential risk of contaminating surface and ground water from hydrocarbon and chemical handling and waste management practices at the mine site. With appropriate management however, the impacts are likely to be negligible.</li> </ul>	<p>non-operating bores, monthly water salinity and pH from operating sources, and an annual comprehensive analysis of the groundwater from each source. Additional management measures will include:</p> <ul style="list-style-type: none"> <li>Management of hydrocarbon, chemical and waste products on site will be directed by the commitments made in Section 8.8.6 of this PER and in applicable sections of the Project EMP, EMS and Conceptual Closure Plan.</li> <li>The EMP for construction and operation phases will provide detailed management commitments to minimise the risk of spills and contamination to groundwater, or the Gilgai formation. These commitments include the appropriate installation and use of structures such as vehicle wash down bays, waste hydrocarbon remediation facilities and oil water separators. The EMP will also detail effective measures in the response to contamination events and spillage emergencies.</li> <li>Pre-existing haul roads and access tracks will be used to minimise interference to natural drainage.</li> <li>Any new disturbance areas will be located to avoid existing drainage lines and designed for minimal impact on surface drainage as far as practicable.</li> <li>Drainage of the minor streams and drainage lines that the haul route crosses will be maintained with effective culverts and/or floodways. This aspect will be specifically considered when reshaping the Mt Karara / Mungada Haul Road.</li> <li>Existing culverts will be re-established where possible under roads, embankments and formations to allow free flow of drainage water and to assist in water shedding from the site.</li> <li>During high rainfall events the effect of stormwater discharge from the site will be controlled. Adequate drainage will be assured through site structures, stockpiles and roadways. This will negate the possibility of project enhanced flooding, erosion and sedimentation.</li> <li>Final placement of site waste rock and product stockpiles will consider stormwater flow and drainage in the local</li> </ul>	<p>surface and ground waters are likely to be negligible.</p> <ul style="list-style-type: none"> <li>Midwest aims to ensure there will be no net/long term adverse impact to surface or groundwater resources in the project area, or to other users and dependent environmental values.</li> </ul>

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			<p>Conservation, 1992).</p> <ul style="list-style-type: none"> <li>Position Statement No. 4. Environmental Protection of Wetlands (EPA, 2004).</li> </ul>		<p>area. In terms of physical water flow, the project will be implemented to have little impact on surface water runoff in the region, however if proven necessary, a sediment trap system will be incorporated into the site design.</p> <ul style="list-style-type: none"> <li>The support infrastructure will be designed to ensure the safe storage and handling of all hazardous and waste materials to prevent contamination to the environment.</li> <li>Landfill and overburden stockpiles will be constructed with sufficient surface to groundwater table distance (with considerations to the hydroconductivity of the geology) to minimise the potential for groundwater contamination.</li> <li>Appropriate design standards will be applied to allow for the provision of scour protection measures.</li> <li>Drainage areas will be suitably designed to minimise contamination of surface water.</li> <li>Cleared vegetation and topsoil will be stockpiled away from watercourses and in discrete stockpiles to avoid any interference to surface flows.</li> <li>Contaminated water from work areas will be kept separate from clean storm water.</li> <li>Water interfacing with work areas will be directed to oil water separators.</li> <li>Rate and volume of groundwater extraction will be in accordance with all licence conditions, including licence to take water # GWL159255(2) issued by the Department of Water for the period 11 July 2008 to 13 July 2013 (Appendix K).</li> <li>All other groundwater required will be utilised for dust suppression.</li> <li>Monitoring will be carried out as per water extraction licence conditions. All required water source points are all currently being utilised on the Transportation of Stockpiled Fines project, the drawdown effect created should not be different from the existing licences permit.</li> <li>If new bores are required to be installed at any area of the</li> </ul>	

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					Project, the required approvals and licences will be obtained from the Department of Water, and if necessary, modelling of the effect of use on groundwater flow.	
Dust and Particulates	<ul style="list-style-type: none"> <li>General construction activities e.g. blasting and earthworks.</li> <li>Mining operations such as pit excavation, overburden and waste handling.</li> <li>Vehicle traffic on access roads and haul roads.</li> <li>Crushing and screening processes.</li> </ul>	<p>The objectives for the management of dust emissions are to:</p> <ul style="list-style-type: none"> <li>Ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.</li> <li>Ensure that expected dust impacts to the Koolanooka TEC area are adequately defined through the nomination of a 50 m buffer zone area of influence.</li> <li>Minimise dust associated with the construction and operation of the mines.</li> <li>Minimise exposed surfaces through clearing minimisation, staged clearing and progressive</li> </ul>	<ul style="list-style-type: none"> <li>EPA Guidance Statement No. 18 Prevention of Air Quality Impacts from Land Development Sites (EPA, 2000);</li> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2005); and</li> <li>Air Quality and Air Pollution Modelling Guidance Notes (Department of Environmental Protection WA, 2000).</li> <li>NSW DEC (2005) Approved methods and guidance for the modelling and assessment of air pollutants in NSW. NSW Environment Protection Authority.</li> <li>EPA Victoria draft protocol (State Environmental Protection Policy (Air Quality Management) Draft Protocol for Environmental Management – Mining and Extractive Industries, EPA</li> </ul>	<p>Mine Sites</p> <ul style="list-style-type: none"> <li>All activities conducted during the construction and operation phases of the Project have the potential to generate dust. This includes activities such as clearing, mining, hauling, crushing, screening and stockpiling of the ore.</li> <li>Localised dust will be generated from the movement of vehicles at the mine sites and from handling of ore. The lay down and loading areas will be unsealed and subject to dusting when dry. The degree of dust generated will depend on the moisture content of the ground surface during ground disturbance and the climatic conditions.</li> <li>Dust will be generated during the construction period from the earthworks, stripping of the mine site, movement of vehicles and from exposed bare ground. Desktop dust modelling studies has simulated the effect of these activities (Sinclair Knight Mertz Engineering, 2006).</li> <li>The dust modelling undertaken by SKM, (2006) indicates that in general dust levels at Koolanooka should not become a significant issue. Residences surrounding these operations are many kilometres away and hence should experience little impact. The nearest residential premises to the mine which could be affected by site generated dust plumes is 5 km to the south and 3 km to the west. The property 3 km west of the mine site is leased to Midwest on a long</li> </ul>	<p>Midwest intends to keep dust to a minimum during construction and operation of the Koolanooka and Blue Hills mines. Dust management options are outlined below and in the Project EMP.</p> <p>Mine Site</p> <ul style="list-style-type: none"> <li>Midwest have committed to the use of water trucks to dampen operational surfaces as necessary and to conduct monitoring and auditing of impacts to the bordering TEC vegetation, as detailed in this PER and the EMP.</li> </ul> <p>During construction and operations activities, dust will be minimised by:</p> <ul style="list-style-type: none"> <li>using water sprays (where appropriate);</li> <li>using covered and skirted conveyors at ore transfer points;</li> <li>sealing of relevant joints and installation of a dust collection system;</li> <li>ensuring correct equipment design, operational procedures and adequate operator training occurs.</li> </ul> <p>The crushing and screening plant at Koolanooka will be fitted with dust suppression and extraction equipment features that may include but are not limited to:</p> <ul style="list-style-type: none"> <li>containment apparatus on conveyor transfer points;</li> <li>belt scrapers on the conveyor belt;</li> <li>collection trays under the belt plough on the return belt;</li> <li>dust suppression sprinklers at transfer points and stockpiles;</li> <li>deluge sprays at the ROM area and the hopper; and</li> <li>if any infrastructure is required to be moved from its original position once the Project is operational, then dust control equipment will be reinstalled and operated according to the original plant specifications.</li> </ul>	<ul style="list-style-type: none"> <li>The results of the model indicate that maximum concentrations of TSP likely to be deposited over the TEC will exceed the NSW DEC (2005) standard in some locations. It should be noted however, that concentrations at which vegetation is impacted by dust deposition (SKM, 2006) are not predicted to be exceeded. This will lead to no adverse impact to the TEC flora at Koolanooka or flora at Blue Hills.</li> </ul>

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		rehabilitation.	Victoria, 2006) <ul style="list-style-type: none"> <li>EPA Victoria draft protocol (State Environmental Protection Policy (Air Quality Management) Draft Protocol for Environmental Management – Mining and Extractive Industries, EPA Victoria, 2006)</li> </ul>	<p>term contract for use as exploration offices and the property 5km to the south of the mine is now owned by Midwest.</p> <ul style="list-style-type: none"> <li>The most sensitive receptor in the project area is the Koolanooka TEC. SKM's assessment indicates that this receptor should mostly experience impact below the NSW dust emission standard TSP levels (NSW DEC, 2005), and will be below levels which are recognised to cause a health impact to such vegetative species, as demonstrated in vegetative health studies (Doley, 2006).</li> <li>A further dust modelling report produced for a project in the Windaning Range indicated that dust emissions at Blue Hills were not likely to be a significant issue. The results of the modelling at Windaning Range indicated that the predicted PM10 concentrations resulting from operations would comply with project air quality goals, provided the specific operational controls recommended by the report were adhered to (Heggies, 2006). However in order to ensure that the DSO proposal impacts are adequately represented regarding the aspect of dust, Midwest nominates a 50 m buffer zone surrounding the TEC impact area that will be recognised as an impact area of influence.</li> <li>An Annual Progress Report on an integrated research program at Koolyanobbing, conducted for Portman Iron Ore Limited (Portman, 2007), clearly demonstrated some key characteristics of dust deposition behaviour over distance from mining</li> </ul>	<p>TEC Cutback</p> <ul style="list-style-type: none"> <li>The proponent nominates a dust buffer zone of 50 m in width surrounding the cutback disturbance as an area that will likely receive concentrated impact from blasting based dust. They will install dust monitoring equipment along the borders of this buffer zone, for the purposes of determining the actual deposition exhibited across the duration of activities at this site.</li> <li>Dust monitoring will also be carried out by Midwest with regard to the vegetative health of the TEC area through assessment of these static dust monitoring points and through surveying by qualified botanists. SKM dust modelling indicates that on most days this will not be a significant issue however, Midwest makes a commitment to halt operations during periods of extreme weather conditions.</li> <li>Midwest would like to highlight that in the proposed cutback area no priority flora has so far been recorded, and this combined with the observations by SKM on the potential for dust deposition impact to plant health being low, Midwest hold the view that any dust health impacts on surrounding vegetation are likely to be low. Additionally the actual area of impact to this vegetation community is small, given that the clearance area is 3.8 ha of the total TEC area of 3500 ha.</li> </ul> <p>Roads</p> <ul style="list-style-type: none"> <li>Munckton Road and part of the haul road on M70/1013 has been sealed to minimise dust issues generated by heavy haulage.</li> <li>Lignosulphate binders will be used to surface treat the haul road where necessary. An initial application will be carried out on necessary surfaces with a further application required after 4-6 months. The product to be utilised is PolyCom by Biocentral Laboratories, and technical details of this substance can be found detailed in Technical Appendix 13-6</li> <li>Water tankers will be used to moisten areas which have the potential to generate dust, including areas that receive</li> </ul>	

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				<p>activity. In an assessment on dust loads on individual plants in October 2006, dust loads were found to rapidly fade with distance, and that at a distance of 50 m (the proposed buffer width for the Midwest DSO PER) dust loads experienced were roughly halved from those adjacent to the actual impact area. When combined with observations by SKM, Midwest believes this demonstrates that the proposed buffer width of 50 m from the TEC cutback area is adequately sized, and dust impacts are unlikely to be a significant vegetative health issue at the point of impact.</p> <ul style="list-style-type: none"> <li>Also it should be highlighted that from further correspondence with Portman Iron Ore Limited, it has been observed that the combination of drought and dust impacts on vegetation in this region can amplify vegetative impacts, and that impact loads experienced will be heavily influenced by prevailing winds. Both of these elements will be taken into account when carrying out monitoring and daily mining operations.</li> </ul> <p>Roads</p> <ul style="list-style-type: none"> <li>Munckton Road and part of the haul road on M70/1013 have been sealed to minimise dust issues generated by heavy haulage. Lignosulphonate binders will be used on the haul road to minimise dust emissions.</li> </ul> <p>Dust Suppression</p> <ul style="list-style-type: none"> <li>If the Koolanooka pit waters are used for dust suppression they will be blended with bore water with the aim of providing a salinity level of no greater than 5,000 ppm TDS. Currently the</li> </ul>	<p>heavy traffic, unsealed roads and access tracks.</p> <p>Project in General</p> <p>The EMP will identify specific management measures to minimise dust generation from all aspects of the project including:</p> <ul style="list-style-type: none"> <li>incorporation of dust control measures into project design where dust emissions are significant;</li> <li>implementation of dust suppression techniques in areas with high dust generating potential, including allocation of a dedicated water truck for this purpose, with a second truck to be utilised if necessary;</li> <li>water spray from water trucks will be directed away from vegetation where practicable, and combined with blending methods, dust suppression water will not be of an excessive salinity in order to minimise the damage to vegetation health;</li> <li>minimisation of vegetation clearing;</li> <li>staged clearing and progressive rehabilitation to minimise exposed areas;</li> <li>regular inspections to visually assess dust generation;</li> <li>halting of operations of weather conditions that will generate excessive and uncontrolled levels of dust, particularly within the recognised Threatened Ecological Community.</li> </ul> <p>The commitments within the EMP will be consistent with the amount of dust expected to be generated in various areas of the project and the environmental and social values to be protected in those areas.</p> <p>Midwest will also undertake the following:</p> <ul style="list-style-type: none"> <li>vegetation clearing and exposed surfaces will be kept to a minimum wherever practicable.</li> <li>the performance of dust suppression equipment will be monitored and equipment will be maintained in an effective operating condition;</li> </ul>	

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				<p>Koolanooka pit contains a water body measuring about 9,600 m<sup>2</sup> in area and estimated 2 m in depth. The water level is about 285 m AHD and a recent sample has a water salinity of 20,000 mg/LTDS (57% of the salinity of seawater). Calculations for a water body of 2 m depth suggest that the original salinity of the groundwater would be approximately 2,500 mg/L TDS. Given that groundwater inflow does not keep pace with the summer evaporation of 11 mm/d, the rate of inflow into the pit at current water levels is calculated to be less than 110 m<sup>3</sup>/d (Rockwater, 2004a). All other water required for dust suppression activities will be sourced from surrounding, licensed bores, and total dust suppression requirements of the general project will be 180 kl / day. An additional 1000 kl / day will be required during the Karara haul road development, which will take approximately one year to complete.</p> <ul style="list-style-type: none"> <li>The blending of pit and bore water to reduce the salinity level should ensure no long term salinity issues occur that rehabilitation will not be impeded and damage to surrounding vegetation will be minimised. Midwest will ensure that dust suppression techniques used do not adversely affect bordering vegetation. Use of pit water through such blending will also ensure that a gradual drop in pit water salinity is experienced as these waters will become diluted through groundwater inflow. Water will be transported by truck from Koolanooka sources for dust suppression in the Mungada area.</li> </ul>	<ul style="list-style-type: none"> <li>where unacceptable dust levels occur, further dust suppression controls will be implemented;</li> <li>dust suppression methods will be developed in consultation with the DEC to maintain the integrity of neighbouring DEC land if required; and</li> <li>dust management methods will be audited annually and on an as needs basis.</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
Greenhouse Gas Emissions	<ul style="list-style-type: none"> <li>Construction of the mine.</li> <li>Mine operation</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.</li> <li>Minimise emissions to levels as low as practicable on an on-going basis and consider offsets to further reduce cumulative emissions.</li> </ul>	<ul style="list-style-type: none"> <li>EPA Guidance Statement No. 12. Guidance Statement for Minimising Greenhouse Gas Emissions (EPA, 2002).</li> <li>EPA Guidance Statement No. 18 Prevention of Air Quality Impacts from Land Development Sites (EPA, 2000).</li> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2005).</li> <li>Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2002 Series, Australian Greenhouse Office.</li> </ul>	<ul style="list-style-type: none"> <li>Release of greenhouse gases through combustion of diesel fuel used in equipment, vehicles and detonation of explosives for blasting provision of the Project's power requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Greenhouse gas emission minimisation will be incorporated into mine planning in accordance with EPA Guidance Statement for Minimising Greenhouse Gas Emissions (2002).</li> <li>Energy efficient technology will be selected where practicable and energy consumption will be considered as a criterion in equipment selection.</li> <li>Vegetation clearing will be minimised where practicable, thereby assisting to minimise greenhouse gas emissions from the Project.</li> <li>Progressive rehabilitation of open areas will result in partial offsets of emissions over the life of the Project.</li> <li>Atmospheric emissions will not be reported to the National Pollutant Inventory as they do not meet the minimum reporting threshold values.</li> </ul>	<ul style="list-style-type: none"> <li>The Project will generate minimal greenhouse gases. Amounts produced are below reporting thresholds.</li> <li>Output of greenhouse gas and other gaseous emissions from the Project will be kept as low as practicable.</li> <li>Quantity of emissions is below reporting requirements.</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>Construction of the mine.</li> <li>Mine operation.</li> <li>Blasting at the mine site will be required.</li> </ul>	<ul style="list-style-type: none"> <li>Minimise the noise and vibration associated with the construction and operation of the proposal.</li> <li>Protect the amenity of nearby residents from noise and vibration impacts resulting from activities associated with the proposal by</li> </ul>	<ul style="list-style-type: none"> <li><i>Environmental Protection (Noise) Regulations 1997</i> (Western Australian Government).</li> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2006).</li> <li>Statement of Planning Policy Road and Rail</li> </ul>	<p>Mining</p> <ul style="list-style-type: none"> <li>Mining operations will be undertaken 24 hours a day on a continuous basis. Ore will be loaded onto mine trucks using a hydraulic excavator and haul trucks. Ore will then be loaded into the crushing plant by front end loaders and reloaded into road trains by front end loaders once processed.</li> <li>Noise modelling will not be undertaken at the Koolanooka mine site as this aspect is not expected to be a significant</li> </ul>	<p>All practicable measures will be implemented to minimise noise emissions generated by mining and processing activities. Noise management measures that may be considered include:</p> <ul style="list-style-type: none"> <li>design and layout of mine site (eg stockpile locations) to minimise noise emission;</li> <li>purchase of plant and equipment with reduced sound pressure levels; and</li> <li>blasting during daylight hours.</li> </ul> <p>Management of employee noise exposure will be in compliance with the Mines Safety and Inspection Act &amp; Regulations 1994. This will include engineering plant design</p>	<ul style="list-style-type: none"> <li>There will be no adverse impact to the local community from noise or vibration due to the distances of sensitive receptors from the operations areas.</li> </ul>

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		ensuring the noise and vibration levels meet statutory requirements and acceptable levels.	<p>Transport Noise (WAPC, 2005).</p> <ul style="list-style-type: none"> <li>AS2670:2001 Evaluation for human exposure to whole body vibration.</li> <li>AS2436-1981 'Guide to Noise Control on Construction, Maintenance and Demolition Sites'.</li> </ul>	<p>issue. The distance of the two homesteads closest to the mining operations (3 km and 5 km) does not warrant noise modelling as they are uninhabited. One of these residences is leased for use by Midwest. Mining activity is currently conducted on the DSO Fines Project, and any noise created by this proposal will be similar to the existing noise, although it is noted that blasting activities have not yet commenced at this site.</p> <ul style="list-style-type: none"> <li>Noise modelling is not required at the two Mungada pits as the nearest residences are a significant distance away.</li> </ul> <p>Road Transport</p> <ul style="list-style-type: none"> <li>Ore will be transported from Blue Hills to the Koolanooka site via the upgraded existing Mt Karara/Mungada Haul Road and then along existing roads and heavy haulage routes to Tilley Siding. The use of the Mt Karara/Mungada Haul Road for transportation of ore from Blue Hills to the gazetted Shire Road (Mungada Road) will require the haul road to be returned to its original width to accommodate haulage trucks.</li> <li>The transport route follows gazetted roads as defined in the Road Traffic Act 1974 therefore no noise amelioration is required. The noise from the heavy haulage trucks propulsion and braking systems will comply with the EPA Draft Guidance Statement for EIA No 14 (Version 3) Road and Rail Transportation Noise.</li> </ul>	<p>solutions to minimise noise generation and / or propagation, on-going monitoring of noise exposure levels, use of personal protective equipment, and appropriate operational practices.</p> <p>Midwest will also undertake the following:</p> <ul style="list-style-type: none"> <li>noise will be considered in plant and equipment selection and appropriate construction methods;</li> <li>low-noise equipment will be used wherever possible; and</li> <li>silencers, mufflers and noise barriers will be used where necessary.</li> </ul>	
Waste Rock &	<ul style="list-style-type: none"> <li>Excavation of</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that waste rock is placed and</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Notes on Mining Waste Rock</li> </ul>	Waste Rock Stockpiles	Waste Rock	<ul style="list-style-type: none"> <li>Disposal of waste rock will not</li> </ul>

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Topsoil Stockpiles	<p>mine pit.</p> <ul style="list-style-type: none"> <li>Construction of waste dumps.</li> </ul>	<p>managed to negate or control impacts to surface water flow and groundwaters, and ensure there are no long-term impacts on the surrounding environment.</p> <ul style="list-style-type: none"> <li>Clearly identify potentially acid generating material, selectively handle this material and store the material so that acid leachate is not generated.</li> <li>Stockpile topsoil effectively for later use in rehabilitation.</li> </ul>	<p>Dumps (DoIR, 2001).</p> <ul style="list-style-type: none"> <li>Environmental Notes on Mining Acid Mine Drainage (DoIR, 2006).</li> <li>Mine Void Water Issues in WA (WRC, 2003).</li> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2005).</li> </ul>	<ul style="list-style-type: none"> <li>Waste rock stockpiles produced by the project (haematite and detrital ore) are expected to amount to 1.7 million tonnes per year with the majority being produced at Koolanooka. The haematite ore at Koolanooka has very low sulphur content and contains no pyritic shales. The assessed total sulphur in the haematite ore is 0.149%.</li> <li>Given the low sulphur content of the ore and the lack of any observable issues at existing waste rock stockpiles generated from previous mining over thirty years ago, the potential for acid generation is unlikely. This position is supported by the results of the National Association of Testing Authorities (NATA) accredited Chemistry Centre of WA who used the suspension peroxide oxidation combined acidity and sulphate method (SPOCAS) to assess samples obtained from all three pits (WA Chemistry Centre, 2006) (See Technical Appendix 13.3). Assessment confirmed that all samples were within guideline values and no treatment was recommended.</li> <li>The waste rock generated by the project will be stockpiled on land which has been previously cleared where this is possible. The waste may also be used for construction purposes (e.g. road base material and construction of bunds), where the material is suitable for this purpose.</li> <li>At Koolanooka waste rock will be backfilled into the existing pit and / or will be added onto the existing waste dumps to the west and south of the South Fold cutback, Figure 4.2. This area has been significantly disturbed by</li> </ul>	<ul style="list-style-type: none"> <li>Overburden stockpiles will be planned and constructed in compliance with the Environmental Notes on Mining Waste Rock Dumps (DoIR, 2001), and the Guidelines for Mining Proposals in Western Australia (DoIR, 2006).</li> <li>Overburden stockpiles will be constructed with a rounded footprint to conform with surrounding natural landforms.</li> <li>If overburden stockpiles are placed near drainage channels they will be monitored and rock armoured or culvert channelled if necessary to prevent scouring and erosion.</li> <li>Windrows will be used along the crest of slopes to prevent erosion of the slopes. Toe windrows will be used to contain eroded material if needed.</li> <li>Waste dump design will consider the physical nature of material and landform stability, chemical nature of waste materials, associated pollution prevention, integration into surrounding landscape and revegetation issues. For example, waste rock dumps will be set well back from pit edges.</li> </ul> <p>Design criteria for waste dumps:</p> <ul style="list-style-type: none"> <li>maximum height 25 m above natural ground level at the structure site;</li> <li>8 metre wide berms every 10 metre of height;</li> <li>berms to be sloped at 5° into body of dump;</li> <li>berms to have cross bunds placed every 30 m; and</li> <li>top surface and berms will have bunds.</li> <li>Some waste material will be used to improve the formation and revegetation of historic waste dumps to improve their aesthetic appeal.</li> <li>Although production of sulphidic waste rock is unlikely, strategies will be implemented where necessary, to manage potential acid forming materials through encapsulating in neutralising material or clay.</li> <li>Waste rock rehabilitation requirements will be discussed</li> </ul>	<p>produce any additional environmental impact to that which already exists at Koolanooka and Blue Hills.</p> <ul style="list-style-type: none"> <li>Existing landscape values will be retained and pre-existing disturbed areas in poor vegetative condition will be enhanced by rehabilitation and revegetation.</li> </ul>

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				<p>previous operations.</p> <ul style="list-style-type: none"> <li>At Mungada East, waste rock will be added onto the existing dump to the west and south of the pit, and at Mungada West, waste rock will be added to the east and to the south of the existing waste dump on the eastern flank of the pit, Figure 4.3. The dumps at Mungada will be designed to form extensions to the existing waste landforms and will be shaped to fit in smoothly with existing natural ridgelines. These extensions will cover areas that had been cleared during previous mining activities, and will constitute the majority of the project clearance required in the Blue Hills area.</li> </ul> <p>Topsoil Stockpiles</p> <ul style="list-style-type: none"> <li>Topsoil stockpiling is expected to occupy only small areas, as a portion of the project area is already cleared of vegetation and there are some areas of minimal topsoil naturally available. As far as possible topsoil will be placed directly onto areas ready for revegetation, but where stockpiling is necessary this will be conducted on the toe of designated waste dump areas (Figure 4.2 &amp; Figure 4.3) and will comply with all commitments made in this PER and the project EMP. If suitable topsoil material for revegetation purposes cannot be obtained in sufficient quantity for revegetation purposes, Midwest will source suitable material from existing waste dumps, or other predisturbed locations, that do not require vegetation clearance.</li> </ul>	<p>further in the Closure Plan for this project.</p> <p>Topsoil</p> <ul style="list-style-type: none"> <li>A plan will be prepared showing all areas requiring topsoil removal prior to commencement of stripping.</li> <li>The top 150 mm of topsoil will be stripped prior to land disturbance, wherever it is present and safely accessible.</li> <li>Where practicable, topsoil will not be stripped when wet as this can lead to compaction and loss of soil structure.</li> <li>Where little topsoil exists and rehabilitation is required, suitable material will be sourced from previously disturbed and cleared areas. Additionally, the entire length of the haul road requires it to be pre-striped for it to be reinstated. Some of the topsoil material obtained will be made available for use in other topsoil poor locations.</li> <li>Topsoil will be applied as soon as possible to areas being rehabilitated. If stripped topsoil exceeds rehabilitation requirements, excess topsoil will be stockpiled for later use.</li> <li>Topsoil stockpiles will be constructed (no higher than 2 m) and managed to preserve its biological activity.</li> <li>Stockpiles will be scarified to encourage germination and seed bank enrichment during this time.</li> <li>To minimise airborne dust from topsoil stockpiles /or areas from where topsoils are sourced, non-saline water will be applied when required. Surfaces will be monitored to ensure crusting does not inhibit seed germination. A vegetative cover will assist in reducing wind erosion.</li> </ul> <p>Borrow pits and quarries</p> <ul style="list-style-type: none"> <li>Materials required for road base will sourced from waste rock material that is suitable for this purpose, and / or from the cleared 3 m verge alongside the haul road, where suitable materials are present. If a dedicated borrow pit is required at a later date then the appropriate approvals will be obtained disturbances.</li> <li>where possible, borrow pits and quarries will be located behind physical terrain and/or vegetation belts or otherwise</li> </ul>	

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					<p>in areas that would reduce their visual impact. None are currently planned in this proposal;</p> <ul style="list-style-type: none"> <li>• where possible, borrow pits and quarries will not be located in areas where their presence would impact on surface drainage patterns;</li> <li>• where possible, trees and heavy stands of vegetation will be avoided;</li> <li>• where possible, each borrow pit and quarry will not exceed 1 ha in surface area.</li> <li>• access to borrow pits and quarries will be from a single track only;</li> <li>• the removal of borrow material will be limited to inside the designated borrow pit area;</li> <li>• drainage and erosion control structures will be developed around the pit to control the impact of substantial rainfall events;</li> <li>• the maximum final depth of borrow pits and other small excavation structures will be 2 metres from the maximum reasonably expected groundwater level; and</li> <li>• borrow pits and quarries will be rehabilitated as soon as possible after use, and will be landscaped to best fit into the existing environment.</li> </ul>	
Asbestos	<ul style="list-style-type: none"> <li>• Based on a review of the exploration and mining data no asbestiform minerals have been observed in the Koolanooka or Blue Hills. As such,</li> </ul>	<ul style="list-style-type: none"> <li>• Based on examination of exploration &amp; mining activities from the surrounding regional area, no asbestiform minerals have been associated with the types of deposits proposed to be</li> </ul>	<ul style="list-style-type: none"> <li>• Asbestos Management in Mining, DOCEP</li> <li>• Management of Asbestos in Mining Operations, DOIR 2001.</li> </ul>	<p>Asbestiform minerals can be present:</p> <ul style="list-style-type: none"> <li>• in ultramafic mineral assemblages;</li> <li>• in iron ore deposits where there has been tight folding of the mineral sequence; and</li> <li>• where Banded Iron Formations (BIF) have been altered and have metamorphosed.</li> </ul> <p>None of these conditions are expected to be present at Koolanooka or Blue Hills.</p>	<p>In the unlikely event that asbestiform minerals are encountered during mining operations, this hazard will be managed by implementing the Midwest “Fibrous Minerals Procedure”, with reference to the guidelines Asbestos Management in Mining, DOCEP, and Management of Asbestos in Mining Operations, DOIR 2001.</p> <p>Planning</p> <ul style="list-style-type: none"> <li>• Employees will assess the potential for ultramafic rocks being intersected, especially serpentinites and sheared fine-grained tremolite-talc rocks.</li> </ul>	<ul style="list-style-type: none"> <li>• It is viewed by Midwest that the discovery of with asbestos ore materials is extremely unlikely, as this material has not been observed at this site at any time in the past, during mining and exploration</li> </ul>

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	<p>asbestiform minerals are not anticipated to present a risk to safe mining operations.</p> <ul style="list-style-type: none"> <li>This section of the PER will fully discuss the potential for asbestos impacts on the project and suitable management actions, in the unlikely event that asbestiform materials are discovered within the DSO proposal area. Additionally, the EMP, EMS and CP will detail consideration of asbestos material management.</li> </ul>	<p>mined and therefore no associated risks regarding safe tourism access to the areas are anticipated.</p>		<p>Asbestiform minerals have not been observed or logged in historical or recent diamond drill core from either deposit. Reverse circulation (RC) drilling produces percussion drill chips and no asbestiform minerals have not been geologically logged from drilling either deposit. Previous mining operations at both the Koolanooka and Blue Hills sites by WMC in the late 1960s to the early 1970s similarly do not record any occurrence of asbestiform minerals in either the ore or waste products extracted.</p> <p>For the above reasons, it is improbable that asbestiform minerals will occur either at Koolanooka or Blue Hills, confirmation of the absence of asbestiform minerals would require mining of the entire site.</p>	<ul style="list-style-type: none"> <li>Employees will refer to the regional-asbestos/fibrous-mineral location plan to identify units predisposed to this type of mineral occurrence, and will check with the Environmental Officer or Senior Geologist if in doubt.</li> </ul> <p>Midwest will ensure the drilling contractors</p> <ul style="list-style-type: none"> <li>have a suitable cyclone (especially for RAB rigs) on site to firmly fit plastic sample bags;</li> <li>that water injection systems are provided and operating;</li> <li>that suitable lengths of chimney or outer return hoses that are being used to divert dust away from drill work and sampling areas; and</li> <li>that appropriately rated dust masks are available and are worn.</li> </ul> <p>Programme</p> <p>Midwest personnel should:</p> <ul style="list-style-type: none"> <li>brief the contactors of the potential danger when fibrous minerals are encountered before and during the programme;</li> <li>plan drilling and work areas so that minimum dust exposure is experienced;</li> <li>act if dust levels are deemed unacceptable, (close down the rig if necessary);</li> <li>report all fibrous materials to the Senior Geologist and OS&amp;H Officer;</li> <li>ensure adequate supply of plastic sample bags are available to use when required;</li> <li>ensure that appropriate rated dust masks are available and worn at every stage of the programme including drilling, sieving and sampling; and</li> <li>ensure that disposable paper coveralls are an available and worn by the drill crew and field staff when fibrous materials are expected.</li> </ul> <p>Rehabilitation and Disposal</p>	<p>activities.</p>

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					<ul style="list-style-type: none"> <li>Rehabilitation of the bagged samples is to be determined on the location and extent of fibrous minerals encountered in the drilling by the Project Geologist, Environmental Officer and OS&amp;H Officer.</li> <li>Bagged fibrous mineral samples are to be disposed of at the nominated disposal site. Action on disposal and rehabilitation of non bagged samples will be dependant upon an assessment of the drill site location and quantity of fibrous materials.</li> </ul> <p>Sample Despatch</p> <ul style="list-style-type: none"> <li>Assay laboratories must be informed of the presence of fibrous materials in the samples on the accompanying sample submission documentation. Sample bags must be clearly marked with "Caution – Asbestos" flagging.</li> </ul>	
Solid, Hazardous and Liquid Wastes	<ul style="list-style-type: none"> <li>Construction and operation of mine site.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce the volume of waste through product selection, reuse and recycling.</li> <li>Ensure that waste is contained and isolated from groundwater and surface water, and that storage, treatment or collection of waste does not result in long term impacts on the surrounding environment.</li> <li>Ensure all site generated waste is removed by a licenced contractor and disposed of in the Morawa Shire landfill or other appropriate facility.</li> </ul>	<ul style="list-style-type: none"> <li>Water Quality Protection Guidelines No. 10 Mining and Mineral Processing Above-ground fuel and chemical storage (Department of Water, 2000).</li> <li>Australian Standard 1940-2004: The storage and handling of flammable and combustible liquids.</li> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2005).</li> <li><i>Explosives and Dangerous Goods Act 1961.</i></li> <li><i>Explosives and Dangerous Goods</i></li> </ul>	<p>Construction and operation activities associated with the mine will generate waste materials and will require the transport, storage and handling of hydrocarbons and chemicals. If not adequately handled, stored or disposed of these materials can contaminate local soil, groundwater or surface waters. Contamination can arise from the escape of leachate containing hydrocarbons, chemicals, elevated nutrients, or heavy metals. Visual amenity may be impacted by inadequately managed waste and feral animals may be encouraged forage in the area.</p> <p>Types of waste generated by the Project include the following:</p> <ul style="list-style-type: none"> <li>domestic waste;</li> <li>recyclable products;</li> <li>waste oils, greases and lubricants;</li> </ul>	<p>General Waste</p> <ul style="list-style-type: none"> <li>No onsite waste disposal will be undertaken during this Project, and domestic and construction waste will be minimised through reuse and recycling where appropriate. General waste will be managed by a licensed contractor and removed from site for disposal in an approved landfill.</li> <li>Consideration will be given to the best design and operation of short term waste storage facilities to be used by the waste removal contractor. Storage facilities will be designed to minimise infiltration of water, formation of leachates, and distribution of litter by wind and water, and will include effective fire management. A Bellan Cage will be utilised to prevent the spread of windblown litter on site. More details on the specifics of short term waste management will be provided in the Project EMP.</li> <li>Waste production will be audited periodically to identify new opportunities for reduction, re-use and recycling. Used tyres will be stored in accordance with Part VI of the Environmental Protection Act 1986 Regulations. These commitments will also be provided in the EMP for this project.</li> <li>Sewage and grey water from the mine operations will be treated on-site using approved septic tank and leach drain</li> </ul>	The management of general and hazardous waste is expected to result in negligible environmental impacts.

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		<ul style="list-style-type: none"> <li>Minimise the environmental impacts of hydrocarbons, chemicals (solvents, cleaning fluids etc.) and explosives through appropriate storage, handling and disposal.</li> </ul>	<p><i>(Explosives) Regulations 1963.</i></p> <ul style="list-style-type: none"> <li>Guidance Note S301, Storage of Dangerous Goods Licensing and Exemptions (DoIR, 2004).</li> <li>Dangerous Goods (Transport) (Road and Rail) Regulations 1999 (Government of Western Australia).</li> <li>Australian Code for the Transport of Dangerous Goods by Road and Rail (National Road Transport Commission and ACTDG, 2005).</li> <li>Used Tyre Strategy for Western Australia (Waste Management Board, 2005).</li> <li>Australian Standard 1768–2003, Lightning Protection.</li> <li>Australian Standard 2187.0–1998, Explosives-Storage, Transport and Use - Part 0: Terminology.</li> <li>Australian Standard 2187.1–1998, Explosives-Storage, Transport and Use - Part 1: Storage. DEC – Contaminated Sites Management Series –</li> </ul>	<ul style="list-style-type: none"> <li>organic debris including vegetation;</li> <li>general refuse including waste metal, cardboard and packaging;</li> <li>sewage; and</li> <li>inert waste including excess fill.</li> </ul>	<p>systems.</p> <ul style="list-style-type: none"> <li>Liquid effluent generated at the site including oils and water from the workshop will be managed in accordance with relevant legislation.</li> </ul> <p>Hazardous Substances</p> <ul style="list-style-type: none"> <li>During construction and operations, hazardous substances will be stored according to the requirements of Australian Standard 1940. Storage of bulk fuel will be in above ground tanks within bunded, impermeable enclosures, or in double skinned tanks.</li> <li>Hazardous substance management, including procedures for the correct handling, storage, spill management and clean up will be incorporated in the Project EMP. Spill response equipment will be located in the vicinity of work areas, with site personnel trained in spill response management.</li> <li>Refuelling, workshop and vehicle wash down areas will be constructed to prevent discharge of spills, leaks or wastes: drains, bunds or oil / water separators will be fitted where appropriate.</li> <li>Storage of explosives will be in a remote magazine in accordance with the Explosives and Dangerous Goods Act 1961 and Explosives and Dangerous Goods (Explosives) Regulations 1963.</li> <li>Hazardous waste and spilled hazardous materials will be removed from site by a licensed contractor for disposal in an approved facility in accordance with the requirements of the controlled waste regulations.</li> </ul> <p>Midwest will also undertake the following:</p> <p>Bulk Hydrocarbon Storage Facilities</p> <ul style="list-style-type: none"> <li>Bulk hydrocarbons containers will be stored and managed in accordance with Australian Standard 1940 – The Storage and Handling of Flammable and Combustible Liquids (AS 1940-1993).</li> <li>Containers that are self bunded (double skinned) will be protected against collision by equipment and/or vehicles by</li> </ul>	

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			<p>Bioremediation of hydrocarbon-contaminated soils in Western Australia, October 2004.</p> <ul style="list-style-type: none"> <li>DEC – Contaminated Sites Management Series – Bioremediation of hydrocarbon-contaminated soils in Western Australia, October 2004.</li> </ul>		<p>the placement of appropriate barriers or bollards.</p> <ul style="list-style-type: none"> <li>Containers that are not self bunded will be contained in secondary facilities with impervious floors and bunds. These facilities will have a capacity to contain 110% of the volume of the largest tank or 25% of the total volume stored in the compound.</li> <li>Containers will be appropriately labelled as required by the relevant legislation.</li> <li>Areas adjacent to secondary storage facilities will be contoured to drain away from the facilities.</li> <li>Water or other liquids that collect in the storage facilities will be removed and treated. This is to maintain the containment capacity and integrity of the facility.</li> </ul> <p>Minor Storage</p> <ul style="list-style-type: none"> <li>Drums and small containers of hydrocarbon products will be stored upright with fitted lids, in secondarily contained facilities.</li> <li>Storage facilities will have impervious floors and bunds, with a capacity to contain 110% of the volume of the largest container or 25% of the total volume stored in the compound.</li> <li>Drums and containers will be checked regularly for signs of corrosion and leaks.</li> <li>Containers will be labelled as required by the relevant legislation.</li> </ul> <p>Spills</p> <ul style="list-style-type: none"> <li>Spill response equipment will be readily accessible in each work area to enable quick response to spills. As a minimum, spill response equipment will be located at fuel storage and transfer facilities, work areas, near open water bodies, and at maintenance workshop areas.</li> <li>Spills will be controlled at the source, contained and cleaned up as soon as they occur. Contaminated material will be removed and bio-remediated (if biodegradable) or</li> </ul>	

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					<p>disposed at a licensed facility.</p> <ul style="list-style-type: none"> <li>In the event of spills, environmental management will require internal and external reporting and incident analysis and described within the project EMS and EMP. Decision matrices will be developed to determine which types of incidents and impacts require reporting and the appropriate reporting timeframes. These will be defined in the Environmental Management Plan and Environmental Management Systems documents.</li> <li>Personnel will be trained and competent in spill management.</li> </ul> <p>Waste Disposal</p> <ul style="list-style-type: none"> <li>Storage of waste oil on site will be in accordance with the Dangerous Goods Regulations 1992.</li> <li>Waste oil on site will be managed in accordance with the bulk storage and / or minor storage management requirements described above.</li> <li>Where practicable, waste materials will be minimised by reuse and recycling.</li> <li>Oily waste materials (filters, rags, spill clean up materials) will be segregated from general waste, contained and disposed of off site at a licensed facility.</li> </ul> <p>Bioremediation Facility</p> <ul style="list-style-type: none"> <li>Soil and biodegradable materials contaminated by hydrocarbons will be disposed in a designated site for bioremediation in accordance with the Environmental Protection Authority Guidelines for Oil Farming of Oily Wastes.</li> <li>The bio-remediation facility will be vertically separated from the groundwater table.</li> <li>Materials in the facility will be placed at depths of less than 30 cm, aerated through periodic tilling and kept moist to encourage bacterial activity.</li> <li>Remediated materials will have residual levels of hydrocarbons determined in conjunction with DEC.</li> </ul>	

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					<p>Materials containing acceptable levels of hydrocarbons will be used for rehabilitation activities.</p> <ul style="list-style-type: none"> <li>Management of remediated soils will take place in accordance with the current DEC guideline 'Bioremediation of hydrocarbon-contaminated soils in Western Australia, October 2004'</li> </ul> <p>Workshop / Servicing Areas</p> <ul style="list-style-type: none"> <li>Where practicable, a dry workshop policy will be implemented. Spills will be picked up by absorbent materials.</li> <li>Vehicles and mobile equipment will be washed down on a concrete surface that drains to a sump. Oils and sediments will be separated from the wash down water, prior to the water being re-used on site.</li> </ul> <p>Explosives</p> <ul style="list-style-type: none"> <li>Explosives will be stored in a magazine registered and licensed in accordance with the Explosives and Dangerous Goods Act 1961 and the Explosives and Dangerous Goods (Explosives) Regulations 1963 and in accordance with Australian Standard 1768-2003, Lightning Protection, Australian Standard 2187.0-1998, Explosives - Storage, Transport and Use -Part 0: Terminology, Australian Standard 2187.1-1998, Explosives -Storage, Transport and Use -Part 1: Storage.</li> <li>Spills of nitrate based explosives will be removed by hosing with water .The potential for spillage of these products is extremely unlikely as use of these products will be carefully and tightly managed, and the only opportunity for spillage is during explosive hole charging, which is done directly by hose from an external contractor's truck to each explosives hole. These materials will not be required to be stored on site, and as such spillage of these materials is highly unlikely.</li> </ul> <p>Housekeeping and General Wastes</p> <ul style="list-style-type: none"> <li>Waste will be segregated into general waste, recyclable wastes and hazardous waste.</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<ul style="list-style-type: none"> <li>• Waste receptacles will be available at the appropriate locations to enable waste segregation and containment.</li> <li>• Practices implemented in relation to waste generation will include, the minimal production of waste through efficient designs, reduction of materials required, and reuse/recycling of waste materials.</li> <li>• As a minimum, batteries and scrap metal will be recycled.</li> <li>• Where possible, recyclable waste will be removed by a contractor to a recycling facility.</li> <li>• General waste will be removed to the Morawa Shire landfill facility or other approved location, by a contractor.</li> <li>• Waste will be secured against wind blown litter and animal foraging by use of a Bellan Cage.</li> <li>• Littering will be prohibited.</li> <li>• Work areas will be kept neat and tidy.</li> <li>• On decommissioning of a work area, non-permanent structures and facilities will be removed and disposed of appropriately in accordance with the Conceptual Closure Plan for this Project.</li> </ul> <p>Sewerage</p> <ul style="list-style-type: none"> <li>• Septic tanks and leach drains will be constructed and maintained in accordance with Department of Health and Local Council and DEC requirements.</li> </ul> <p>Fire</p> <ul style="list-style-type: none"> <li>• All employees and contractors will undergo site environmental induction training that includes bushfire prevention and emergency response procedures.</li> <li>• Select site personnel will undergo advanced training in fire suppression.</li> <li>• Fire breaks will be established around the site in agreement with the Fire and Emergency Services Authority (FESA) and the DEC.</li> <li>• Mobile plant and light vehicles will be equipped with</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<p>appropriate fire suppression equipment that complies with relevant Australian Standards and staff will be trained in its use.</p> <ul style="list-style-type: none"> <li>Internal hot work permits will be required for work that has the potential to create ignition sources. Hot works will not occur within 3 m of vegetation without a prior hazard assessment and written approval from the Site Manager.</li> <li>Fire extinguishing equipment will be available at each work area where hot works occur and will be maintained in accordance with Australian Standards.</li> </ul>	
Social & Cultural Environment	<ul style="list-style-type: none"> <li>Mine site construction</li> </ul>	<ul style="list-style-type: none"> <li>Avoid disturbance to cultural and heritage sites.</li> <li>Ensure compliance with relevant legislation including the <i>Heritage of Western Australia Act 1990</i> and the <i>Aboriginal Heritage Act 1972</i>.</li> <li>Respect the rights of all land owners.</li> </ul>	<ul style="list-style-type: none"> <li>EPA Guidance Statement No. 41. Assessment of Aboriginal Heritage (EPA, 2004).</li> <li>Guidelines for Consultation with Indigenous People by Mineral Explorers (DoIR, 2004).</li> </ul>	<p>Indigenous Heritage</p> <p>Koolanooka Mine site</p> <ul style="list-style-type: none"> <li>Approval to disturb previously recorded Aboriginal Heritage site DIA 4496 has been obtained under Section 18 of the Aboriginal Heritage Act 1972. DIA site 5868 has been determined to be a duplicate of the site DIA 4496.</li> <li>Permission for the disturbance to Aboriginal Heritage site DIA 4496 was applied for once the Company's mining licences had been granted. This covers the entire length of the Koolanooka Hills. Under Section 18(3) of the Aboriginal Heritage Act 1972, Midwest has been granted consent by the Minister for Indigenous Affairs to use its mining leases to "undertake mining operations through an extension of the existing open pit operations." This consent was granted to Midwest in December 2003 and is contingent on meeting the various obligations and responsibilities under the Aboriginal Heritage Act 1972 (Appendix J).</li> <li>Two other sites of Aboriginal Heritage are found within the local area (DIA 20817 and DIA 20816), as these sites</li> </ul>	<p>Indigenous Heritage</p> <ul style="list-style-type: none"> <li>Aboriginal community representatives and elders will be consulted as part of the planning process for mining and construction activities. Management plans will be discussed and agreed upon.</li> <li>The locations of existing registered sites will be taken into account to minimise and avoid where possible, impacts to Aboriginal sites. Registered sites will not be removed, damaged or altered without Section 18 approval from the Minister of Indigenous Affairs, under the Aboriginal Heritage Act 1972.</li> <li>Any new significant sites identified during ethnographic and archaeological survey or construction will not be removed, damaged or altered without approval under Section 18 of the Aboriginal Heritage Act 1972.</li> </ul> <p>Midwest will undertake management of Aboriginal Heritage sites by:</p> <ul style="list-style-type: none"> <li>completing a full assessment for the presence of Heritage sites;</li> <li>consulting with appropriate custodians throughout the Project;</li> <li>gaining approval for any intended impact on heritage areas;</li> <li>establishing appropriate exclusion zones, with fencing and signage of these areas if required;</li> </ul>	<ul style="list-style-type: none"> <li>Significant sites identified from the Aboriginal Sites register and from ethnographic and archaeological surveys and construction will not be removed, damaged or altered without approval under Section 18 of the <i>Aboriginal Heritage Act 1972</i>.</li> </ul>

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
				<p>are remote from the project they are not expected to be impacted.</p> <ul style="list-style-type: none"> <li>To date no Aboriginal groups have made objections to the granting of the Mining Leases or to previous mining operations in the area.</li> </ul> <p>Blue Hills Mine site</p> <ul style="list-style-type: none"> <li>If the proponent needs to disturb the observed archaeological sites at this location (small cave (DIA 20858) and large cave (DIA 20857)), Midwest will obtain consent from the Minister for Indigenous Affairs under Section 18 of the Aboriginal Heritage Act 1972 prior to any such activity occurring.</li> </ul> <p>Mt Karara/Mungada Haul Road</p> <ul style="list-style-type: none"> <li>The Project will not impact on Aboriginal Heritage sites in regard to the Mt Karara/Mungada haul road, as only a 3 m wide pre-cleared roadside verge will be impacted at this location, and no haul road realignment will occur. The re-establishment of this haul road will not impact on any areas of new vegetation and will not impact on any potential aboriginal heritage.</li> </ul> <p>Non-Indigenous Heritage</p> <ul style="list-style-type: none"> <li>The Project will not impact on the heritage values of the Koolanooka Hills area.</li> </ul>	<ul style="list-style-type: none"> <li>training the workforce and contractors on any relevant heritage requirements;</li> <li>establishing a dedicated heritage management plan if required, discussing heritage considerations within the site EMP;</li> <li>reporting potential heritage areas or artefacts if encountered during the Project;</li> <li>ensuring disturbance to sites is in accordance with conditions of any Section 18 approvals;</li> <li>demarking sites requiring protection on the ground if appropriate, and on site maps. Exclusion zones around these sites will be established and communicated to personnel;</li> <li>ensuring employees and contractors complete a site induction prior to commencement of work. The induction will inform personnel of nearby sites (if appropriate) and their legal obligations to protect sites and/or disturb sites according to approved procedures;</li> <li>ensuring employees and contractors will promptly report the identification of any Aboriginal sites in the vicinity of the operations. Where sites are identified, they will be avoided; and</li> <li>employing qualified anthropologists/archaeologists to assess sites as circumstances dictate and require.</li> </ul> <p>Non-Indigenous Heritage</p> <ul style="list-style-type: none"> <li>As the Koolanooka mine is listed in the Morawa Heritage Inventory, Midwest has photographed the site prior to the commencement of earthworks. Photographs of the mine will also be taken at completion of mining activities to continue the photographic record of the site. Archiving of the photographic record will be determined in consultation with the Shire of Morawa.</li> <li>Midwest has established a local Community Development Fund in Morawa which aims to support local business ventures and the community in general. As part of this undertaking Midwest and contractor contracts for the</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<p>Project will include a local employment clause.</p> <ul style="list-style-type: none"> <li>Midwest will also endeavour to fulfil the desired social outcomes of the Morawa Shire Council and Shire of Perenjori, concerning the local areas influenced by this Project. This includes consideration of accommodation, transport, small business use, servicing, and local education and training options.</li> <li>Midwest will, where possible and feasible, support local business for services and supplies. This may include the establishment of a temporary revegetation nursery in Morawa, and the use of local workshop options for fleet vehicle servicing requirements.</li> </ul> <p>Public Access</p> <ul style="list-style-type: none"> <li>Public notices will be sent out prior to disruption or temporary closure of roads and public access.</li> <li>Communication channels for public comments and complaints will be established and maintained. These channels will be made known to the community.</li> <li>Any existing fences and tracks affected by activities will be restored.</li> <li>Where practicable alternative access will be established for temporary disruptions to recreational use / access.</li> <li>Public access to the site will be restored at the completion of activities.</li> <li>The Mt Karara / Mungada Road will remain available to all road users at all times, subject to compliance with the Midwest Traffic Management Plan.</li> <li>Public notices will note the expected length of closure and anticipated re-opening of closed areas.</li> <li>During the operational phase of the project no public access issues are anticipated.</li> <li>A management plan will manage access to site during mining activities, in particular blasting.</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
Visual Amenity, Landform and Geo-conservation	<ul style="list-style-type: none"> <li>Mine construction</li> </ul>	<ul style="list-style-type: none"> <li>Minimise the Project impacts with regard to community use and access to significant environmental features.</li> <li>Ensure landscape values are considered and measures are adopted to reduce the visual impacts of the Project.</li> <li>Maintain and protect any significant landscape and geo-heritage values and maintain the integrity, ecological functions and environmental values of the soil and landform.</li> </ul>	<ul style="list-style-type: none"> <li>EPA Guidance No. 33 Environmental Guidance for Planning and Development (EPA, 2005).</li> <li>WA Planning Commission Statement of Planning Policy No. 2, Environment and Natural Resource Policy (WAPC, 2004).</li> </ul>	<ul style="list-style-type: none"> <li>The Project will not result in an unacceptable degree of change or degradation to the broader natural environment and ecological processes of which it is a part.</li> <li>The Project will have a minimal impact on the anthropocentric or (geo) heritage values of the BIF.</li> </ul>	<ul style="list-style-type: none"> <li>At both mining areas, impact will be minimised by ensuring clearing only occurs in approved areas and overburden stockpiles are located in an area that minimises any impact to visual amenity or prominent drainage lines, and that stockpiles are shaped to blend in with local landforms. At Koolanooka, Midwest make the commitment that existing waste dumps will be reshaped where possible to better consider aesthetic concerns at this minesite. Considerations of final landform will be incorporated into the project Closure Plan. This document will be made available to stakeholders for comment as part of the EIA process.</li> <li>Roads and other infrastructure will be designed and located in order to minimise long term impacts on the area's future status and use as a conservation reserve. Infrastructure removal and rehabilitation of the site to final land use in line with future land use requirements will be carried out upon closure.</li> <li>Computer generate depictions of the final landforms of the areas on completion of the Project have been included. These are provided as Plates 8.1 through to 8.6.</li> </ul>	<ul style="list-style-type: none"> <li>There will likely be no significant impact to the geo-heritage or anthropocentric values of the Koolanooka / Blue Hills area, after waste dumps are blended appropriately into surrounding ridgelines and rehabilitation has been successfully conducted upon closure.</li> </ul>
Mine Planning Decommissioning and Rehabilitation	<ul style="list-style-type: none"> <li>Decommissioning of the mine site</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that rehabilitation achieves a long term safe, stable and functioning landform which is consistent with the surrounding landscape and other environmental values.</li> <li>Fulfil commitments</li> </ul>	<ul style="list-style-type: none"> <li>AMEC Mine closure Guidelines (AMEC, 2000).</li> <li>Strategic Framework for Mine Closure (ANZMECC, 2000).</li> <li>Mine Closure Guideline for Minerals Operations in WA. (DoIR, 2000).</li> <li>Mine Void Water</li> </ul>	<ul style="list-style-type: none"> <li>At Koolanooka ore will be excavated from areas that have already been disturbed or partially mined but which are external to the existing pit. The South Fold Orebody will be excavated from a cut back to the immediate south-southeast of the old pit with ore being transported to the plant site via a combination of existing and new haul roads.</li> <li>Operations at the Mungada East &amp; Mungada West pits at Blue Hills will be</li> </ul>	<ul style="list-style-type: none"> <li>A full Closure Plan (Appendix 13.26) has been developed to comply with the AMEC Mine Closure Guidelines (2000) and ANZMEC/MCA Strategic Framework for Mine Closure (2000), to return the mine site to a self-sustaining ecosystem that is consistent, as far as possible, with the natural surrounding area. All activities will be adequately financed, implemented and monitored to achieve the agreed targets.</li> <li>Decommissioning will comprise the safe dismantling and removal of infrastructure, the appropriate disposal of waste materials and the impacted areas returned as closely as possible to their pre-disturbed state. Where the removal of</li> </ul>	<ul style="list-style-type: none"> <li>At Koolanooka, rehabilitation will result in a safe, stable landform with revegetation consistent with the adjacent TEC and blending into the surrounding landscape.</li> <li>There will be no introduction of</li> </ul>

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
		<p>made to stakeholders and regulators regarding closure outcomes.</p>	<p>Issues in WA (WRC, 2003).</p> <ul style="list-style-type: none"> <li>• Guidance Statement No 6: Rehabilitation of Terrestrial Ecosystems (EPA, 2006).</li> <li>• Guidelines on Safety Bund Walls Around Abandoned Open Pits. (DME, 1997).</li> <li>• Mine Closure and Completion. (DITR, 2006).</li> </ul>	<p>returned and connected to Koolanooka through re-instating the existing Mt Karara / Mungada Haul road.</p>	<p>non-visible infrastructure or features that have been incorporated into the natural landscape may cause environmental damage, then their retention will be discussed with the relevant authorities at the time.</p> <ul style="list-style-type: none"> <li>• Formation of waste rock stockpiles will be performed progressively over the project's duration, taking into account desirable final landform and rehabilitation requirements. The predicted waste dump layouts for Koolanooka, Mungada East and Mungada West are provided in Figures 8-2, 8-3 and 8-4 respectively. Waste dumps from previous mining will also be reformed, where feasible. Specifically, the Northern Waste dump alongside the public access road will be reshaped, and be rehabilitated with regard to erosion issues.</li> <li>• rehabilitation will occur progressively where possible as disturbed areas are no longer utilised. Upon the completion of mining, should Midwest not undertake further operations all sites impacted by the project will be rehabilitated. Rehabilitation activities will include;</li> <li>• re-establishment of stable landform with erosion protection for long term stability.</li> <li>• ripping of compacted areas and on contours of slopes; and</li> <li>• spreading of vegetation debris to return organic matter to the area and provide supplementary seeding with appropriate species. Seed stock will be gathered in 2007 - 2008, pre-clearance, to provide an effective provenance seed-set for use during rehabilitation practices.</li> <li>• The rehabilitation programme will include development of completion criteria to indicate the state when rehabilitation can be considered self sustaining. Closure considerations will include assessment and remediation of contaminated sites, ongoing placement of waste materials to improve the form of existing waste dump areas, and the rehabilitation of all project disturbed areas, including exploration drill pads and tracks.</li> <li>• Additionally a suitable pit abandonment strategy will be developed and detailed in the Closure Plan. This will take into account that the area will revert to a tourist destination</li> </ul>	<p>weeds or diseases to the TEC area or new rehabilitation areas.</p> <ul style="list-style-type: none"> <li>• At Blue Hills, disturbed areas will be rehabilitated to blend with the surrounding landscape and revegetation will aim at providing a vegetation complex similar to the pre-existing complex.</li> </ul>

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<p>after closure. This strategy will also incorporate the needs of the local shire and DOCEP for safe tourism access.</p> <p>Midwest will also undertake the following:</p> <ul style="list-style-type: none"> <li>• Temporary infrastructure will be removed, divested or otherwise disposed of appropriately.</li> <li>• Soils contaminated with hydrocarbons will be removed and bioremediated.</li> <li>• Borrow pits and other excavations, other than the iron ore pits, will have surfaces battered to an angle of 15° or less. The maximum final depth of borrow pits and other small excavation structures will be 2 metres from the maximum reasonably expected groundwater level.</li> <li>• Disturbed areas will be land formed to achieve free draining status and blend in with the surrounding environment.</li> <li>• Pre-existing drainage networks will be re-established.</li> <li>• Erosion and sedimentation will be minimised by the construction of erosion control berms, bunds or contour banks as appropriate.</li> <li>• Windrows that interfere with natural drainage will be breached as a minimum, and completely removed as appropriate.</li> <li>• Compacted surfaces no longer required for operations will be contour ripped or scarified to promote water penetration and the catchment of seed.</li> <li>• Disturbed areas will be progressively rehabilitated as far as possible.</li> <li>• Topsoil (100 mm if available) or a suitable growth medium and vegetation (if available) will be spread over the area.</li> <li>• Where required, native provenance seeds will be used to enhance revegetation.</li> <li>• Hygiene requirements will be maintained during rehabilitation;</li> <li>• Weed infestations will be controlled by physical or</li> </ul>	

Environmental Factor	Relevant Project Component	Environmental Management Objectives	Applicable Standards	Potential Impacts	Environmental Management & Mitigation	Predicted Outcome
					<p>chemical means.</p> <ul style="list-style-type: none"> <li>• Rehabilitated areas will be sign-posted and protected from disturbance.</li> <li>• Areas where revegetation is not initially successful will receive remedial attention e.g. remedial seeding with local provenance seed.</li> </ul> <p>Waste dumps will be constructed to blend with the surrounding landscape and have the following structural criteria:</p> <ul style="list-style-type: none"> <li>• maximum height 25 m above natural ground level at the structure site;</li> <li>• 8 metre wide berms every 10 metre of height;</li> <li>• berms to be sloped at 5° into body of dump;</li> <li>• berms to have cross bunds placed every 30 m; and</li> <li>• top surface and berms to have bund along the crest.</li> </ul>	



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## Environmental Management Commitments

**Table S3 DSO Project Environmental Management Commitments**

Commitment Number	Topic	Actions	Objectives	Timing	Seek Advice From
1	Project Construction and Operation	Prior to construction and operations, a Project Environmental Management Plan (EMP) will be developed. The plan will set out procedures to minimise and manage the environmental impacts of construction and operation activities.	Provide a framework for continual improvement and minimise risk of impacts from construction.	Prior to construction / operations.	DEC, DoW, DIA, DoIR
2	Project Construction and Operation	The Environmental Management Plan will be implemented during construction and operation, and communicated to Project personnel through training and induction sessions	Ensure continual improvement and minimise risk of impacts from construction.	Commencement of construction / operations.	
3	Project Construction and Operation	The Environmental Management Plan will be developed in accordance with the Project Environmental Management System (EMS).	Provide a framework for continual improvement and minimise risk of impacts.	Planning. Prior to construction.	DEC
4	Project Construction and Operation	Midwest will appoint an Environmental Manager to oversee and implement all environmental requirements contained within the DSO PER, EMP and EMS on the DSO project.	Allocate DSO management responsibility to an environmental professional	Prior to construction	DEC
5	Vegetation and Flora	As a component of the Project EMP there will be management procedures implemented at Blue Hills for the protection of priority flora, developed in consultation with the DEC, prior to mine and infrastructure construction works. The plan will set out procedures to maintain the abundance, diversity, distribution and conservation status of threatened flora species.	Ensure flora species are adequately managed.	Prior to mine and infrastructure construction works.	DEC
6	Vegetation and Flora	The boundary between the TEC and impact areas will be fenced prior to construction and operation to avoid inadvertent impact.	Preservation of mine site vegetation for conservation purposes.	Prior to construction and throughout the life of the mine.	DEC
7	Terrestrial Fauna	As a component of the Project EMP there will be management procedures implemented at Koolanooka and Blue Hills for the protection of Malleefowl, developed in consultation with the DEC, prior to mine and infrastructure construction works. The plan will set out procedures to maintain the abundance, diversity, distribution and conservation status of Malleefowl.	Ensure fauna species are adequately managed.	Prior to mine and infrastructure construction works	DEC
8	Surface Water Hydrology	Drainage structures will be designed and constructed to minimise alterations to offsite surface drainage patterns, resulting in no offsite turbidity impacts for the	Adequately manage surface water hydrology.	Life of mine.	DoW

Commitment Number	Topic	Actions	Objectives	Timing	Seek Advice From
		Gilgai formation to the south of the Mungada pits.			
9	Air Quality - Dust	Assessment of the affect of dust on the health of TEC flora will be undertaken prior to construction/operation and monitoring of impact will continue throughout the life of the Project as required by Regulatory Authorities.	Determine the nature and extent of dust effects on TEC flora	Prior to mine and infrastructure construction works and throughout the life of the Project.	DEC
10	Waste Rock Management	The Closure Plan, detailing waste rock management, will be implemented.	Maintain a Conceptual Mine Closure Plan.	Throughout life of mine	DEC and DOIR
11	Asbestos Management	Midwest will comply with all commitments provided in the Midwest "Fibrous Minerals Procedure", the DSO PER and its supporting documents, concerning management of asbestos materials.	Comply with Midwest Fibrous Minerals Procedure and supporting documents	Throughout life of mining	DoIR and DOCEP
12	Waste (Solid, hazardous and liquid)	Procedures for the issues raised in Section 8 will be detailed in the Project EMP.	Adequately manage the removal and disposal of Project related waste.	Throughout life of Mine	DEC
13	Social and Cultural Environment	Midwest will consult with traditional owners and obtain their consent to disturb any new Aboriginal Heritage sites discovered in the Project disturbance area. Midwest will obtain approvals relevant to the <i>Aboriginal Heritage Act 1972</i> for disturbance to heritage sites.	Ensure that no heritage sites are disturbed without consent or a permit.	Prior to disturbance of heritage sites.	DIA,
14	Social and Cultural Environment	Midwest will photograph the Koolanooka mine area prior to disturbance and provide the photographs to Morawa Shire for archiving..	Ensure heritage values of the area are protected.	Prior to construction	DIA
15	Decommissioning and Rehabilitation	A Closure Plan has been developed in alignment with AMEC Mine Closure Guidelines (2000) and ANZMEC/MCA Strategic Framework for Mine Closure (2000). During the life of mine, the plan will be reviewed and updated as required to ensure information remains current.	Maintain a Conceptual Mine Closure Plan	Throughout life of mine.	DEC and DoIR
16	Decommissioning and Rehabilitation	A Final Mine Closure Plan will be developed in consultation with the DEC and DoIR. The plan will define appropriate closure criteria necessary for the establishment of safe landforms and self sustaining ecosystems, and set out procedures for monitoring in order to meet compliance with the closure criteria.	Establish safe landforms and self sustaining ecosystems post closure	Twenty-four months prior to mine closure.	DEC and DoIR