Report and recommendations of the Environmental Protection Authority

Nammuldi-Silvergrass Expansion Project

Hamersley Iron Pty Ltd

Report 1457

November 2012

Public Environmental Review
Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
30/08/10	Level of assessment set	
20/1/12	Final Environmental Scoping Document (ESD) approved	73
2/7/12	Environmental Review Document (ERD) released for public review	23
30/7/12	Public review period for ERD closed	4
17/9/12	Final Proponent response to ERD issues raised	7
21/11/12	Publication of EPA report	9
5/12/12	Close of appeals period	2

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

In this case, the Environmental Protection Authority met its timeline objective in the completion of the assessment and provision of a report to the Minister.

Dr Paul Vogel
Chairman

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Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by Hamersley Iron Pty. Limited (Hamersley Iron) to expand the Nammuldi-Silvergrass Iron Ore Project. The original Nammuldi-Silvergrass Iron Ore Project, located approximately 60 kilometres (km) north west of the town of Tom Price in the Pilbara region, was approved on 28 November 2000 and is subject to the requirements of Ministerial Statement 558.

The expansion proposal is expected to increase the production rate to approximately 45 million tonnes per year over a project life of approximately 17 to 20 years. This will occur by widening and deepening the Marra Mamba pits at both Nammuldi and Silvergrass, and mining bedded Brockman ore at Nammuldi. Mining at the two mines would be both above and below the water table.

There would be accompanying increases in the capacity of and relocation of processing facilities and transport infrastructure and an increase in dewatering to access ore below the water table. The existing project is authorised to clear 2,000 hectares (ha) of vegetation. Approximately 3,900 ha of vegetation would be cleared for additional mine pits, waste dumps and associated infrastructure and facilities. Surplus water management would include transferring dewater to approximately 2,500 ha of pastoral land which would be irrigated for agriculture. The location and proposed layout of the project is shown on Figure 1.

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

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

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

Key environmental factors and principles

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

- Flora and vegetation;

- Surface water flows and groundwater;
- Closure, decommissioning and rehabilitation; and
- Residual impacts.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

(a) The precautionary principle.

(b) The principle of intergenerational equity.

(c) The principle of the conservation of biological diversity and ecological integrity.

(d) Principles relating to improved valuation, pricing and incentive mechanisms.

(e) The principle of waste minimisation.

Conclusion

The EPA has considered the revised proposal by Hamersley Iron to expand the Nammuldi-Silvergrass Iron Ore Project.

Flora and vegetation

The implementation of the proposal would impact an additional 6,400 ha of native vegetation (3,900 ha for the mine, waste dumps, waste fines storage facility and associated infrastructure; and 2,500 ha for the irrigated agriculture area). Flora investigations indicate the vegetation communities potentially impacted by this proposal are widespread. Clearing will also include approximately 45 ha of riparian vegetation associated with the realignment of 3 km of Caves Creek and 47 ha (0.2%) of the *Astrebla* grassland Priority Ecological Community (PEC). Groundwater investigations indicate that groundwater-dependent ecosystems will not be impacted by drawdown of the aquifer underlying Caves Creek.

In view of the above, the EPA recommended that the extent of authorised additional clearing be limited to 6,400 ha as described and spatially defined in the recommended statement of approval. This includes limiting the loss of riparian vegetation or groundwater-dependent ecosystems to 45 ha of clearing for the diversion of Caves Creek and approximately 47 ha of the PEC. A condition has been recommended which provides for the proponent to prepare a Vegetation and Groundwater-Dependent Ecosystems Monitoring and Management Plan to monitor and manage the proposal to ensure no additional losses of groundwater-dependent ecosystems other than the extent authorised.

Surface water flows and groundwater

The combined dewatering at the two mines will result in approximately 643 gigalitres (GL) of abstraction during the life of the project. The maximum extraction rates are expected to be 138 megalitres (ML)/day (50.4 GL/year) for Nammuldi, and 185.4 ML/day (67.4 GL/year) for Silvergrass. The proponent has developed a Surface Water Management Strategy which uses the following hierarchy for disposal of excess water:

- on-site use;
- off-site use (including potentially 25 ML/day to the nearby Brockman-4 mine);
- irrigation of approximately 2,500 ha of pastoral land (using the majority of the excess water); and
- disposal to Duck Creek (when water is not needed for irrigated agriculture).

The potential impacts on the environmental values of Duck Creek need to be maintained over the life of mining operation and as long as discharges to the creek occur. The EPA has recommended Condition 7 to manage potential impacts of surface water discharges. This condition requires the proponent to identify the environmental values of Duck Creek and provides for the proponent to prepare a Water Discharge Monitoring and Management Plan, which addresses monitoring to demonstrate that its predictions are being met and that any abstracted groundwater discharged to the environment meets appropriate water quality standards. The proponent will also be required to include provisions for remediating the Duck Creek system, if necessary, to ensure that the environmental values are maintained.

Noting that irrigation of the agricultural area has the potential to impact the local hydrological regime, the EPA has also recommended Condition 8 to ensure that soil saturation and water quality are monitored and managed to control run-off and water mounding likely to be associated with irrigation of the agricultural area.

Introduced species

The EPA is concerned that the introduced species, Rhodes Grass (*Chloris gayana*) which is proposed to be used in the irrigated agricultural area has the potential to become an invasive weed and there may be a need to consider an alternative species for cultivation. The EPA has therefore recommended Condition 9 which requires the proponent to demonstrate that the species it selects for cultivation does not have the potential to become an invasive weed. The condition also requires the proponent to ensure that the cultivated species does not spread beyond a 30 m buffer surrounding the individual agricultural pivots that are to be located within the larger irrigated agricultural area.

Closure, decommissioning and rehabilitation

The EPA has recommended a condition (Condition 10) which provides for an integrated Closure, Decommissioning and Rehabilitation Plan which will apply to the existing and proposed operations. The plan will be prepared in accordance with the Department of Mines and Petroleum (DMP)/EPA *Guidelines for Preparing Mine Closure Plans* (June 2011). The condition also addresses the management of mine pit voids and the potential for acid or neutral metalliferous drainage.

Residual impacts

This proposal is in the Hamersley IBRA subregion. The EPA has recommended Condition 11, which addresses the significant residual impacts of the proposal relating to:

- clearing of riparian vegetation along Caves Creek and a portion of *Astrebla lappacaea* Brockman PEC; and
- clearing and direct disturbance of up to 6,308 ha of native vegetation of predominantly good to excellent condition.

The condition provides for a contribution to the strategic regional conservation initiative.

The EPA has recommended that the proposal can be implemented to meet the EPA's environmental objectives provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4. As the proposal is being revised, the recommended conditions supersede the implementation conditions for the existing approved proposal, being Ministerial Statement 558.

Recommendations

That the Minister for Environment:

1. Notes that the proposal being assessed is for the expansion of the Nammuldi-Silvergrass Iron Ore Project, with increases in the capacity of processing facilities and clearing for infrastructure, pits, waste rock dumps, and mine dewatering.
2. Considers the report on the key environmental factors as set out in Section 3.
3. Notes the EPA has concluded that it is likely that the EPA's objectives would be achieved, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4.
4. Notes that as the proposal is being revised, the recommended conditions are intended to supersede the implementation conditions relating to the existing approved proposal in Statement 558.
5. Imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the information provided in this report, the EPA has developed a set of conditions, which the EPA recommends be imposed if the proposal by Hamersley Iron to expand the Nammuldi-Silvergrass Iron Ore Project is approved for implementation.

As the proposal is being revised, the recommended conditions are intended to supersede the implementation conditions relating to the existing approved proposal in Statement 558.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) Limiting the extent of clearing to 6,400 ha as described and spatially defined in recommended statement of approval.

(b) Groundwater-dependent vegetation – ensuring dewatering and discharges do not cause long term impacts on the health and abundance of groundwater-dependent vegetation beyond the areas authorised for clearing.

(c) Discharge to Duck Creek – monitoring and management to ensure discharges do not cause long term impacts to the environmental values of Duck Creek.

(d) Irrigated agriculture area – ensuring water quantity and quantity are managed to prevent adverse impacts on local hydrology.

(e) Management of introduced crop species – to demonstrate that the species selected for cultivation does not have the potential to become an invasive weed species and ensuring that the cultivated species does not spread beyond a 30 m buffer surrounding the individual agricultural pivots.

(f) Closure, decommissioning and rehabilitation – preparation and implementation of an integrated Closure, Decommissioning and Rehabilitation Plan which will apply to the existing and expanded operations at Nammuldi-Silvergrass. The plan will be prepared in accordance with the DMP/EPA *Guidelines for Preparing Mine Closure Plans* (2011).

(g) Residual impacts and risk management measures – contribution to the strategic regional conservation initiative to mitigate for the significant residual impacts on vegetation in good to excellent condition, riparian vegetation and a PEC.

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3. Summary of identification of key environmental factors
4. Recommended Environmental Conditions and nominated Decision-making Authorities
5. Summary of submissions and proponent's response to submissions

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposal by Hamersley Iron Pty. Limited (Hamersley Iron), a wholly-owned subsidiary of Rio Tinto Iron Ore (Rio Tinto), to expand the Nammuldi-Silvergrass Iron Ore Project. The proposal, is located approximately 60 km north west of the town of Tom Price in the Pilbara region. The original Nammuldi-Silvergrass Iron Ore Project was approved on 28 November 2000 and is subject to the requirements of Ministerial Statement 558.

The mining production rate is expected to be increased to approximately 45 million tonnes per year (Mtpa), over a project life of approximately 17 to 20 years, by widening and deepening Marra Mamba pits at both Nammuldi and Silvergrass, and mining bedded Brockman ore at Nammuldi. Mining at the two mines would be both above and below the water table. There would be accompanying increases in the capacity of and relocation of processing facilities and transport infrastructure, and an increase in dewatering to access ore below the water table. Surplus water management would include transfer of water from dewatering to approximately 2,500 ha of pastoral land for irrigated agriculture. There would also be approximately 3,900 ha of vegetation cleared for mine pits, waste dumps and associated infrastructure and facilities. The location and proposed layout of the project is shown on Figure 1. Approximately 2,000 ha of clearing is authorised for the existing Nammuldi-Silvergrass Iron Ore Project approved in November 2000.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

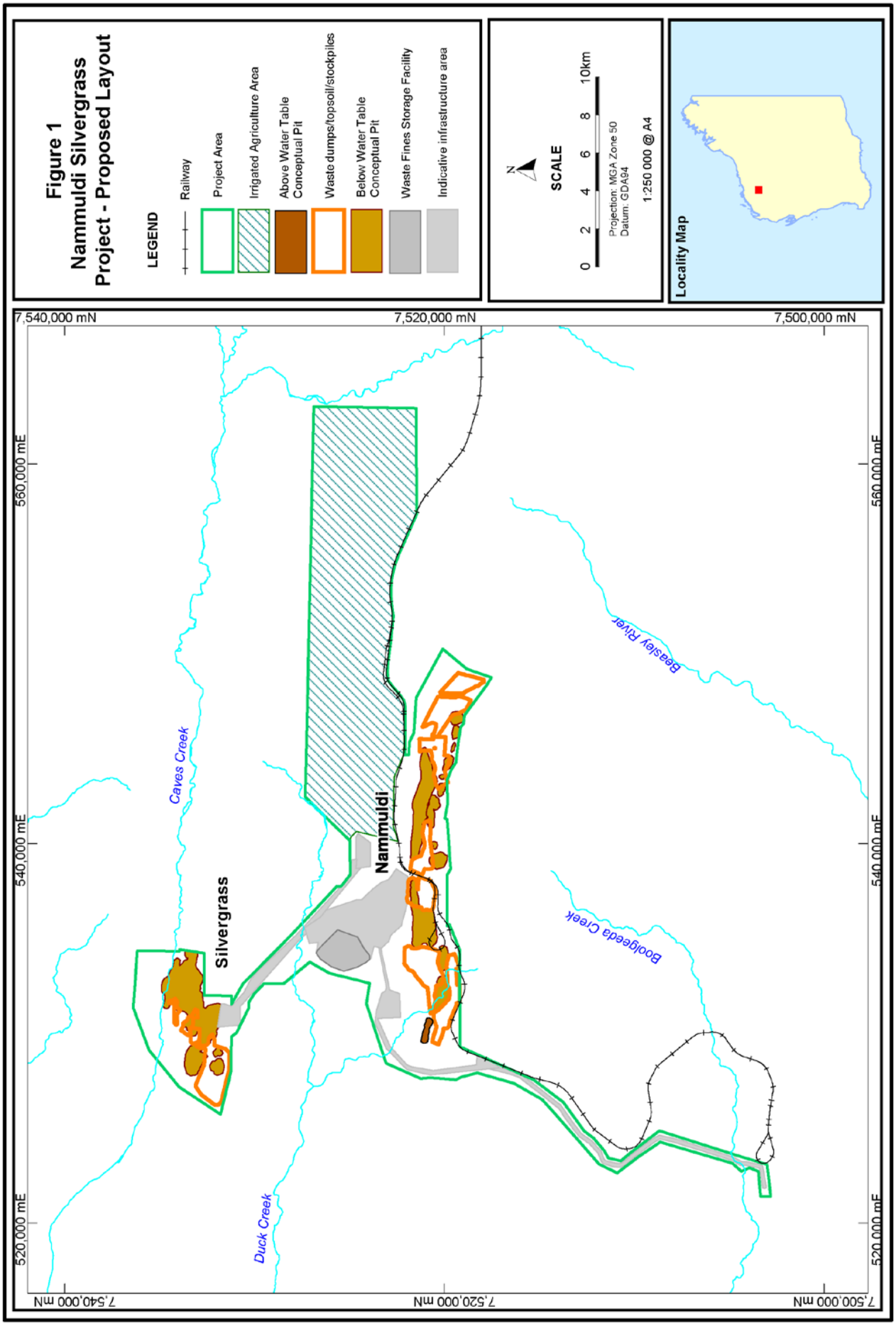

Figure 1. Nammuldi Silvergrass Project – Proposed layout

2. The proposal

The proposal involves the expansion of existing operations of the Nammuldi-Silvergrass Iron Ore Project and is therefore a Revised Proposal.

The proposal includes:

- modifying and increasing the size of the Marra Mamba pits (widening and deepening) at both Nammuldi and Silvergrass, and mining bedded Brockman ore at Nammuldi;
- increasing the capacity of, and relocating, ore transport infrastructure;
- increasing the capacity of, and relocating, the processing facilities to produce approximately 45 Mtpa of Shipped Ore Product (SOP);
- increasing dewatering at Nammuldi and Silvergrass to access ore below the water table;
- variations to the surplus water management strategy, including transfer of water from dewatering to the Irrigated Agriculture Area (IAA) on Hamersley Station;
- re-aligning a section of Caves Creek to allow mining of Silvergrass Pit 1; and
- changing the location of the waste fines storage facility (formerly central thickened tailings facility).

The proposal includes the additional clearing of approximately 3,900 ha of vegetation for mine pits, waste dumps and associated mine infrastructure and facilities, and approximately 2,500 ha for the IAA.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the Public Environmental Review (PER) *Nammuldi-Silvergrass Expansion Project* (Hamersley Iron Pty. Limited, June 2012).

Table 1: Summary of the Proposal

Proposal Title	NAMMULDI-SILVERGRASS EXPANSION
Short Description	This proposal is an expansion of the original Nammuldi-Silvergrass Iron Ore Project of November 2000, located approximately 60 km north west of the town of Tom Price, Shire of Ashburton, in the Pilbara. The production rate will be increased to approximately 45 Mtpa over a project life of 17 to 20 years by widening and deepening Marra Mamba pits at both Nammuldi and Silvergrass mine sites, and mining bedded Brockman ore at Nammuldi. Mining

	will be both above and below the water table. There will be accompanying increases in the capacity, and relocation of processing facilities and transport infrastructure, and an increase in dewatering to access ore below the water table. Surplus water management will include transfer of water from dewatering to approximately 2,500 ha of pastoral land for irrigated agriculture. There will also be approximately 3,900 ha of vegetation cleared for mine pits, waste dumps and associated infrastructure and facilities.

Table 2: Location and extent of physical and operational elements

Column 1	Column 2	Column 3
Physical Element	**Location**	**Authorised Extent**
Open cut Marra Mamba mine pits plus Bedded Brockman pits	Nammuldi area (see Figure 1)	Mining up to 225 m below the water table
Open cut Marra Mamba mine pits	Silvergrass area (see Figure 1)	Mining up to 150 m below the watertable All pits to be backfilled above the post-mining water table levels
Existing approval for mine, waste dumps, and associated infrastructure	See Figure 1	Clearing of up to 2,000 ha of native vegetation within the development footprint
Mine, waste dumps, waste fines storage facility, and associated infrastructure	See Figure 1	Clearing of up to 3,900 ha of native vegetation within the development footprint
Irrigated agriculture area	See Figure 1	Clearing of up to 2,500 ha of native vegetation within the development footprint
Dewatering	Nammuldi area (see Figure 1): Silvergrass area (see Figure 1):	Abstraction of no more than 51 GL/year Abstraction of no more than 68 GL/year

Management of surplus water	Project area and surrounding areas (see Figure 1)	• transfer for offsite use • transfer to the Irrigated Agriculture Area • periodic discharge to Duck Creek
Diversion of Caves Creek	Silvergrass area (see Figure 1)	Permanent realignment of up to a 3 km length of Caves Creek

The potential impacts of the proposal initially predicted by the proponent in the PER document (Section 6.2.2, Table 16) and their proposed management are summarised in Table ES2 (Executive Summary) of the proponent's document.

3. Key environmental factors and principles

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report are summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as Aboriginal culture and heritage, terrestrial fauna, and particulates and dust, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

(a) Flora and vegetation;

(b) Surface water flows and groundwater;

(c) Closure, decommissioning and rehabilitation; and

(d) Residual impacts.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics set out in Table 1.

Details on the key environmental factors and their assessment are contained in sections 3.1 to 3.4. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal, taking into consideration environmental impact management by the proponent. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

(a) The precautionary principle.

(b) The principle of intergenerational equity.

(c) The principle of the conservation of biological diversity and ecological integrity.

(d) Principles relating to improved valuation, pricing and incentive mechanisms.

(e) The principle of waste minimisation.

3.1 Flora and vegetation

Description

The proponent proposes to clear 6,400 ha of land comprising 3,900 ha for mine pits, waste dumps, the realignment of Caves Creek (45 ha), and associated mine infrastructure, as well as 2,500 ha for irrigated agriculture. The original Nammuldi- Silvergrass project has approval for 2,000 ha of clearing.

The flora and vegetation surveys of the greater Nammuldi area have recorded more than 600 species from over 60 families, including 14 introduced species. The area is part of a pastoral station which has been grazed, most recently by cattle, however most vegetation communities were found to be in good to excellent condition.

The riparian vegetation of major creek lines, Mulga woodland, and some cracking clay soil communities in the area are considered to be locally restricted. A Threatened Ecological Community (TEC) occurs on the cracking clays adjacent to the project area – *Themeda* grassland TEC. This TEC also occurs at other locations along Caves Creek with the largest area some 25 km to the east. A Priority Ecological Community (PEC) also occurs within the Greater Nammuldi Area – the *Astrebla* tussock grassland PEC which consists of rare tussock grassland dominated by *Astrebla lappacea*.

The proposal includes the clearing of 45 ha of riparian vegetation for the realignment of Caves Creek. This equates to 9% of the extent of riparian vegetation in the proposal area. It is also proposed to clear 47 ha (0.2%) of the PEC. The *Themeda* grassland TEC will not be impacted by clearing.

Mine dewatering is required to enable mining below the water table at both Nammuldi and Silvergrass. This will result in a cone of depression around the pits during the working life and afterwards as the water table rebounds.

Drawdown for the Nammuldi pits will be restricted to the Nammuldi valley, which does not contain any major creeks or groundwater-dependent vegetation.

Drawdown relating to the Silvergrass pits will result in at least two metres of drawdown for approximately 15 km along Caves Creek. Groundwater investigations have identified a clay layer 15 to 20 m thick, which separates the alluvial surface water aquifer of the creek from the deeper aquifer. The proponent has stated that the drawdown will not impact on the riparian vegetation.

Submissions

Submissions for this factor raised matters including the following:

- The Palm Springs / Duck Creek wetland system is significant for biodiversity conservation in the Hamersley IBRA sub-region. Groundwater drawdown and surface water discharge management are therefore important.
- Dewatering at Silvergrass has the potential to cause drawdown in the superficial aquifer along Caves Creek to a greater extent than identified in the original proposal. 'No mine dewatering impact on Palm Springs' should be a management objective.
- The Caves Creek realignment should not impact on the cracking clay TEC and PEC.
- Mine dewatering effluent discharged to creeks has potential to affect vegetation and other environmental values over many kilometres.

Assessment

The EPA's environmental objectives for this factor are:

- to maintain the abundance, diversity, geographic distribution and productivity of flora and vegetation communities at species and ecosystem levels, through the avoidance or management of adverse impacts and improvement in knowledge; and
- to protect Declared Rare and Priority Flora, and other species of conservation significance consistent with the provisions of the *Wildlife Conservation Act 1950*.

The proposed expansion of the Namuldi operations together with the development of Silvergrass pits will result in the clearing of 6,400 ha of vegetation. It should be noted that 2,000 ha of clearing for the existing proposal has been authorised in the current Ministerial Statement 558.

The EPA notes that:

- the vegetation communities potentially impacted by the proposal are widespread in the region;
- Themeda Grassland TEC will not be impacted and that the proponent has included a 200 m buffer around the mapped boundary of the TEC; and
- the proposed 91 ha of clearing in the *Astrebla* grassland PEC equates to 0.2% of the known area of the PEC. This is not considered to be a

significant impact on the extent of the PEC and is also unlikely to significantly impact the ecological functions of the PEC.

In view of the above, the EPA recommends that the proposal is implemented consistent with the extent of impacts detailed by the proponent. The extent of authorised clearing will be limited to 6,400 ha as described and spatially defined in the recommended statement of approval.

The EPA also notes that groundwater investigations have identified a clay layer 15 to 20 m thick which separates the alluvial surface water aquifer of Caves Creek from the deeper aquifer. The proponent has predicted that groundwater-dependent ecosystems will not be impacted by drawdown of the underlying aquifer. The EPA has recommended a condition (Condition 6) to ensure that the loss of riparian vegetation or groundwater-dependent ecosystems is limited to the 45 ha of clearing for the diversion of Caves Creek. The condition provides for the proponent to prepare a Vegetation and Groundwater-Dependent Ecosystems Monitoring and Management Plan to monitor and substantiate the proponent's predictions. The plan requires the establishment of triggers to identify any decline in health of the riparian vegetation, and management actions to be implemented in the event that trigger levels are exceeded.

Summary

Having particular regard to:

(a) the widespread nature of the vegetation communities potentially impacted by this proposal in the region;

(b) Themeda Grassland TEC will not be impacted by the proposal;

(c) the clearing of 0.2% of the *Astrebla* grassland PEC is unlikely to significantly impact the ecological functions of the PEC; and

(d) groundwater investigations which indicate that groundwater-dependent ecosystems will not be impacted by drawdown of the aquifer underlying Caves Creek,

it is the EPA's opinion that it is likely that the EPA's environmental objective(s) for this factor can be achieved provided implementation conditions are imposed requiring:

- limiting the extent of authorised clearing to 6,400 ha as described spatially defined in the recommended statement of approval; and
- ensuring that the loss of riparian vegetation or groundwater-dependent ecosystems is limited to the 45 ha of clearing for the diversion of Caves Creek. The condition provides for the proponent to prepare a Vegetation and Groundwater-Dependent Ecosystems Monitoring and Management Plan to monitor and substantiate the proponent's predictions.

3.2 Surface water flows and groundwater

Description

The Nammuldi and Silvergrass sites are located in the Ashburton River Basin, with the Nammuldi site located at the headwaters of Duck Creek and Beasley River catchments, and the Silvergrass site occurring immediately south of Caves Creek. Duck Creek has a total catchment of approximately 6,500 km^2 and drains from east to west discharging into the Ashburton River. The major tributaries of Duck Creek are Caves Creek and Boolgeeda Creek.

The combined dewatering will result in approximately 643 GL of abstraction during the life of the mines. The maximum abstraction rates are expected to be 138 ML/day (50.4 GL/year) for Nammuldi and 185.4 ML/day (67.4 GL/year) for Silvergrass. The proponent has developed a Surface Water Management Strategy which uses the following hierarchy for disposal of excess water:

- on-site use including potable water, process water, dust control, other general uses;
- off-site use including potentially 25 ML/day to the Brockman 4 mine;
- irrigated agriculture which would use the majority of the excess water; and
- disposal to Duck Creek when water is not needed for irrigated agriculture.

The irrigated agriculture area will need to be managed to prevent groundwater mounding. The proponent has developed an Agriculture Environmental Management Plan to prevent significant increases in the rate of accession of water to the water table below. Measures include optimisation of the irrigation system, evapotranspiration and evaporation rates, and real-time monitoring to ensure that the volume of irrigation water does not exceed crop use capacity. The peak daily irrigation rate is anticipated to be in excess of 200 ML/day in summer and 90 ML/day in winter.

Water in excess of what can be discharged to the irrigated agriculture area is proposed to be discharged to Duck Creek. It is the proponent's view that Duck Creek is the most suitable receiving creek in the Greater Nammuldi area as:

(1) it contains more persistent pools and its riparian vegetation and aquatic fauna populations are likely to be more accustomed to periods of sustained creek bed saturation than other watercourses in the area, and

(2) water discharged to Duck Creek would not reach Palm Springs which has cultural and biological significance.

Discharge to Duck Creek is expected to occur in summer during substantial rainfall events, as required during emergencies, and during winter, in periods when the surplus water generation exceeds agricultural area irrigation capacity.

Discharge modeling estimated the width and depths of flows at a range of hypothetical continuous discharge volumes to Duck Creek every day until steady state was reached. The modeling showed that the flow would be entirely contained within the low-flow channel, with the exception of a discharge of 200 ML/day in Reach 1. The current Ministerial Statement (No. 558) allows a maximum of 18 ML/day of discharge into Duck Creek. The proponent proposes a threshold discharge of 20 ML/day, however this will also be exceeded for periods of time.

The proponent considers that discharges in excess of 20 ML/day are unlikely to significantly increase the length of the anticipated discharge footprint. Modeling of the discharge footprint downstream of the Duck Creek discharge points identified that a steady state discharge of 20 ML/day is expected to travel over 80 km down the creek.

As indicated, the strategy proposes preferential disposal to the irrigated agricultural area. Over the 17 to 20 year life of the mine, the predicted average discharge (after exceeding the capacity of the Irrigation Agricultural Area) is expected to exceed the 20 ML/day threshold for a total of 17 months over an eight-year period, including discharges exceeding 40 ML/day for nine months of this period. The proponent generally considers that this will occur at times when there is already a substantial flow in the creek system (ie, high rainfall events).

Surface water quality is not expected to be adversely affected by dewatering discharge and will be the subject of ongoing monitoring. The proponent will monitor water quality of excess water using trigger levels developed under ANZECC / ARMCANZ guidelines. Due to the periodic nature of the discharge and consistency of aquatic fauna populations in the watercourses, the discharge of water is considered unlikely to significantly affect aquatic fauna populations.

It should also be noted that the 3 km realignment of Caves creek is not predicted to impact on the overall surface water flow regime of the creek.

Approximately 30 km downstream from the Silvergrass site along Caves Creek is Palm Springs. These springs are fed by groundwater rather than surface water and are not expected to be impacted by this proposal as they are not connected to the Silvergrass orebody aquifer.

Submissions

The submissions for this factor raised matters including the following:

- the importance of maintenance of Caves Creek water quality and flow characteristics following the diversion;
- monitoring the impacts on hydrology and ecology of Duck and Caves creeks within areas where surface water discharges are proposed;
- the chemical composition and quality of discharged dewater; and

- dewatering at Silvergrass has the potential to cause greater drawdown along Caves Creek than originally identified.

Assessment

The EPA's environmental objectives for this factor are:

- to maintain the quantity and quality of surface water and groundwater so that existing and potential environmental values, including ecosystem maintenance, are protected; and

- to maintain the integrity, ecological function and environmental values of watercourses and sheet flow, and to ensure that alterations to surface drainage do not adversely impact native vegetation or flow regimes.

The existing operations at Nammuldi are regulated under the commitments included in Ministerial Statement 558, through various management plans.

Surface water discharges can bring about changes to the ecology of creek systems. The receiving environment in the Nammuldi-Silvergrass region has seasonal surface water flows and therefore permanent flows would disrupt the environmental values of creeks in this area.

Given the discharge to Duck Creek, the EPA has recommended Condition 7 to manage potential impacts of surface water discharges. This condition requires the proponent to identify the environmental values of Duck Creek. The recommended condition provides for the proponent to prepare a Water Discharge Monitoring and Management Plan which addresses monitoring to demonstrate that its predictions are being met and that any abstracted groundwater discharged to the environment does not exceed the *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC/ARMCANZ 2000) having regard to baseline water quality levels at the Nammuldi-Silvergrass Expansion Project. The proponent will also be required to include provisions for remediating the Duck Creek system, if necessary, to ensure that the environmental values are maintained.

Noting that irrigation of the agricultural area has the potential to impact the local hydrological regime, the EPA has also recommended Condition 8 to ensure that soil saturation and water quality are monitored and managed to control run-off and water mounding associated with the irrigated agricultural area.

Summary

Having particular regard to the:

- proponent's proposed Adaptive Surface Water Management Plan,

it is the EPA's opinion that it is likely that the EPA's environmental objectives for this factor can be achieved provided conditions are imposed requiring the proponent to:

- identify the environmental values of the Duck Creek system and to ensure that it manages its discharges to achieve its predictions regarding the likely extent of surface water expression in the creek system; and

    - prepare and implement a Water Discharge Monitoring and Management Plan which addresses monitoring and management to demonstrate that its predictions are being met, and that any abstracted/extracted groundwater discharged to the environment does not exceed the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines*, (Chapters 1–7), October 2000 (ANZECC/ARMCANZ 2000) having regard for baseline water quality levels at the Nammuldi-Silvergrass Iron Ore Project.

3.3 Closure, decommissioning and rehabilitation

Description

The proposal would result in clearing of vegetation for mine pits, waste dumps, and associated infrastructure. Mine pits remaining at the end of mining have the potential to impact ground and surface water quality. It is proposed to grow the introduced species Rhodes Grass (*Chloris gayana*) on the irrigated agricultural area and this species has the potential to become a weed, potentially spreading beyond the irrigated agricultural area.

Mine pit voids and water quality

The proponent has indicated that some mine voids will be backfilled to above the water table, whilst others will not.

All Silvergrass, pits will be backfilled to above the predicted stable post-mining water table level as a minimum to ensure that no permanent pit lakes form. Modelling of groundwater recovery at Silvergrass indicates that it will take approximately 125 years after mine closure and the cessation of dewatering before recovering close to pre-mining levels. The proponent indicates the backfilled pits will enable groundwater throughflow and prevent permanent groundwater sinks forming.

At Nammuldi, as several pits will be mined concurrently, there will be limited opportunities for progressive disposal of waste to pit voids during mining. In addition, there will likely be insufficient material to backfill the Nammuldi pits to above the pre-mining watertable since more than 90% of the known high grade ore resource occurs below the current watertable.

The proponent has indicated that due to the difficulties associated with modelling partially back-filled pits, modelling of post-closure conditions has only been undertaken assuming no back-filling. Modelling of groundwater recovery (assuming no back-filling) indicates it will take between 50 and 70 years before groundwater levels across Nammuldi reach a quasi-steady state after dewatering of the Nammuldi pits ceases. On average, these post-mining groundwater levels will be approximately 65 to 75 m lower than pre-

mining groundwater levels. Pit lakes are expected to form in all Nammuldi pit voids except for Lens B. Mine pit void lakes will be in the order of 90 m (Lens A and Lens E/F) to 160 m (Lens C/D) deep.

Evaporation from the pit lakes is expected to exceed local rainfall runoff and groundwater inputs into the voids, which will cause the pit lakes to become local groundwater sinks. Although the pit lakes are expected to increase in salinity as a result of evaporation over time, modelling of the mine pit water quality indicates that after 150 years the water quality is still likely to be within the freshwater range.

Modelling has also indicated that the outflow component of the water balance from the mine pits will be predominately from evaporation with flow of water from the pit voids to groundwater likely to be limited to approximately 2% of the outflow from Lens C/D pit void, approximately 11% from Lens A and approximately 21% from Lens E/F. This flow of water from pit lakes to the underlying groundwater is not expected to significantly affect the water quality of the groundwater. In addition, there are no nearby groundwater-dependent vegetation, water holes or restricted subterranean fauna communities within the Nammuldi valley which are likely to be affected by the minor change to groundwater quality.

Acid and metalliferous drainage (AMD)

Acidic drainage is associated with sulphide-containing minerals, in particular pyrite (FeS_2), which can occur within waste material in the pit zones. Pyrite can oxidise causing the release of sulphuric acid with the dissolution of a variety of metals from exposed rocks. In the presence of neutralising materials, such as calcite or dolomite, pyrite oxidation can lead to neutral metalliferous drainage. Under particular reaction conditions, other types of neutral or alkaline metalliferous drainage can occur from rock types with elevated concentrations of metal and metalloid species.

Testing indicated that mining at Nammuldi and Silvergrass is unlikely to encounter significant volumes of material with the potential to generate acid. Analysis of elemental enrichments identified that iron, arsenic and selenium were elevated, consistent with the majority of Pilbara lithologies.

The proponent's evaluation concluded that any AMD generated is readily manageable and would not pose a significant ecological risk.

Submissions

Submissions on the PER raised the following matters:

- the waste dumps should be designed and constructed with closure in mind to ensure that adverse materials can be encapsulated;
- IAA - decommissioning of water infrastructure and rehabilitation should be addressed in the closure and rehabilitation plan;
- closure criteria need refining prior to next revision of the plans; and

- mine voids should be backfilled to levels which would prevent formation of permanent pit lakes to avoid long-term impacts on water quality and biodiversity values.

Assessment

The EPA's environmental objective for this factor is:

- To ensure that a planning process is in place so that the mine can be closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed post-mining outcomes and land-uses, and without unacceptable liability to the State. Planning is to be carried out in accordance with the DMP/EPA *Guidelines for Preparing Mine Closure Plans*.

The EPA notes the Decommissioning Plan condition (Condition 7, of Ministerial Statement 558) for the existing operations at Nammuldi-Silvergrass requires updating to reflect contemporary practices and standards for mine closure and rehabilitation.

The EPA has recommended Condition 10 which provides for an integrated Closure, Decommissioning and Rehabilitation Plan which will apply to the existing and expanded operations at Nammuldi-Silvergrass. The Plan will be prepared in accordance with the DMP/EPA *Guidelines for Preparing Mine Closure Plans* (2011).

Matters to be addressed in the Mine Closure Plans for Nammuldi and Silvergrass include:

- managing long term hydrological impacts;
- managing surface water systems;
- progressive rehabilitation;
- Identification of completion criteria;
- monitoring and contingency measures; and
- rehabilitation of the IAA.

The EPA is also concerned that the introduced species Rhodes grass has the potential to become an invasive weed and there may be a need to consider an alternative species for cultivation on the irrigated agricultural area. The EPA has therefore recommended a condition (Condition 9) which requires the proponent to demonstrate that the species it has selected for cultivation does not have the potential to become an invasive weed species. The condition also requires the proponent to ensure that the cultivated species do not spread beyond a 30 m buffer surrounding the individual agricultural pivots located within the larger agricultural area, and to identify trigger level and management actions to be implemented in the event that the species spreads beyond the agricultural pivots.

Summary

Having particular regard to:

- the proponent's hydrological investigations and predictions in relation to water quality in pits likely to remain at the end of mining:
- AMD likely to be generated by mining operations is readily manageable and would not pose a significant ecological risk;
- the need to ensure that species selected for cultivation on the irrigated agricultural area do not have the potential to become an invasive weed,

it is the EPA's opinion that it is likely that the EPA's environmental objective for this factor can be achieved provided conditions are imposed requiring the proponent to:

- prepare and implement an integrated Closure, Decommissioning and Rehabilitation Plan which will apply to the existing and expanded operations at Nammuldi-Silvergrass; and
- demonstrate that the species selected for cultivation does not have the potential to become an invasive weed species. The condition also requires the proponent to ensure that the cultivated species do not spread beyond a 30 m buffer surrounding the individual agricultural pivots.

3.4 Residual impacts

Description

Following the implementation of all mitigation measures, the Expansion Proposal would have the following significant residual impacts:

- clearing of approximately 45 ha of riparian vegetation along Caves Creek at Silvergrass to enable construction of the deviation of an approximately 3 km section of the creek and flood protection levees;
- clearing of a 47 ha portion of *Astrebla lappacaea* Brockman PEC; and
- clearing and direct disturbance of up to 6,308 ha of native vegetation of predominantly good to excellent condition.

Assessment

The EPA's environmental objective for this factor is

- to consider and provide adequate offsets where all efforts to avoid and minimise environmental impacts have been made and significant environmental impacts still remain (residual impacts).

The EPA has identified a substantial increase in the number of applications for and amount of clearing of native vegetation in the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region. This increase, combined with the predicted future activities requiring clearing in the Pilbara bioregion, as well as other impacts from pastoralism and fires, is likely to have

a significant impact on environmental values. As a result, the EPA has determined that a proactive approach to limiting these impacts is required.

Conservation areas in the Pilbara bioregion total approximately 8% of the area, with the remainder mostly Crown Land, covered with mining tenements and pastoral leases. As such, the potential for traditional land acquisition and management offsets is limited. The EPA has determined that a possible solution is the establishment of a strategic regional conservation initiative for the Pilbara. This initiative would pool funding from various offset requirements and then fund on-ground management actions to deal with key threatening processes across the Pilbara bioregion. One benefit of this is that the actions undertaken will benefit a range of species and ecosystems, including those identified as Matters of National Environmental Significance. Another benefit of this approach is that it limits the tenure issue by forgoing the requirement to acquire land. Normal government processes to transfer land into the conservation estate can continue to take place outside of the environmental impact assessment process.

Offsets for clearing good to excellent condition native vegetation have already been applied in the Pilbara bioregion for clearing close to the Fortescue Marsh. Where there is an additional level of environmental value (such as a Priority Ecological Community or riparian vegetation), a higher offset has been applied to account for this greater value. This has generally been for proposals within the Fortescue subregion, as well as some that are also partly in the Hamersley subregion, but also within the Upper Fortescue catchment.

The Fortescue subregion is poorly represented in the formal conservation reserve system (currently at 0.57%). The Hamersley IBRA subregion is fairly well represented (12.6%) within the conservation reserve system. However, this is still below the target of 15%. Taking this into account, lower offset rates for clearing of good to excellent condition native vegetation have been applied.

The other two IBRA subregions in the Pilbara (Chichester and Roebourne) are both also poorly represented (3.92% and 4.47% respectively). An appropriate rate will be determined when the EPA receives a proposal in these areas. However, given this limited protection, this rate is likely to be similar to the Fortescue subregion.

The actual rate applied to any particular proposal may vary depending on factors such as impacts on important State environmental assets (such as impacts on National Parks) and overlap between State and Commonwealth matters, such that an offset requirement is not duplicated.

This proposal is in the Hamersley IBRA subregion. Consistent with the approach outlined above, the EPA has recommended a condition (Condition 11), which addresses the significant residual impacts of the proposal relating to:

- clearing of riparian vegetation along Caves Creek and a portion of the *Astrebla lappacaea* Brockman PEC; and

- clearing and direct disturbance of up to 6,308 ha of native vegetation of predominantly good to excellent condition.

The condition provides for a contribution to the strategic regional conservation initiative.

3.5 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

4.1 Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Hamersley Iron Pty. Limited to expand the original Nammuldi-Silvergrass iron ore project, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) Limiting the extent of clearing to 6,400 ha as described and spatially defined in recommended statement of approval.

(b) Groundwater-dependent vegetation – to ensure dewatering and discharges do not cause long term impacts on the health and abundance of groundwater-dependent vegetation beyond the areas authorised for clearing.

(c) Discharge to Duck Creek – monitoring and management to ensure discharges do not cause long term impacts to the environmental values of Duck Creek.

(d) Irrigated Agriculture Area – ensuring water quantity and quantity are managed to prevent adverse impacts on local hydrology.

(e) Management of introduced crop species – to demonstrate that the species selected for cultivation does not have the potential to become an invasive weed species and ensuring that the cultivated species does not spread beyond a 30 m buffer surrounding the individual agricultural pivots.

(f) Closure, decommissioning and rehabilitation – preparation and implementation of an integrated Closure, Decommissioning and Rehabilitation Plan which will apply to the existing and expanded operations at Nammuldi-Silvergrass. The Plan will be prepared in

accordance with the DMP/EPA *Guidelines for Preparing Mine Closure Plans* (2011).

(g) Residual Impacts and Risk Management Measures - contribution to the strategic regional conservation initiative to mitigate for significant residual impacts on vegetation in good to excellent condition, riparian vegetation and a PEC.

4.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the Department of Environment and Conservation, the Department of Water and the Department of Mines and Petroleum on matters of fact and matters of technical or implementation significance.

Appendix 1

List of submitters

Organisations:

Government
Department of Indigenous Affairs
Department of State Development
Department of Health
Pilbara Development Commission
Department of Mines and Petroleum
Department of Environment & Conservation
Department of Water

Non- Government
Windiwari (Wintawari) Guruma Aboriginal Corporation

Individuals:
None

Appendix 2

References

ANZECC/ARMCANZ 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality,* Australian and New Zealand Environment and Conservation Council, and Agriculture and Resource Management Council of Australia and New Zealand, October 2000, Canberra

DMP/EPA 2011, *Guidelines for Preparing Mine Closure Plans*, June 2011, Department of Mines and Petroleum and Environmental Protection Authority, June 2011, Perth

EPA 2000, *Nammuldi-Silvergrass Iron Ore Project, 55km north-west of Tom Price,* Report No. 997, October 2000, Perth

EPA 2006*, Environmental Offsets,* Position Statement 9, January 2006, Environmental Protection Authority, Perth

EPA 2008, *Environmental Offsets – Biodiversity*, Guidance Statement No. 19, September 2008, Environmental Protection Authority, Perth

Hamersley Iron 2000, *Nammuldi-Silvergrass Iron Ore Project - Consultative Environmental Review*, February 2000, Perth

Hamersley Iron 2012, *Nammuldi-Silvergrass Expansion Project – Public Environmental Review*, Hamersley Iron Pty. Limited, June 2012, Perth

Hamersley Iron 2012, *Nammuldi-Silvergrass Expansion Project – Response to Public Submissions*, Hamersley Iron Pty. Limited, September 2012, Perth

Rio Tinto 2012, *Nammuldi Closure Plan,* Rio Tinto Iron Ore, April 2012, Perth

Rio Tinto 2012, *Silvergrass Closure Plan,* Rio Tinto Iron Ore, May 2012, Perth

Appendix 3

Summary of identification of key environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
BIOPHYSICAL			
Flora and vegetation	The proposal requires clearing of 6,400 hectares (ha) of native vegetation for mine pits, waste dumps, the realignment of Caves Creek, mine infra-structure and irrigated agriculture in addition to the original Nammuldi-Silvergrass project, which has approval for 2,000 ha of clearing. The flora and vegetation surveys of the Greater Nammuldi Area have so far recorded more than 600 species from over 60 families, including 14 introduced species. The area is part of a pastoral station which has been grazed most recently by	A comprehensive weed monitoring and management procedure should be developed to ensure that weeds, including introduced crops, do not spread outside the Irrigated Agricultural Area (IAA). Rhodes Grass (*Chloris gayana*) has the potential to become a serious weed and would require intensive management. No impacts on Palm Springs, the *Themeda* grasslands on cracking clays Threatened Ecological Community (TEC) or the Brockman Iron cracking clay communities Priority Ecological Community (PEC) due to altered hydrodynamics of Caves Creek. The realignment of Caves Creek should not impact upon the hydrodynamics and sediment transportation rates of Caves Creek downstream of the groundwater drawdown and creek diversion. Alterations downstream and associated impacts would present a residual risk and a management legacy for biodiversity values, including Palm Springs (i.e. permanent pools), the *Themeda* grasslands on cracking clays TEC and the Brockman Iron cracking clay communities PEC.	**Flora and vegetation is considered to be a Key Environmental Factor. See Section 3.1.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	cattle, however, most vegetation communities were found to be in Good to Excellent condition. The riparian vegetation of major creek lines, Mulga woodland, and some cracking clay soil communities in the area are considered to be locally restricted. A Threatened Ecological Community (TEC) occurs on the cracking clays adjacent to the project area – *Themeda* grassland TEC. This TEC also occurs at other locations along Caves Creek with the largest area some 25 km to the east.	Monitoring and management to include provision for remediating these systems to ensure that the environmental and conservation values and any downstream ecosystems are maintained. The Palm Springs / Duck Creek wetland system is one of four significant wetland systems for biodiversity conservation in the Hamersley Interim Biogeographic Regionalisation for Australia (IBRA) subregion. It is important that these systems and impacts on them be managed for the effects of groundwater drawdown and surface water discharge. The Silvergrass expansion should not cause direct impact on the *Themeda* grasslands on cracking clays TEC and the Brockman Iron cracking clay communities. All impacts on the Brockman Iron cracking clay communities PEC should be avoided. In the event that the direct disturbance of part of the Brockman Iron cracking clay communities PEC, is considered acceptable, no further disturbance beyond the identified area should be permitted.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	The use of introduced species in the IAA means that there is the potential for weed species to escape from the area. Species of concern include Rhodes Grass (*Chloris gayana*). The proponent needs to ensure that selected crop species are contained within the IAA, to implement a Weed Monitoring and Management Plan, and to undertake mitigation actions should weed species be found outside the IAA.	If it becomes evident that changes to water quality and/or depth in monitoring bores adjacent to Palm Springs take place, the proponent should notify DEC and DoW. This should also link to the Palm Springs Management Plan (See below). The proponent proposes to provide funds to support a Palm Springs Management Plan, as an offset, should a significant residual impact occur on the pools. DoW considers this plan should be a condition of approval, to maintain the natural ecosystem, not simply an option for offset. The proponent stated that there is no significant groundwater-dependent vegetation on Duck Creek, but the vegetation on Caves Creek has identifiable value. Dewatering at Silvergrass is predicted to impact about 10km of this vegetation, so DoW will link any monitoring associated with the groundwater licence to the amount of impact allowed by the environmental approval. The potential invasiveness of Rhodes Grass (*Chloris gayana*) when used for pastoral purposes in the Pilbara is of concern. Less invasive alternatives should be investigated with a view to their use prior to the results of DEC's Rhodes Grass research becoming	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		available.	
Fauna		Specific fauna management protocols should be implemented in consultation with DEC if trenching activities for pipeline installation are to be undertaken.	No impact is expected on conservation-significant vertebrate fauna species beyond loss of fauna habitat. **Fauna is not considered to be a Key Environmental Factor.**
Subterranean fauna	Significant stygofauna sampling took place at Nammuldi,with only 3 specimens collected. There is little evidence to suggest a significant stygal community exists. The majority of stygo-fauna species recorded at Silvergrass are widely distributed in the Pilbara bioregion. One taxa may be restricted, with 35 specimens found	Stygofauna sampling efforts at Silvergrass identified a single species which may be restricted to the Caves Creek alluvial aquifer – stygal taxa *Nedsia* sp. Advice should be sought from DEC on the potential for impacts on this species, and whether a management condition should be required.	The Caves Creek alluvial aquifer extends significantly outside the project area. **Subterranean fauna is not considered to be a Key Environmental Factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	within the proposal boundary, but a greater number was recorded outside the boundary.		
Aquatic fauna	Of the 12 species of freshwater fish known from the Pilbara, seven species were recorded. One species, the Fortescue grunter, has a restricted distribution within the Pilbara Region, but is reasonably common within its range.	No comments received.	**Aquatic fauna is not considered to be a Key Environmental Factor.**
Surface water flows	The proponent would need to realign 3 km of Caves Creek in order to construct one of the pits at the Silvergrass location. This is unlikely to impact on the surface water flow regime. Discharge to creeks is	Pit 1 and the realignment of Caves Creek should not significantly impact upon: • water quality; • flow velocities; • flow regime; and • sediment transportation rates, of Caves Creek downstream from the proposed creek diversion. The realignment of Caves Creek is at indicative design	**Surface water flows is considered to be a Key Environmental Factor. See Section 3.2.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	expected to occur in summer during substantial rainfall, as required during emergencies, and during winter, in periods when the surplus water generation exceeds agricultural area irrigation capacity. The proponent anticipates that the peak volume of surface water discharge will be no more than 20 GL/year (in 2018).	stage only. The current design is to permanently realign 3 km of the main creek channel, and to protect the downstream channel, TEC, water quality and Palm Springs. The DoW seeks the EPA's guidance on whether it is acceptable to leave the final design details until after project approval, and in consultation with DoW and DEC. It is not yet possible to confirm that there will be no reduction of flow to the TEC. The proponent should monitor the hydrology, ecology and biomass of Duck and Caves creeks to be impacted specifically within the area of influence of the existing and proposed surface water discharge and mine dewatering. To monitor creek ecosystems during discharge and compare against baseline data has no 'rectification' or 'reduction' action associated with it. There appears to be no purpose in this monitoring (PER p 259, Section D). Water management issues are likely to impact on both the Duck and Caves creek systems including: • dewatering at Silvergrass increasing the predicted	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		groundwater drawdown footprint (i.e. 10m drawdown contour) along Caves Creek from the current 4 km to 7 km; and • periodic surplus water discharge down Duck Creek when water exceeds what can be used for mine operations and irrigated agriculture. The proponent should provide information indicating whether the chemical composition and quality of mine dewatering effluent discharged to creek systems would be compatible with sustaining healthy ecosystems within the creeks. The amount of water discharged to local creeks has the potential to affect the environmental values of these systems for several tens of kilometres. The sustained discharge of mine dewatering effluent into waterways could cause environmental impacts on vegetation and other environmental values by changing wetting-drying cycles. Discussion is limited on the effects of discharging water with a different chemical composition into creeks. A 2011 report suggested that water quality changes due to dewatering discharge from the project would be minimal, but this has not been substantiated by any	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		studies on similar systems in the Pilbara. Aquatic macroinvertebrates can be very sensitive to changes in chemical composition. The discharge of dewatering effluent may directly affect the degree of wetting and drying of riverine systems and water quality for up to 80 km. Ecotoxicological testing should be carried out on some key organisms to demonstrate that discharge water quality is compatible with maintaining healthy aquatic communities.	
Groundwater	The proponent has investigated the impact of drawdown of groundwater as a result of dewatering for the proposal. Drawdown for the Nammuldi pits will be restricted to the Nammuldi valley which does not contain any major creeks or groundwater-dependent vegetation. Drawdown relating to	Dewatering estimates are preliminary and not precise, especially for Silvergrass. More work is needed to firm up the dewatering rates, to allow assessment of the drawdown and discharge impacts. Silvergrass dewatering is in an area where environmental impacts will be most significant (stygofauna and vegetation). Dewatering at Silvergrass has the potential to cause drawdown in the superficial aquifer along Caves Creek to a much greater extent than identified in the original proposal – approximately 15 km. Dewatering is predicted to have no impact on Palm Springs, which should be a management objective. Discharge may impact on Palm Springs if Caves Creek	**Groundwater is considered to be a Key Environmental Factor. See Section 3.2**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	the Silvergrass pits will result in at least two metres (m) of drawdown for approximately 15 km along Caves Creek. Groundwater investigations have also identified a clay layer 15 to 20 m thick which separates the alluvial surface water aquifer from the deeper aquifer. The proponent has stated that the drawdown will not impact on the riparian vegetation. The proponent also considers that neither the TEC nor PEC will be impacted by the drawdown. The proponent has developed a Surface Water Management Strategy which uses the	backs up due to the large volume of discharge into Duck Creek. DoW will work with the proponent and DEC to ensure trigger levels and contingency actions are acceptable, and sufficient to ensure adverse impacts are identified and minimised. Triggers and contingencies need to be consistent between the approved Environmental Management Plan and the Groundwater Licence. The proponent has not committed to the options presented for surplus water management - before discharge to Duck Creek. The amount of discharge to Duck Creek may be much higher, should transfer to B4 mine be postponed, or the Irrigated Agriculture Area (IAA) be unable to cope, due to water table rise. Discharge to Duck Creek may result in permanent saturation for a large distance, and groundwater backing up towards Palm Springs. Modelling of the discharge footprint identified that a steady state discharge of 20 ML/day would travel over 80km down the creek. Should the discharge rate be higher, there may be impacts on groundwater-dependant ecosystems outside the project footprint.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	following hierarchy for disposal of excess water: • On-site use (including potable water, process water, dust control, other general uses); • Off-site use (including potentially 25 ML/day to the Brockman 4 mine); • Irrigated agriculture (which would use the majority of the excess water); and • Disposal to Duck Creek (when water is not needed for irrigated agriculture).	A commitment to these alternative options, or a condition to limit the extent of discharge impacts from excess disposal would be necessary. DoW would expect regular monitoring and reporting of discharge volumes through commitments in the adaptive surface water management plan, as well as under operating strategy/licensing commitments. The IAA would use water from both Nammuldi and Silvergrass after use on site, or off-site to other users, according to the proponent's surplus water management strategy. This may imply that the irrigation project will only take the amount of excess water that can be managed through this adaptive process, with contingency to divert the excess to Duck Creek until the elevated water table has declined. Technical advice from Department of Agriculture and Food WA should be sought on whether the management of soil condition is practically achievable by controlling irrigation rates alone. DoW does not feel the project can be managed under the *Rights in Water and Irrigation Act 1914* licensing process alone, and recommends that further work be undertaken to satisfy the above comments, or the EPA	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		may consider recommending ministerial conditions to address water management aspects of the proposal.	
Residual impacts	A Priority Ecological Community (PEC) occurs within the Greater Nammuldi Area – the *Astrebla* tussock grassland PEC which consists of rare tussock grassland dominated by *Astrebla lappacea*. The proposal includes the clearing of 45 ha of riparian vegetation. It is also proposed to clear 47 ha of the PEC which equates to 0.2% of the PEC.	No public comments received.	**Considered to be a Key Environmental Factor. See Section 3.4.**
POLLUTION			
Greenhouse gas emissions	GHG emissions for the original proposal *plus* expansion proposal would be approximately 600 kt CO_2 e per annum.	The proponent should clarify the emission intensity figures reported in the PER to ensure that the EPA can benchmark the project and ensure best practice outcomes. The emission intensity metrics are confusing and inaccurate. The emissions based on	The proponent is committed to minimising emissions to levels as low as reasonably practicable through a wide range of

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		mining emissions alone should be calculated. It is noted that the greenhouse gas (GHG) intensity for the expansion appears to be very high. There is no explanation for this. The proponent should benchmark the emission intensity of the project against other comparable iron ore mining projects. The proponent has not noted best practice standards nor nominated feasible future emission intensity targets. Annual emissions contained in the PER are based on an apparently static emission intensity level over the life of the project despite the fact that, even without a carbon price, emission intensity (CO_2-e per $) for iron ore mining in Australia is expected to drop by around 25% between 2010 and 2050. Specific management strategies to minimize greenhouse gas emissions, which are complementary to the carbon pricing mechanism (detailed above), should be employed. Management strategies to minimize emissions should be identified. The proponent should demonstrate compliance with *Guidance No.12 on Minimising Greenhouse Gas Emissions*, which notes that proponents should 'clearly indicate in their review documentation':	management actions as listed in the PER (Section 15.4.2). **Greenhouse gas emissions is not considered to be a Key Environmental Factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		• greenhouse gas emissions inventory and benchmarking; • measures to minimize greenhouse gas emissions; and • carbon sequestration to further reduce emissions.	
Dust and atmospheric emissions	Generation of dust can be triggered by on-site sources as follows: *Mining activity* - blasting, loading, hauling, crushing, conveying, screening, and stockpiling material. *Exposed surfaces* - wind over pits, waste dumps and additional disturbed ground. *Vehicle activity* - heavy mining equipment, light vehicles, and rail locomotives on dry, unsealed surfaces. Agricultural activity - harvesting of crops.	Campaign dust monitoring, using the appropriate Australian Standard, may be necessary at sensitive receptors (i.e. permanent village, B2 Camp and BS4 Camp) inside the site during operational phases to confirm that particulate concentrations are below national air quality guideline levels. Dust monitoring was overlooked in the environmental management plan. Background dust levels surrounding the Greater Nammuldi area are naturally high and can be close to, or higher than, ambient air quality criteria. From an air quality perspective, the camp should be considered a sensitive receptor and the proponent should consider a campaign monitoring program to confirm that the campsite is not significantly impacted by dust from the mine. The provided particulate concentrations based on Dampier ambient monitoring are not sufficient, given the large distance involved, to indicate that the dust impacts at the	Dust would be controlled by implementation of a range of management measures as listed in the PER (Section 15.2.3). **Dust and atmospheric emissions is not considered to be a Key Environmental Factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		Greater Nammuldi area are insignificant. There is a separate dust management plan in an appendix which discusses a number of important dust control issues, but should also consider objective measures of dust concentrations rather than focusing on visible dust plumes. An adaptive dust management plan which incorporates simple monitoring methods (e.g. particle counters) and the development of trigger levels for management actions can be a very important component of a dust management strategy. Existing modelling results on dust emission impacts and dust deposition, and any previous dust deposition assessment results should be included in the current EMP. Section 15.2.2 of the PER states “A subsequent survey was conducted in 2011 (Environmental Alliances 2011) where a preliminary modelling assessment of the impact of dust emissions was undertaken for 2015, 2019 and 2026”. This modelling data should have been presented in the EMP and PER. Section 9.4.6 states “Modelling has been undertaken to estimate dust deposition in the vicinity of the *Themeda* grasslands TEC. The predicted maximum	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		was found to be significantly lower (<5%) than the Rio Tinto standard for dust deposition and no adverse impacts on the vegetation would be expected (Environmental Alliances 2010).” These data should be presented in the EMP. Dust management is of interest from both health and environmental perspectives: watering; dust stabilisers for loads and stockpiles; and general moderation of dust-generating activities, with effective monitoring and management plans are required. Other air emission sources (apart from dust) during operation and rehabilitation should be identified and addressed in the EMP. Dust would be the main air quality concern for the Greater Nammuldi Area. The proponent should demonstrate that air quality impacts are low and provide evidence which verifies their claims of emissions being insignificant.	
Noise	Due to the remoteness of the site, impacts will primarily be restricted to the health and safety of the workforce, and to a lesser extent, fauna disturbance in the	The proponent should re-assess impact from rail noise as prescribed by State Planning Policy (SPP) 5.4, which includes a minimum of one (1) train pass-by per hour during the night-time period and uses the Nordic Kilpe algorithm. The currently assessed rail noise is likely to be under-	Accommodation facilities would be located at sufficient distance to achieve appropriate noise control and/or may require inclusion of noise attenuation within the

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	immediate vicinity.	predicted given the assumptions used by the acoustic consultant. The proponent should clarify which noise-sensitive premises are within the mining proposal / boundary, and therefore which noise target is to be achieved. At some locations, the assigned noise levels may not apply and only the internal noise criteria within the dongas may be applicable. The proponent should clarify which types of premises are to be considered in this assessment and the location of boundaries between the premises. The proposal area is surrounded by a pastoral lease, with the exception of some unallocated Crown land to the north. In the case of the boundary between the pastoral lease and the mine site, the assigned noise levels to be met are $L_{A\,10}$ of 60 dB, $L_{A\,1}$ of 75 dB and $L_{A\,max}$ of 80 dB. In the case of the boundary between the mine site and the unallocated Crown land, no assigned levels apply. Harvesters operating on rural premises are exempt from Regulation 7 under Regulation 12 of the Environmental Protection (Noise) Regulations 1997. Table 58 should be amended to include the parameter	design to ensure compliance with assigned levels. **Noise is not considered to be a Key Environmental Factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		used for each noise criterion. The 'rail operations' is an outdoor,night criterion, the 'dongas' is an internal $L_{A\ eq,}T$ criterion and the 'mine operations' is the $L_{A\ 10}$ from the Environmental Protection (Noise) Regulations 1997. The PER acknowledges that noise may be an issue at the 'Existing B2 Operations Camp'. Section 15.1.2 states that received noise levels will exceed the assigned levels for B2 operations camp, however, it is unclear whether this refers to the proposed or existing B2 operations camp. The proponent should clarify whether the dongas' internal noise levels at the 'Existing B2 Operations Camp' comply with the criterion. The proponent should clarify whether any noise control measures are required to ensure that the dongas' internal noise levels at the 'Existing B2 Operations Camp' are achieved. The acoustic consultant's report identifies that the predicted noise levels inside the dongas may exceed the criterion, however no noise mitigation measures for the dongas at this location are identified.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
SOCIAL SURROUNDINGS			
Aboriginal heritage	The proposal is largely within the Eastern Guruma Native Title Determination Area. An agreement with Eastern Guruma has been established. Sites with ethnographic significance are well recorded and will be avoided by "no go" buffers of sufficient size to protect the values of the sites, as determined by consultation with the Eastern Guruma.	There are three Registered Aboriginal Sites and 'Other Heritage Places' of ethnographic interest located within the proposal boundary (DIA Site IDs 6071, 18240 and 18244). All three are burials situated to the south of the old Brockman airstrip. The Eastern Guruma Native Title Holders have recently raised concerns about aspects of the Nammuldi Below water-table (BWT) expansion project coming closer to these burials and requested that a buffer zone of 300 m be established around them to ensure their long-term preservation. The vast majority of sites listed on the Aboriginal Heritage Inquiry System (AHIS) are archaeological, some of which may have moderate–high cultural significance for Eastern Guruma people. The general preference of the Eastern Guruma Native Title Holders is that all archaeological sites be avoided wherever possible. If this is not possible, further consultation and Section 18 approval would be required. In addition to the burials mentioned above, the following places and features would appear to lie inside the proposal boundary in the Silvergrass area:	Requirements of the *Aboriginal Heritage Act 1972* will be adhered to, as well as the Agreement with the Eastern Guruma people. **Aboriginal heritage is not considered to be a Key Environmental Factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		• Pijnaymurru (the old Brockman Homestead); • Caves Creek (Pinaynmurru Wuntu) – named creek; • Duck Creek (Nharraminju Wuntu) – named creek; • Boolgeeda Creek (Pulykuti) – named creek; • Thartawinha Tharrha – secret men's cave (actual location unknown); and • Jagalunha (Nine Mile Well). Extant remnants of the old Brockman Homestead (Pijnaymurru), which may be directly impacted by the proposal, may hold historical and personal significance for Guruma people. The PER document addresses impacts and management strategies for the creeks including proposed realignment of Caves Creek and specifies on-going consultation with the Eastern Guruma people in relation to these. The actual location of Thartawinha Tharrha is currently unknown. Eastern Guruma consultants involved in previous consultations, while highlighting the cultural significance of water to their society, did not object to the proposed Nammuldi BWT mining and dewatering and the associated Nammuldi agricultural hayfields project. They have requested that consultation be ongoing because of the sensitivities.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		The PER acknowledges that avoidance is the preferred option for all sites, and states that all ethnographic sites of High or Extreme significance would be avoided. In the case of sites which cannot be avoided, assessment, consultation and Section 18 approvals would take place in the event that impacts would occur. Continued consultation with the Eastern Guruma regarding the Nammuldi-Silvergrass expansion, including the associated cultural and environmental impacts. Maintenance of a buffer zone of 300 m around the Brockman burials (DIA Site ID 6071 Mt Brockman Station Burial; DIA Site ID 18240 Hsa12 – Brockman Burial 1; and DIA Site ID 18244 Hsa13 – Brockman Burial 2) to ensure their protection.	
OTHER			
Closure, decommissioning and rehabilitation	Some voids will be backfilled to above the water table, whilst others will not. All Silvergrass, pits will be backfilled to	Assessment of the physical characteristics of the waste materials including detailed design and placement of waste dumps, which would contain significant quantities of highly erodible materials, will be required due to the tenure of the waste dump	The proponent has prepared and submitted Closure, Decommissioning and Rehabilitation Plans with

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	above the predicted stable post-mining water table level as a minimum to ensure that no permanent pit lakes form. At Nammuldi, as several pits will be mined concurrently, there will be limited opportunities for progressive disposal of waste to pit voids during mining. In addition, there will likely be insufficient material to backfill the Nammuldi pits to above the pre-mining watertable since more than 90% of the known high grade ore resource occurs below the current watertable. Testing indicated that	locations. The proponent should provide further details on the management of dispersive wastes. Design details of the Waste Fines Storage Facility and geochemical characterisation of the waste fines would be addressed in the Mining Proposal stage as the tenure of the site is appropriate. (There are depth limitations within the General Purpose Lease of 15 m below the natural ground surface.) The Waste Dump design is not "conservative" for a highly erodible waste dump. Justification by materials characterisation and trials is required. Mine scheduling details are also required to ensure that adverse materials can be encapsulated and that waste dumps will be designed and constructed with closure in mind. Closure options for IAA - some closure strategy options should be presented in the preliminary Mine Closure Plan (MCP). The default closure option should be the decommissioning and rehabilitation of this area. The plan should address decommissioning of water infrastructure and rehabilitation requirements. Waste dump erosion - the MCPs do not address erosion of 'temporary' waste dumps impacting upon the TEC during mining and prior to backfilling of pit	the PER, using the *Guidelines for preparing mine closure plans (June 2011)* as a basis. Recommended condition 10 details proponent obligations for closure. **Closure, decommission-ing and rehabilitation is considered to be a Key Environmental Factor. See Section 3.3.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	mining at Nammuldi and Silvergrass is unlikely to encounter significant volumes of material with the potential to generate acid. Analysis of elemental enrichments identified that iron, arsenic and selenium were elevated, consistent with the majority of Pilbara lithologies.	voids. No erosion monitoring would take place until closure. Caves Creek re-alignment - potential for bottlenecking and pooling of water at entry to realigned section. Proponent should further investigate option of removing diversion structures at closure and re-instating the natural drainage. Stakeholder consultation deficiencies - some comments and the proponent's response are not included. Closure objectives - vague, and not "outcome-based". Objectives should refer to clear closure goals, not ongoing processes or procedures. Closure criteria - need refining prior to next revision of the plans as many of the criteria are not clearly measurable. End-point for closure monitoring should be only when agreed criteria have been met. All mine voids should be backfilled to a level which would prevent the formation of permanent pit lakes, and to ensure that there is a capillary break between	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		the surface and groundwater to maintain groundwater quality. The proposal would leave permanent water-filled voids at closure which would continue to present a residual risk and a management legacy. All mine voids should be backfilled to a level which prevents the formation of permanent pit lakes, to avoid long-term impacts on water quality and biodiversity values. The proponent should determine and manage any water quality changes in mine pit lakes. The proponent has indicated that mine pit lakes may be left after mining, and that water in these features may slowly increase in salinity over a period of several hundred years. Wildlife (particularly birds) may be attracted to the lakes to feed on insect larvae and other organisms which are likely to develop populations. Elevated concentrations of metalloids (arsenic and selenium) and some metals could reach concentrations of concern within mine pit lakes, and pose a risk to wildlife. This exposure pathway has not been adequately covered in the risk assessment carried out for the PER.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		If pit lakes are going to be maintained, the proponent must provide for their long-term management. The proponent is undertaking geochemical modelling to predict how water quality will evolve in mine voids after mine closure. The proponent is also looking at options for diverting surface water flows to periodically flush the mine pit lakes. It is important that these measures are supported by water quality monitoring and contingencies to manage the mine pit lakes in the event that water quality deteriorates over time and poses a threat to wildlife. DoW supports the proponent's commitment to backfill the Silvergrass pits to above the predicted stable post-water table level, to minimize any long-term impacts on Caves Creek. It is unlikely that the Nammuldi pit would be backfilled due to insufficient backfill material, but the lower ecological values associated with Duck Creek make this acceptable. DoW is satisfied with this approach. Rehabilitation of the disturbed areas following mining is required as part of the approval to implement the proposal. It is not an offset (PER p 259, Section D). Rehabilitation of the impacts on riparian vegetation is	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		offered "as far as practicable". To what standard would this be? (PER p 259, Section D).	
Climate change		Using the best available climate change science, the proponent should demonstrate how projected climate change impacts (including temperature change, rainfall change, extreme weather events) would be incorporated into the infrastructure and site design in order to reduce risks to the natural environment during construction, operation and post-closure. Climate change impacts in the north-west are likely to include more extreme weather events including increased inundation and flooding. This could lead to infrastructure deterioration/damage and contamination of the environment (for example, as a result of spills, stockpiles being compromised). Higher temperatures, reduced rainfall and increased risk of fires also present risks to the natural environment which could be exacerbated by impacts from the project.	**Climate change is not considered to be a Key Environmental Factor.**

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*		
	YES	In considering this principle, the EPA notes the following: • Investigations of the biological and physical environment should provide background information to assess risks and identify measures to avoid or minimise impacts. • The assessment of these impacts and management is provided in Section 3 of this report. • Conditions have been recommended as considered necessary.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*		
	YES	The proposal would result in the loss of 45 ha of riparian vegetation and 47 ha of PEC from clearing. Flora and vegetation are relevant environmental factors discussed in this report and conditions have been recommended to ensure minimal impact.

3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*		
	YES	The proposal would result in impacts on riparian vegetation and a PEC. These impacts have the potential to affect biological diversity/integrity. Flora and vegetation are key environmental factors discussed in this report.
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.* *(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.*		
	YES	The proposal would require decommissioning and rehabilitation. The proponent should bear the cost of any potential pollution, containment, monitoring, management, decommissioning, rehabilitation and closure.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.*		
	YES	In considering the proposal, the EPA notes that mineral waste from the proposal is proposed to be partly used to backfill the pits (Silvergrass). Other waste products would be created as a result of implementation of the proposal, and would be disposed of according to relevant regulations and legislation.

Appendix 4

Identified Decision-making Authorities
and
Recommended Environmental Conditions

Identified Decision-making Authorities

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

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

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

Decision-making Authority (DMA)	**Approval**
1. Minister for Water c/o Department of Water	Groundwater abstraction licences; bed and banks permits, *Rights in Water and Irrigation Act 1914*
2. Minister for State Development	*Iron Ore (Hamersley Range) Agreement Act 1963*
3. Minister for Lands	*Land Administration Act 1997* Division 3, section 79 (1) (granting of leases of Crown land)
4. Minister for Indigenous Affairs	*Aboriginal Heritage Act 1972* – section18 approval
5. CEO, Department of Mines & Petroleum	Storage and handling of hazardous materials mines safety *Dangerous Goods Safety Act 2004;* *Mines Safety and Inspection Act 1994*
6. Director General Department of Environment and Conservation	Part V EP Act Works approval & licence
7. CEO, Shire of Ashburton	Planning approval

Note: In this instance, agreement is required with DMAs numbers 1, 2, 3 and 4 since these DMAs are Ministers.

Statement No. XXX

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

NAMMULDI-SILVERGRASS EXPANSION

Proposal: The proposal includes the existing Nammuldi-Silvergrass Iron Ore Project and the proposed expansion, located approximately 60 kilometres north-west of the town of Tom Price, Shire of Ashburton, in the Pilbara region.

The proposal is further documented in Schedule 1 of this statement.

Proponent: Hamersley Iron Pty. Limited
Australian Company Number: 004 558 276

Proponent Address: Level 22
152-158 St George's Terrace
PERTH WA 6000

Assessment Number: 1842

Previous Assessment Number: 1247

Report of the Environmental Protection Authority Number: 1457

Previous Report of the Environmental Protection Authority Number: 997

Previous Statement Number: 558 (Published 28 November 2000)

The implementation conditions of this Statement supersede the implementation conditions of Statement 558 in accordance with section 45B of the *Environmental Protection Act 1986*. The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of this proposal is subject to the following implementation conditions and procedures, unless specifically stated otherwise within this statement, and Schedule 1 details definitions of terms and phrases used in the implementation conditions and procedures.

1 Proposal Implementation

1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Column 3 of Table 2 in Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.

2 Contact Details

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

3 Time Limit for Proposal Implementation

3-1 The proponent shall not commence implementation of the proposal after the expiration of five years from the date of this statement, and any commencement, within this five-year period, must be substantial.

3-2 Any commencement of implementation of the proposal, within five years from the date of this statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO.

4-2 The proponent shall submit to the CEO the compliance assessment plan required by Condition 4-1 at least six months prior to the first compliance assessment report required by Condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

(1) the frequency of compliance reporting;

(2) the approach and timing of compliance assessments;

(3) the retention of compliance assessments;

(4) the method of reporting of potential non-compliances and corrective actions taken;

(5) the table of contents of compliance assessment reports; and

(6) public availability of compliance assessment reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by Condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by Condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.

4-6 The proponent shall submit to the CEO a compliance assessment report by 30 April each year addressing compliance in the previous calendar year. The first compliance assessment report shall be submitted by 30 April 2014 addressing compliance for the period from the date of issue of this statement, notwithstanding that the first reporting period may be less than / more than 12 months.

The compliance assessment report shall:

(1) be endorsed by the proponent's Managing Director / General Manager / Chief Executive Officer or a person delegated to sign on the Managing Director's / General Manager's / Chief Executive Officer's behalf;

(2) include a statement as to whether the proponent has complied with the conditions;

(3) identify all potential non-compliances and describe corrective and preventative actions taken;

(4) be made publicly available in accordance with the approved compliance assessment plan; and

(5) indicate any proposed changes to the compliance assessment plan required by Condition 4-1.

5 Public Availability of Data

5-1 Subject to Condition 5-2, within a reasonable time period approved by the CEO of the issue of this statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this proposal and implementation of this statement.

5-2 If any data referred to in Condition 5-1 contains particulars of:

(1) a secret formula or process; or

(2) confidential commercially sensitive information;

the proponent may submit a request for approval from the CEO to not make this data publically available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publically available.

6 Vegetation

6-1 The proponent shall ensure that dewatering and discharge do not cause long term impacts on the health and abundance of groundwater-dependent vegetation communities in Duck and Caves creeks beyond the approved clearing envelope as shown in Figure 3 and delineated by the coordinates specified in Schedule 2.

6-2 To verify that Condition 6-1 is being met, the proponent shall develop a Groundwater Dependent Vegetation Monitoring and Management Plan to the satisfaction of the CEO.

The Groundwater Dependent Vegetation Monitoring and Management Plan shall include:

(1) identification of potential vegetation impact monitoring and control sites between the discharge points and the confluence of Duck Creek and the Ashburton River;

(2) the design of a survey to acquire baseline data, including health and abundance parameters;

(3) definition of health and abundance parameters;

(4) definition of environmental parameters to be monitored, including groundwater drawdown along Caves Creek;

(5) definition of monitoring frequency and timing;

(6) identification of criteria to measure decline in health;

(7) definition of trigger levels for 'no irreversible impact'; and

(8) details of management actions and strategies to be implemented should the 'no irreversible impact' trigger levels be exceeded.

6-3 The proponent shall implement the Groundwater Dependent Vegetation Monitoring and Management Plan required by Condition 6-2 prior to the start of dewatering until advised otherwise by the CEO.

6-4 Prior to the commencement of dewatering, the proponent shall implement the baseline monitoring survey, required by Condition 6-2(2) for all sites identified in Condition 6-2(1) and submit the results to the CEO.

6-5 In the event that monitoring required by Condition 6-3 indicates that a trigger level required by Condition 6-2(7) has been exceeded, the proponent shall provide a report to the CEO within 21 days of the exceedance being identified which:

(1) describes the decline or change;

(2) provides information which allows determination of the likely root cause of the decline or change; and

(3) if considered likely to be the result of activities undertaken in implementing the proposal, describe which management actions will be implemented and the associated timelines to remediate the decline or change.

6-6 The proponent shall implement the actions identified in Condition 6-5(3) until the CEO determines that the remedial actions may cease.

7 Discharge of Water to Duck Creek

7-1 The proponent shall ensure that the discharge of surplus water from the Nammuldi or Silvergrass sites as a result of mining does not cause long term impacts on the environmental and conservation values of Duck Creek.

7-2 To verify that Condition 7-1 is being met, the proponent shall develop a high level environmental and conservation values statement for Duck Creek to the satisfaction of the CEO in consultation with the DEC and the DoW.

7-3 The proponent shall ensure that any water discharged to Duck Creek does not exceed whichever is greater of the following:

(1) the default trigger for the protection of marine and freshwater ecosystems as per the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates;

(2) baseline levels of the receiving environment determined pursuant to Condition 7-4; or

(3) other criteria agreed with the DEC and the DoW.

7-4 Prior to discharging water from the Nammuldi or Silvergrass sites, the proponent shall develop a Water Discharge Monitoring and Management Plan in consultation with the DEC and the DoW to the satisfaction of the CEO to ensure that the environmental and conservation values associated with Duck Creek and any downstream ecosystems are maintained. This plan shall:

(1) when implemented, identify the water quality baseline levels of the western boundary of the proposal, within Duck Creek and downstream of the water discharge points for the criteria measured under the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates;

(2) describe the water discharge program;

(3) when implemented, monitor to demonstrate whether Conditions 7-1 and 7-3 are being met;

(4) when implemented, manage the implementation of the proposal to meet the requirements of Conditions 7-1 and 7-3; and

(5) detail management actions and strategies to be implemented should the monitoring required by Condition 7-4(3) indicate that Condition 7-1 may not be met.

7-5 The proponent shall implement the Water Discharge Monitoring and Management Plan from the commencement of discharge of excess water from the Nammuldi or Silvergrass sites.

8 Water Quality and Quantity (Irrigated Agriculture Area)

8-1 The proponent shall ensure that any irrigation water runoff from the agricultural pivot cells does not exceed whichever is greater of the following:

(1) the default trigger for the protection of marine and freshwater ecosystems as per the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates; or

(2) baseline levels of the receiving environment for the criteria measured under the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates.

8-2 The proponent shall ensure that changes to hydrological regime, specifically soil saturation, related to the establishment of irrigated pivot cells do not adversely affect the environment beyond a 30 metre buffer around the agricultural pivot cells.

8-3 The proponent shall ensure that irrigation water quality is consistent with the requirements for irrigation water as per the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates, or take such other in situ measures as approved by the CEO, to prevent the accumulation of toxicants within the soil profile, and to prevent the degradation of soil structure due to sodicity and excessive salinity.

8-4 The proponent shall monitor the changes to the hydrological regime, specifically soil saturation, as well as the quality of any run-off from the agricultural pivot cells which enters surface water within the boundary of the proposal area to ensure that the requirements of Conditions 8-1 and 8-2 are met. This monitoring is to be carried out using methods detailed in the Nutrient and Irrigation Management Plan which forms part of the Agriculture Environmental Management Plan, June 2012, and any subsequent approved revisions, prepared for this proposal and to the satisfaction of the CEO.

8-5 The proponent shall commence the water quality and soil saturation monitoring required by Condition 8-4 at least one month prior to the commencement of irrigation.

8-6 In the event that monitoring required by Condition 8-4 indicates that the requirements of Conditions 8-1 and 8-2 are not being met:

(1) the proponent shall report such findings to the CEO within 21 days of the decline in water quality being identified;

(2) the proponent shall provide evidence to the CEO which allows determination of the cause of the decline in water quality;

(3) if a decline in water quality is determined by the CEO to be a result of activities undertaken in implementing the proposal, the proponent shall

submit to the CEO actions to be taken to remediate the decline in water quality within 21 days of the determination being made; and

(4) the proponent shall implement the actions to remediate the decline in water quality required by Condition 8-6(3) upon approval of the CEO and shall continue to implement such actions until such time as the CEO determines that the remedial actions may cease.

9 Management of Introduced Crop Species

9-1 The proponent shall demonstrate that the selected crop species does not have the potential to become an invasive weed.

9-2 To verify that the requirements of condition 9-1 are being met, prior to cultivation, the proponent shall prepare a report to the satisfaction of the CEO on advice of the DEC which:

(1) identifies crop species considered for the Irrigated Agriculture Area shown in Figure 1.

(2) provides evidence based on at least two surveys (one conducted during the wet season and one during the dry season), in a similar environment, that the selected crop species does not have the potential to become invasive; and

(3) proposes the crop species to be cultivated.

9-3 The proponent shall only plant the selected crop species following receipt of a notice in writing from the CEO that the crop species is acceptable.

9-4 Prior to cultivation, the proponent shall develop a monitoring and management plan to the satisfaction of the CEO to ensure that the acceptable crop species approved in Condition 9-3 does not spread beyond a 30 metre buffer surrounding the agricultural pivot cells.

The Plan shall include:

(1) the location of monitoring sites, monitoring methodology and frequency of monitoring to demonstrate that the acceptable crop species approved in Condition 9-3 has not spread.

(2) proposed management measures to prevent the propagation and spread of the acceptable crop species approved in Condition 9-3 beyond a 30 metre buffer surrounding the pivot cells.

(3) identification of criteria to measure invasive spread of crop species; and

(4) identification of trigger levels and management actions to be implemented should the criteria identified in Condition 9-4(3) be exceeded.

9-5 The proponent shall implement the monitoring and management plan required by Condition 9-4 and any subsequent revisions approved by the CEO within the Irrigated Agriculture Area shown in Figure 1 prior to crop propagules arriving on site.

9-6 In the event that the results of monitoring required by Condition 9-4 show that over five consecutive years there has been no spread of crop species beyond the indirect impact areas, the proponent may revise the frequency of monitoring required by Condition 9-4, as approved by the CEO.

9-7 In the event that monitoring required by Condition 9-4 indicates that the requirements of Conditions 9-1 and 9-4 are not being met:

(1) the proponent shall report such findings to the CEO within 21 days of the spread of crop species being identified;

(2) the proponent shall provide evidence to the CEO which allows determination of the cause of the spread of crop species;

(3) if determined by the CEO to be a result of activities undertaken in implementing the proposal, the proponent shall submit to the CEO within 21 days of the determination being made, actions to be taken to remediate the spread of crop species ; and

(4) the proponent shall implement the actions required by Condition 9-7(3) to control and eradicate the spread of crop species upon approval of the CEO and shall continue to implement such actions until such time as the CEO determines that the remedial actions may cease.

10 Closure, Decommissioning and Rehabilitation

10-1 Within six months following commissioning of the first Silvergrass pit or a new Nammuldi pit, whichever occurs first, the proponent shall prepare a Closure, Decommissioning and Rehabilitation Plan in accordance with the *Guidelines for Preparing Mine Closure Plans*, June 2011 and any updates, to the requirements of the CEO on advice of the Department of Mines and Petroleum.

10-2 The Closure, Decommissioning and Rehabilitation Plan required by Condition 10-1 shall ensure that closure planning and rehabilitation are carried out in a coordinated, progressive manner and are integrated with development planning, consistent with current best practice, and the agreed land uses.

10-3 The Closure, Decommissioning and Rehabilitation Plan required by Condition 10-1 shall set out procedures to:

(1) manage long-term hydrogeological impacts of mining the Marra Mamba and Bedded Brockman iron deposits;

(2) model the long-term hydrological impacts, particularly the water levels and quality both in the pit void and downstream of waste material landforms;

(3) identify pits to be backfilled;

(4) manage over the long-term the surface water systems affected by the open pits;

(5) progressively rehabilitate all disturbed areas to a standard suitable for the agreed end land use(s), with consideration and incorporation of:

(a) the characteristics of the pre-mining ecosystems within the project area (through research and baseline surveys);

(b) the performance of previously rehabilitated areas within the mining lease;

(c) the performance of rehabilitation areas at the proponent's other operations in the Pilbara; and

(d) best practice rehabilitation techniques used elsewhere in the mining industry;

(6) develop and identify completion criteria;

(7) monitor rehabilitation to assess the performance of all rehabilitated areas against the completion criteria;

(8) report on the rehabilitation and monitoring results;

(9) develop management strategies and/or contingency measures in the event that operational experience and/or monitoring identify any significant environmental impact as a result of the proposal;

(10) manage and monitor mineral waste including physical characteristics and acid or neutral metalliferous drainage using national and international standards and updates; and

(11) close the mine in a manner which does not result in unacceptable liability to the State.

10-4 Within 12 months following commissioning of the first Silvergrass pit or a new Nammuldi pit, whichever occurs first, the proponent shall implement the Closure, Decommissioning and Rehabilitation Plan required by Condition 10-1 and any subsequent approved revisions until otherwise agreed by the CEO.

11 Residual Impacts and Risk Management Measures

11-1 The proponent shall contribute funds for the clearing of "good to excellent" condition native vegetation, riparian vegetation within Area 1a (delineated in Figure 3) and Priority Ecological Communities within Area 1a (delineated in Figure 3) to fund the strategic regional conservation initiative for the Pilbara.

11-2 The proponent's contribution to the strategic regional conservation initiative identified in Condition 11-1 shall be paid biennially, the first payment due two years after ground disturbance. The amount of funding will be made on the following basis and in accordance with the approved Impact Reconciliation Procedure required by Condition 11-3:

- $750 AUD (excluding GST) per hectare of "good to excellent" condition native vegetation cleared within the area delineated in Figure 2 as Area 1, up to a maximum of 6,308 ha; and
- $1,500 AUD (excluding GST) per hectare of Priority Ecological Community and riparian vegetation cleared within the area delineated in Figure 3 as Area 1a.

11-3 Prior to ground-disturbing activities, the proponent shall prepare an Impact Reconciliation Procedure to the satisfaction of the CEO.

11-4 The Impact Reconciliation Procedure required pursuant to Condition 11-3 shall:

(1) include details of a methodology to identify clearing;

(2) include a methodology for calculating the amount of clearing undertaken during each biennial time period; and

(3) state dates for the commencement of the biennial time period and for the submission of results of the Impact Reconciliation Procedure, to the satisfaction of the CEO.

11-5 The real value of contributions described in condition 11-2 will be maintained through indexation to the Perth Consumer Price Index (CPI), with the first adjustment to be applied to the first contribution.

Schedule 1

Table 1: Summary of the Proposal

Proposal Title	NAMMULDI-SILVERGRASS EXPANSION
Short Description	This proposal is an expansion of the original Nammuldi-Silvergrass Iron Ore Project of November 2000, located approximately 60 kilometres north-west of the town of Tom Price, Shire of Ashburton, in the Pilbara. The production rate will be increased to approximately 45 million tonnes per year over a project life of 17 to 20 years by widening and deepening Marra Mamba pits at both Nammuldi and Silvergrass mine sites, and mining bedded Brockman ore at Nammuldi. Mining will be both above and below the water table. There will be accompanying increases in the capacity, and relocation of processing facilities and transport infrastructure, and an increase in dewatering to access ore below the water table. Surplus water management will include transfer of water from dewatering to approximately 2,500 hectares of pastoral land for irrigated agriculture. There will also be approximately 3,900 hectares of vegetation cleared for mine pits, waste dumps and associated infrastructure and facilities.

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

Column 1	Column 2	Column 3
Physical Element	**Location**	**Authorised Extent**
Open cut Marra Mamba mine pits plus Bedded Brockman pits	Nammuldi area (see Figure 1)	Mining up to 225 metres below the water table
Open cut Marra Mamba mine pits	Silvergrass area (see Figure 1)	Mining up to 150 metres below the watertable All pits to be backfilled above the post-mining water table levels
Existing approval for mine, waste dumps, and associated infrastructure	See Figure 1 and geographic coordinates in Schedule 2	Clearing of up to 2,000 hectares of native vegetation within the development footprint

Mine, waste dumps, waste fines storage facility, and associated infrastructure	See Figure 1 and geographic coordinates in Schedule 2	Clearing of up to 3,900 hectares of native vegetation within the development footprint
Irrigated agriculture area	See Figure 1 and geographic coordinates in Schedule 2	Clearing of up to 2,500 hectares of native vegetation within the development footprint
Dewatering	Nammuldi area (see Figure 1): Silvergrass area (see Figure 1):	Abstraction of no more than 51 gigalitres per annum Abstraction of no more than 68 gigalitres per annum
Management of surplus water	Project area and surrounding areas (see Figure 1)	• transfer for offsite use • transfer to the Irrigated Agriculture Area • periodic discharge to Duck Creek
Diversion of Caves Creek	Silvergrass area (see Figure 3)	Permanent realignment of up to a 3 kilometre length of Caves Creek

Table 3: Abbreviations

Abbreviation	Term
CEO	The Chief Executive Officer of the department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or his Delegate.
DoW	Department of Water
DEC	Department of Environment and Conservation
EP Act	*Environmental Protection Act 1986*
ha	Hectares

Figures (attached)

Figure 1 Proposed Layout
Figure 2 Proposed Clearing
Figure 3 Proposed Clearing Detail (Silvergrass)

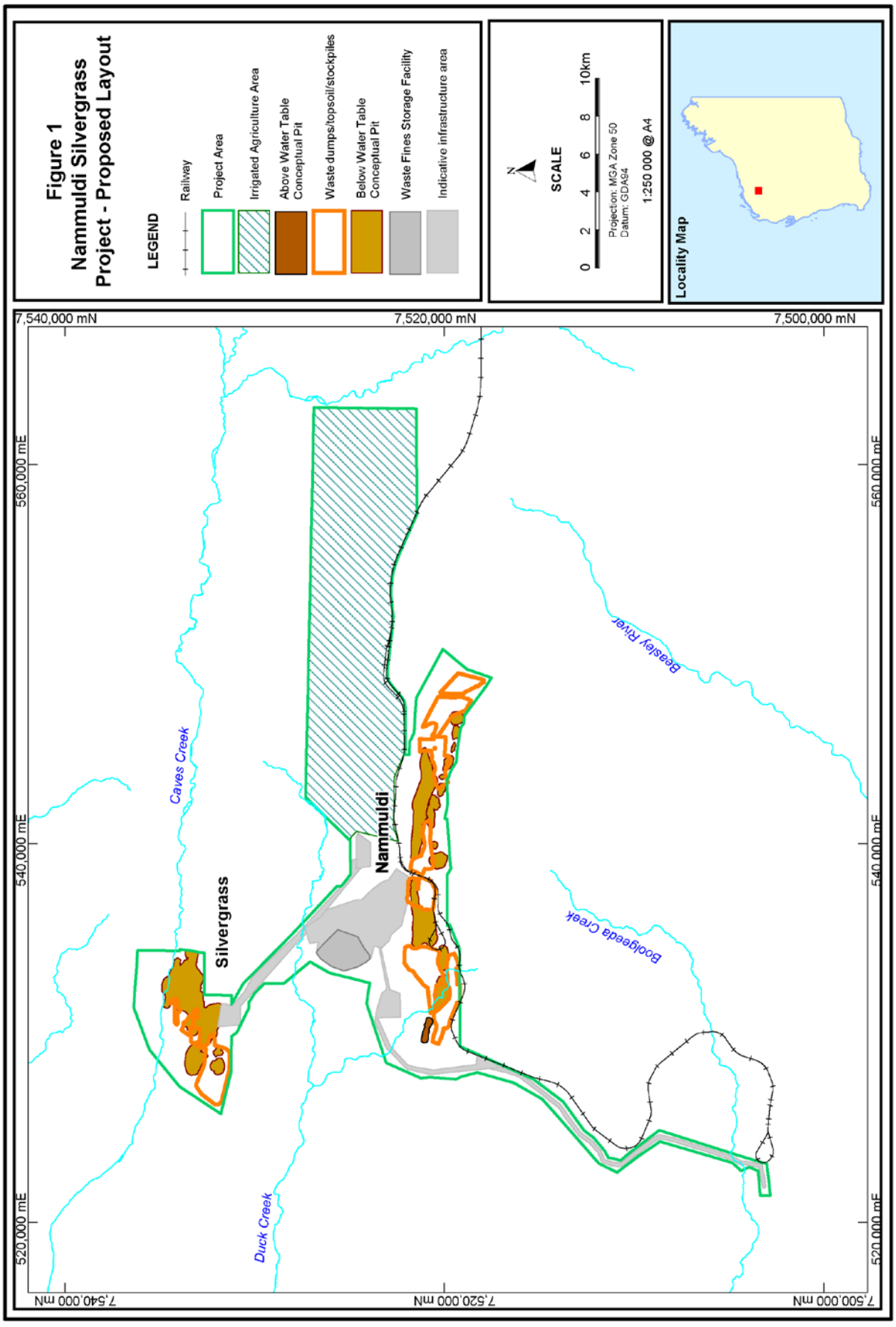

Figure 1 Proposed Layout

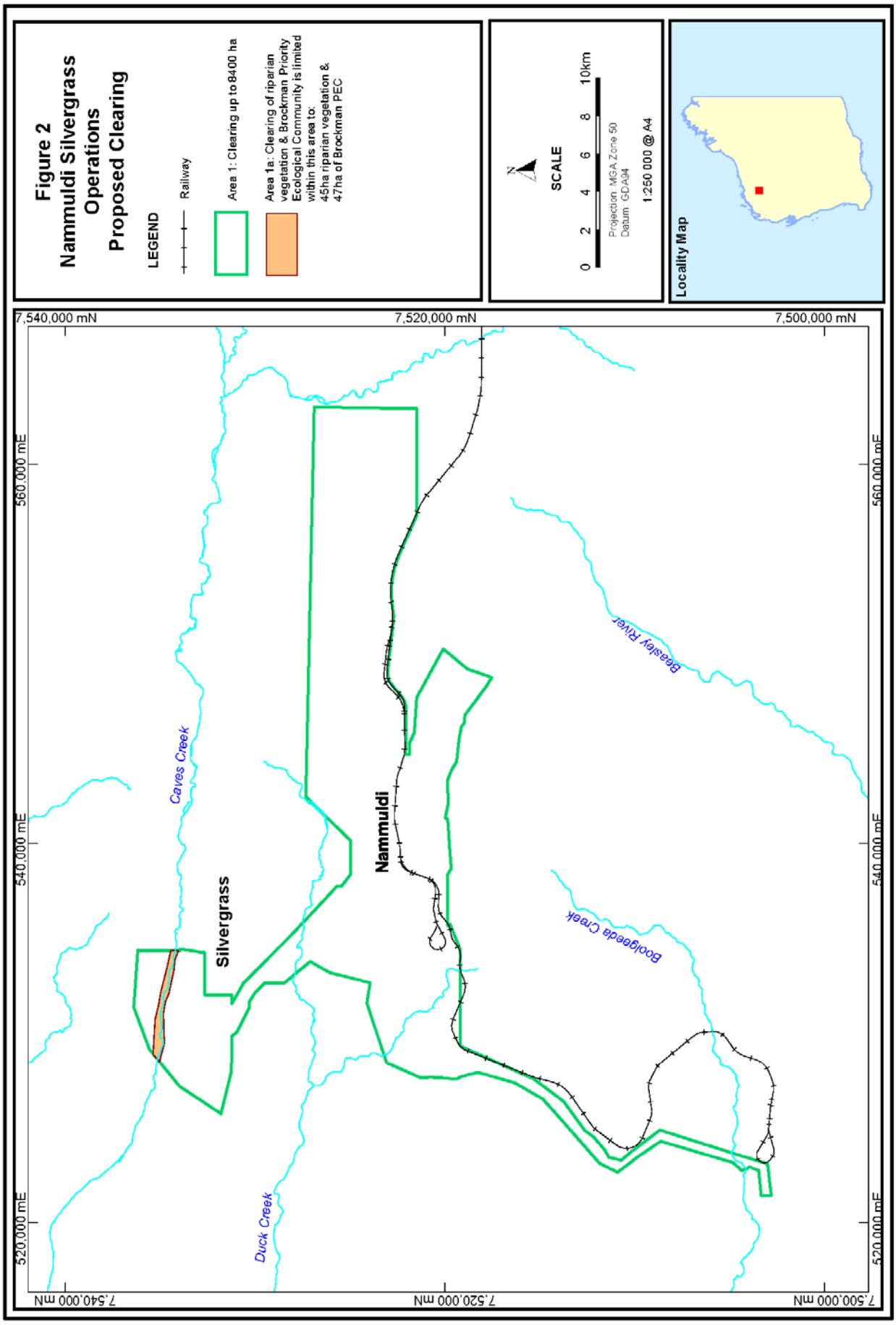

Figure 2 Proposed Clearing

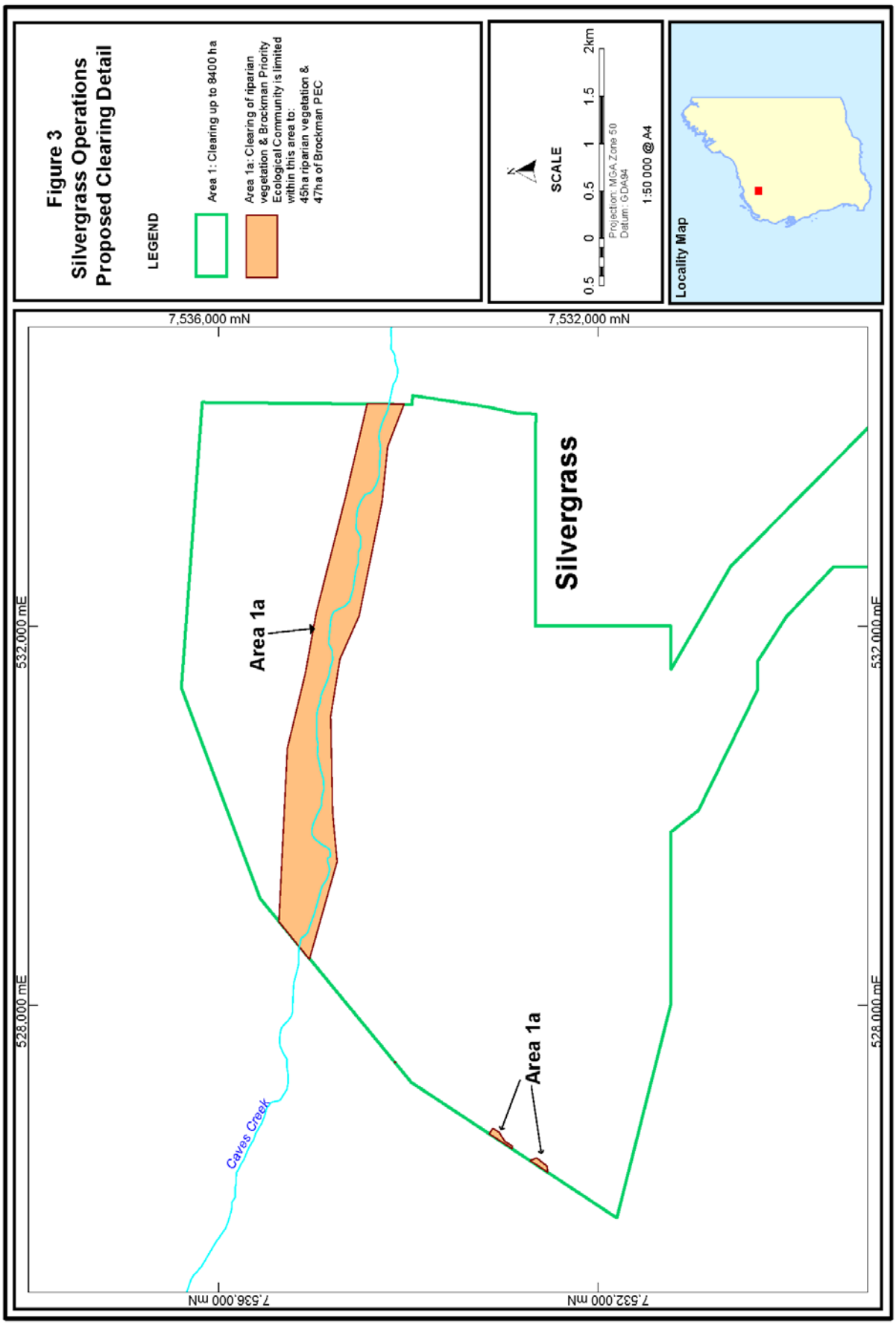

Figure 3 Proposed Clearing Detail (Silvergrass)

Schedule 2

Nammuldi-Silvergrass Expansion Project

Area 1
(Proposal Area)

Prepared 15 November 2012

Co-ordinates defining *Area 1* are prescribed below, noting that the correct recreation of the boundary requires the sequential connection of the co-ordinates as per its co-ordinate number.

All co-ordinates are listed in Map Grid of Australia Zone 50 (MGA Zone 50), datum of Geodetic Datum of Australia 1994 (GDA94).

Coordinate No.	Easting	Northing
1	533175.291	7526060.703
2	533771.861	7527087.304
3	532624.625	7528481.56
4	532626.81	7529518.129
5	532098.277	7530014.988
6	531622.302	7530318.547
7	531332.559	7530317.967
8	530052.697	7530944.329
9	529825.26	7531233.03
10	528000.29	7531236.55
11	525752.794	7531801.595
12	527183.663	7533968.014
13	529124.462	7535567.308
14	531350.007	7536394.28
15	534348.353	7536178.434
16	534343.48	7533961.705
17	534431.949	7533949.078

18	534315.625	7533174.735
19	534247.655	7532870.607
20	534241.742	7532658.09
21	532001.668	7532662.969
22	531998.733	7531228.831
23	531543.851	7531229.711
24	532629.094	7530604.568
25	535115.827	7528141.99
26	536250.067	7527084.695
27	537747.702	7525688.379
28	537747.15	7525462.325
29	537864.059	7525365.575
30	538221.459	7525083.252
31	538391.15	7524949.609
32	540151.976	7524975.094
33	541484.587	7526330.668
34	542469.726	7527332.784
35	548158.122	7527212.649
36	563021.009	7526879.567
37	562945.584	7521478.206
38	557342.418	7521461.189
39	555260.136	7522399.178
40	554751.788	7522588.18
41	554269.472	7522713.854
42	553810.459	7522782.68
43	553476.222	7522811.815
44	553209.782	7522812.714

45	552877.103	7522800.587
46	552290.749	7522734.62
47	552008.445	7522686.57
48	551703.942	7522708.656
49	551149.475	7522776.672
50	550434.676	7522860.765
51	549466.3	7522967.083
52	549101.15	7523008.964
53	548802.634	7522998.836
54	548556.388	7522941.488
55	548350.531	7522785.33
56	548305.706	7522751.327
57	547826.812	7522331.072
58	547544.516	7522133.972
59	547209.677	7522067.516
60	546092.686	7522065.126
61	545037.68	7522061.597
62	544774.407	7522082.233
63	544696.071	7522094.69
64	544688.106	7521876.435
65	545341.317	7521852.8
66	545828.135	7521618.287
67	547707.61	7521497.982
68	550263.888	7520081.79
69	549202.631	7518826.636
70	548757.273	7517535.458
71	548308.287	7517809.093

72	546770.561	7518944.362
73	546350.08	7518992.422
74	546157.87	7519142.591
75	545431.048	7519262.727
76	544297.146	7519394.13
77	543923.46	7519624.093
78	543367.715	7519854.057
79	542067.271	7519839.37
80	541334.925	7519989.329
81	541280.395	7519857.386
82	539430.316	7519731.252
83	538685.477	7519665.175
84	538354.679	7519851.357
85	536042.511	7519851.387
86	535646.068	7519857.396
87	535742.173	7519731.252
88	534395.544	7519197.79
89	529296.949	7519178.624
90	527573.444	7515312.561
91	526381.532	7513733.262
92	524851.903	7512630.747
93	524494.322	7512153.974
94	523828.833	7511577.881
95	523431.531	7511379.232
96	523282.537	7510713.737
97	523739.439	7510177.376
98	524869.969	7508690.859

99	523556.621	7504562.759
100	523103.751	7503015.934
101	521435.064	7502807.346
102	521435.064	7503343.707
103	522746.178	7503482.769
104	522934.901	7503929.738
105	522746.178	7504366.769
106	523173.28	7504833.604
107	524295.671	7508637.82
108	523530.853	7509760.201
109	522650.345	7510913.596
110	523113.25	7511854.265
111	525831.047	7514229.071
112	526488.794	7514809.223
113	527378.075	7516348.03
114	527916.982	7518263.44
115	527722.512	7519096.551
116	527569.675	7519394.98
117	527624.791	7520137.619
118	527681.283	7520764.601
119	527638.536	7521253.162
120	528438.532	7523067.043
121	531561.538	7524109.2
122	532645.578	7523953.102
123	532852.375	7524775.855
124	533175.291	7526060.703

END OF COORDINATE LISTING

Schedule 2

Nammuldi-Silvergrass Expansion Project

Area 1a

(Area of limited permissible PEC/Riparian vegetation clearing)

Prepared 15 November 2012

Co-ordinates defining *Area 1a* are prescribed below, noting that the correct recreation of the boundary requires the sequential connection of the co-ordinates as per its co-ordinate number.

All co-ordinates are listed in Map Grid of Australia Zone 50 (MGA Zone 50), datum of Geodetic Datum of Australia 1994 (GDA94).

Coordinate No.	Easting	Northing	Area
1	528879.272	7535366.109	Area 1
2	530707.813	7535276.337	Area 1
3	531506.324	7535087.346	Area 1
4	532139.464	7534973.949	Area 1
5	533382.113	7534662.102	Area 1
6	534350.72	7534435.309	Area 1
7	534345.995	7534047.867	Area 1
8	533897.124	7534217.963	Area 1
9	533315.965	7534279.38	Area 1
10	532111.115	7534520.351	Area 1
11	531652.795	7534723.52	Area 1
12	531048.012	7534822.75	Area 1
13	530022.707	7534799.125	Area 1
14	529517.138	7534751.874	Area 1
15	528482.383	7535044.815	Area 1
16	528879.272	7535366.109	Area 1
1	526652.375	7533138.643	Area 2

2	526698.601	7533108.589	Area 2
3	526653.529	7533042.712	Area 2
4	526562.223	7532981.455	Area 2
5	526511.362	7532905.17	Area 2
6	526485.495	7532908.919	Area 2
7	526643.123	7533147.891	Area 2
8	526652.375	7533138.643	Area 2
1	526356.489	7532717.938	Area 3
2	526388.854	7532647.432	Area 3
3	526298.702	7532537.635	Area 3
4	526233.972	7532530.696	Area 3
5	526356.489	7532717.938	Area 3
1	527389.281	7534137.419	Area 4
2	527402.812	7534148.287	Area 4
3	527402.59	7534142.298	Area 4
4	527395.498	7534136.979	Area 4
5	527389.726	7534135.42	Area 4
6	527389.281	7534137.419	Area 4

END OF COORDINATE LISTING

Schedule 2

Notes

The following notes are provided for information and do not form a part of the implementation conditions of the statement:

- The proponent for the time being nominated by the Minister for Environment under section 38(6) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal unless and until that nomination has been revoked and another person is nominated.
- If the person nominated by the Minister, ceases to have responsibility for the proposal, that person is required to provide written notice to the Environmental Protection Authority of its intention to relinquish responsibility for the proposal and the name of the person to whom responsibility for the proposal will pass or has passed. The Minister for Environment may revoke a nomination made under section 38(6) of the *Environmental Protection Act 1986* and nominate another person.
- To initiate a change of proponent, the nominated proponent and proposed proponent are required to complete and submit *Post Assessment Form 1 – Application to Change Nominated Proponent*.
- The General Manager of the Office of the Environmental Protection Authority was the Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986* at the time the statement was signed by the Minister for Environment.

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions