Waroona Mineral Sands Project

Iluka Resources Limited

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 1217
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
23/02/04	**Level of Assessment set (following any appeals upheld)**	
31/10/05	**Proponent Document Released for Public Comment**	**79**
28/11/05	**Public Comment Period Closed**	**4**
13/01/06	**Final Proponent response to the issues raised**	**6**
10/04/06	**EPA report to the Minister for the Environment**	**13**

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Summary and recommendations

Iluka Resources Limited (Iluka) proposes to develop a mineral sand mine 1 km north of the township of Waroona. The major components of the proposed operation includes: 3 new mine pits, solar drying dams, ore concentrator, associated mine infrastructure and upgrade to Peel Road and intersection of Peel Road and South West Highway.

The project involves the progressive mining of shallow ore bodies for Titanium minerals and Zircon. The project is expected to yield 245,000 tonnes per annum of Heavy Mineral Concentrate (HMC) over the 4 year life of the mine.

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the key environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the key environmental factors 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.

The EPA is also required to have regard for the principles set out in section 4A of the *Environmental Protection Act 1986.*

Key environmental factors and principles

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

(a) Vegetation and Flora;

(b) Fauna and Habitat;

(c) Water Resources; and

(d) Decommissioning and Rehabilitation.

There were a number of other factors which were very 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) Precautionary principle;

(b) Principle of intergenerational equity; and

(c) Principle of conservation of biological diversity and ecological integrity.

Conclusion

The EPA has considered the proposal by Iluka to develop a new mineral sand mine 1 km north of the township of Waroona, approximately 140 km south of Perth.

The EPA notes in regard to vegetation and flora:
Regionally significant vegetation belonging to the Forrestfield and Guildford Vegetation Complexes will be cleared as a result of mining. Both vegetation complexes are below 30% of the pre-settlement area on the Swan Coastal Plain (SCP). Additionally, Threatened Ecological Community (TEC) type 20b has been identified within Forrestfield Complex remnant vegetation that is to be cleared.

To mitigate the loss of this regionally significant vegetation, Iluka has committed to undertake several works as offsets, which are to be detailed in a Vegetation Mitigation Plan. The plan will include, but not be limited to, fencing and covenanting adjacent native vegetation belonging to all three vegetation complexes, fencing and covenanting adjacent vegetation with representation of TEC type 20b, infill planting riparian vegetation along the Ferraro Brook and infill planting vegetation buffers around rehabilitated remnants.

Additionally, the EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Vegetation and Flora Management Plan. The plan will include, but not be limited to, weed, dieback and fire control measures.

The EPA notes in regard to fauna and habitat:
Two Priority and one Scheduled fauna species were identified as utilising remnant native vegetation as habitat and feeding grounds within the proposed mine area. The Priority 5 Quenda and Common Brushtail Possum are the fauna species expected to have the greatest impact as a result of clearing on the site. To mitigate the displacement of these species, a fauna capture and relocation program has been proposed. The details of this program will be prepared in consultation with the Department of Conservation and Land Management (CALM) and contained inside a Native Fauna Relocation and Habitat Plan.

The EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Native Fauna Relocation and Habitat Plan detailing the fauna capture and relocation program.

In addition to this, the proponent has committed to undertake works in an effort to minimise impact to fauna in the area such as: surveying trees containing hollows inside the project area for nesting animals, protection of trees favoured by black cockatoos as a food source and salvaging trees with hollows inside the clearing zone to be used later in rehabilitation works. The proponent has also committed to reinstate the soil profile at Mullins Sumpland and improve the wetland values.

The EPA notes in regard to water resources:
To protect potentially groundwater dependant ecosystems the EPA has recommended a condition be imposed requiring the proponent to install additional monitoring wells and develop “management criteria” for water levels based on monitoring carried out on the site during the life of the project. Additionally the proponent must prepare and implement a Groundwater Level Contingency Plan in the event reduced groundwater levels are identified as impacting vegetation.

In relation to Potential Acid Sulfate Soils (PASS), the EPA recommends a condition be imposed requiring the proponent to undertake additional site sampling and analysis to conclusively identify PASS and the likely impacts on the site.

The EPA also notes the proponents commitment to prepare a project wide Water Resources Management Plan, and suggests this be formalised in the form of a condition including all relevant criteria for monitoring and management of surface and groundwater resources to maintain environmental values of the aquifers and brooks on the site.

The EPA notes in regard to decommissioning and rehabilitation:
Iluka have consulted with the EPA Service Unit and CALM regarding rehabilitation works to be carried out at the site. It is understood that Iluka has prepared a conceptual rehabilitation strategy and that a comprehensive Decommissioning Plan will be prepared, including completion criteria.

Rehabilitation will be carried out progressively on the site and seed, vegetative material and habitat trees will be salvaged from native vegetation remnants within the clearing zone. Clearing will be kept to a minimum and salvaged vegetative material etc will be stockpiled for later use in rehabilitation works.

The EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Preliminary Decommissioning Plan prior to construction and completion of the Final Decommissioning Plan at least 18 months prior to decommissioning of the site.

The EPA also notes the proponents other commitments in regards to landforms and soil, dust and noise.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4, and summarised in Section 4.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the Iluka Resources Waroona Mineral Sands Project;
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Iluka Resources to develop a mineral sand mine, is approved for implementation.

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

(a) That the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;

(b) A Vegetation and Flora Management Plan be prepared and implemented;

(c) A Native Fauna Relocation and Habitat Plan be prepared and implemented;

(d) A Water Resources Management Plan be prepared and implemented;

(a) Additional monitoring wells be installed, "management criteria" be developed for vegetation health and a Groundwater Level Contingency Plan be prepared and implemented;

(b) An additional round of sampling and analysis for Potential Acid Sulfate Soils be carried out prior to ground disturbing activities; and

(c) A Decommissioning Plan be prepared and implemented.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- Works Approval/Licensing under Part V of the *Environmental Protection Act 1986*; and
- Permits and Licensing under the provisions of the *Rights in Water and Irrigation Act 1914*.

Contents

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the key environmental factors and principles relevant to the proposal by Iluka Resources Limited (Iluka), to develop a new mineral sand mine 1 km north of the township of Waroona, which is approximately 140 km south of Perth. The project area is situated on the Swan Coastal Plain (SCP) at the foot of the Darling Scarp, within the Peel Region of Western Australia.

The proposal is to mine 245,000 tonnes of mineral sands per annum over a 4 year period. The potential environmental impacts associated with the proposal relate to issues with vegetation, fauna, water resources and decommissioning.

The Waroona Mineral Sands Project was referred to the EPA in January 2004 and the level of assessment was set as Public Environmental Review (PER) with a public review period of 4 weeks (31/10/05-28/11/05). This level of assessment was based on the close proximity of the mine to Waroona residents and both direct and indirect impacts to the local hydrology, flora and fauna. The proponent provided the EPA Service Unit with the final PER document in October 2005.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors and principles relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

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.

2. The proposal

Iluka proposes to develop a mineral sand mine 1 km north of the township of Waroona, which is approximately 140 km south of Perth. The area for assessment has been identified as Mining Tenements M70/735, M70/797 and M70/1089 (see Figures 1 & 2).

The major components of the proposed operation include:

- 3 new mine pits;
- Solar drying dams;
- Ore concentrator;
- Associated mine infrastructure; and
- Upgrade to Peel Road and intersection of Peel Road and South West Highway.

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 PER prepared by Iluka in October 2005.

Table 1: Summary of key proposal characteristics

Element	Description
MINING	
Tenements	M70/735, M70/797, M70/1089
Life of Mine (Mine Production)	4 years
Extractive Method	Dry Mining
Size of Ore Body	10.8 Mt
Number of Pits	3 pits
Area of Disturbance	184 ha
Vegetation Disturbance	21.2 ha
Overburden	Approximately 2 Mt
Hours of Operation	7am – 7pm, Monday to Saturday
ORE PROCESSING	
Equipment	Mining Unit & Concentrator
Nominal Processing Rate	300 t/h
Hours of Operation	24 hours day, 7 days week
Heavy Mineral Concentrate production	Approximately 245,000 t/a (0.245 Mt/a)
Greenhouse Gas Emissions	Approximately 40 390 t $CO_{2\text{-}e}$ per annum
INFRASTRUCTURE	
Water Supply	Dewater from Superficial Aquifer - 300 ML/a Purchased supply water - 2000 ML/a
Power Supply	4 MW supplied from Waroona infrastructure, plus diesel fuel for machinery and concentrator
HMC Transport	Approximately 126 return trucks (252 total journeys) per week

Abbreviations:

-e – equivalent
HMC – Heavy Mineral Concentrate
ha – hectare
km – kilometre
ML/a – megalitres per annum
Mt – mega tonnes
Mt/a – mega tonnes per annum
MW – mega watts
t/a – tonnes per annum
t/h – tonnes per hour

The project involves the progressive mining of shallow ore bodies associated with Yoganup Formation sands using dry mining techniques. The Heavy Mineral Concentrate (HMC) comprised of Titanium minerals and Zircon, is separated through the on-site ore concentrator using water and weight of the minerals. The current minable reserve is approximately 10.8 million tonnes with an average grade of 10%

HMC. The project is expected to yield approximately 245,000 tonnes of HMC per annum, over the 4 year life of the mine.

Since release of the PER, a number of modifications to the proposal have been made by the proponent. These include:

Location of Raw Water Dam
Two options were reviewed for the location of the raw water dam. Option A involved locating the dam on the Ferraro Brook and Option B involved locating the dam inside the mine clearing area. The proponent proposes to use Option B as this option reduces the overall clearing requirements for the project and avoids impacts on the watercourse.

Alternative transport routes and cartage hours
Two methods of HMC transport to the Capel processing plant were reviewed, thus being rail and truck. Rail transport was eliminated, as it required the establishment of a suitable spur line and rail loading facility and would still require truck transport to the railhead. Additionally, unloading facilities at Capel and a significant upgrade to the southern section of the rail line would also be required. The cost of finding a suitable location, developing the rail loading facility and rail freight costs would have made the project unviable.

The proponent proposes to use truck cartage direct from the Waroona site to Capel. The designated truck haulage route is the South West Highway, which is currently used by heavy vehicles and an increase in existing traffic from Iluka's Waroona operations is not expected to create a significant increase.

Alteration of North pit boundary
During assessment of the proponent PER document it was identified that remnant native vegetation in survey location 8 was consistent with vegetation of Threatened Ecological Community (TEC) type 20b. Half of location 8 was located inside the original mine boundary and was to be cleared as a result mining.

Through negotiation with the proponent, all but the top north-east corner of location 8 (0.8 ha) was excised from the North pit and the boundary was re-designed accordingly. No new areas of remnant vegetation or environmentally sensitive areas (ESAs) are within the new North pit boundary.

The potential impacts of the proposal and their proposed management are summarised in Appendix 3.

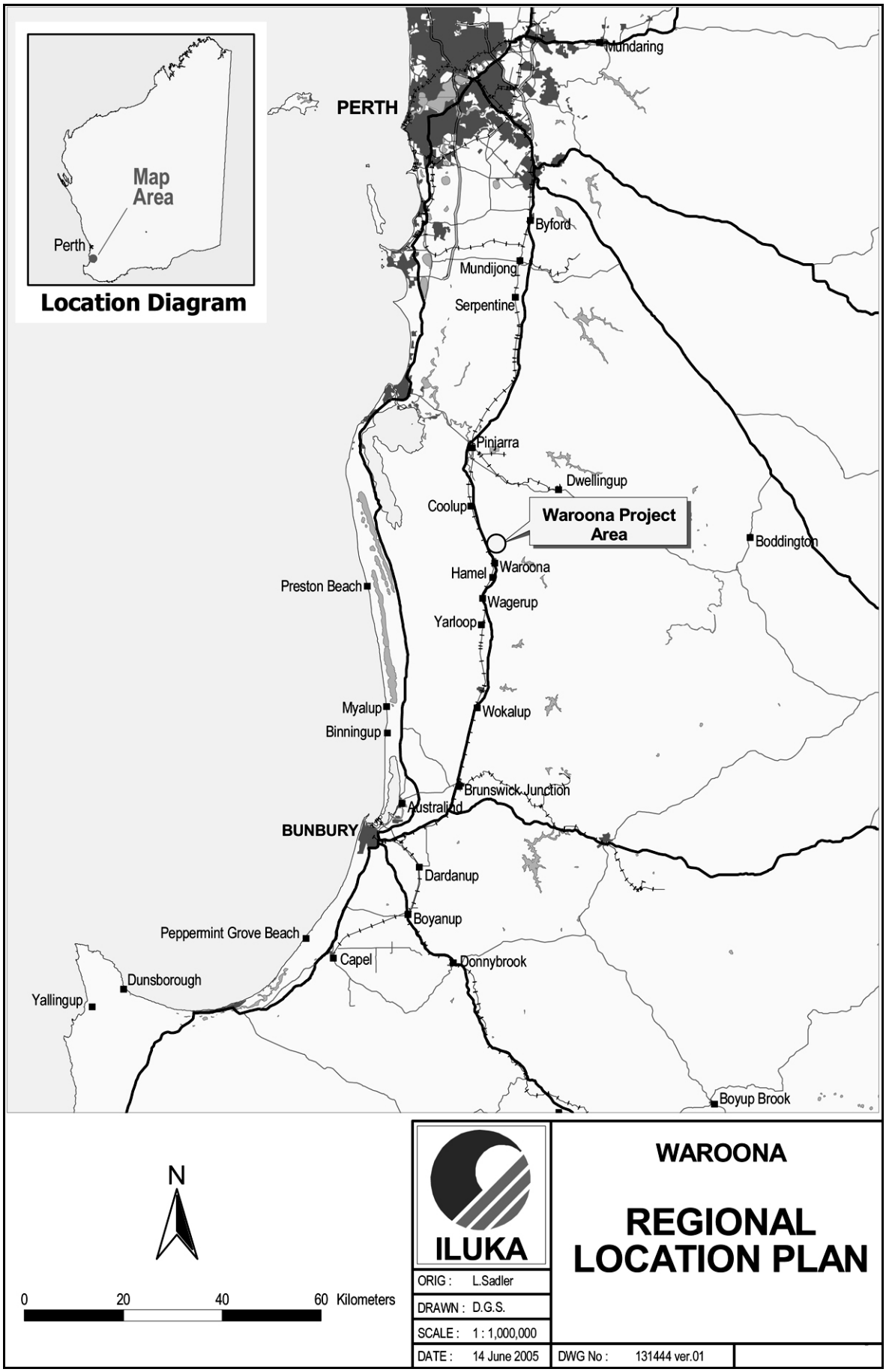

Figure 1: Site location

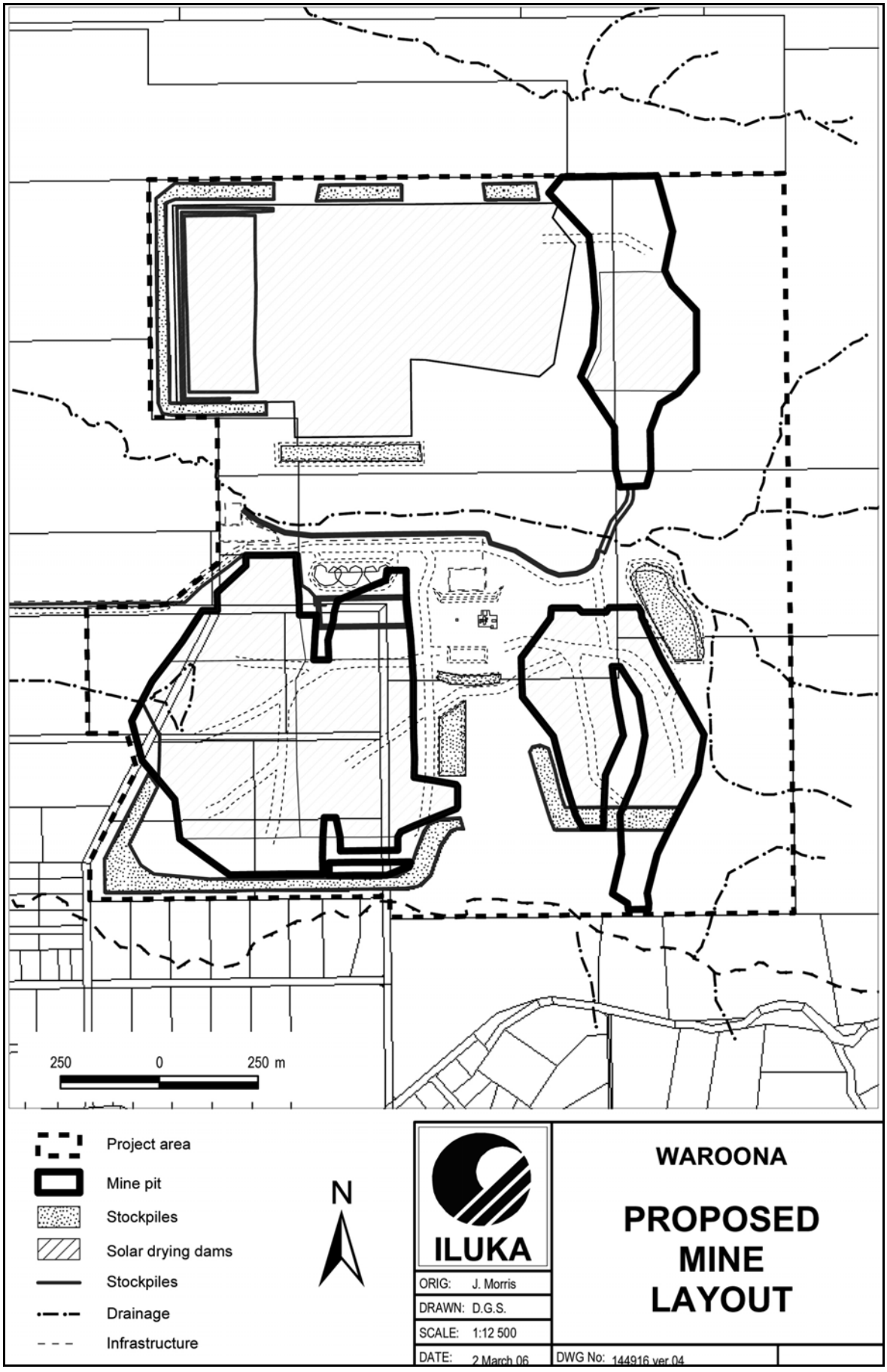

Figure 2 : Site plan

3. Key environmental factors and principles

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the 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 is 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 dust, noise and visual amenity, are very 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 environmental factors relevant to the proposal require detailed evaluation in this report:

(a) Vegetation and Flora;

(b) Fauna and Habitat;

(c) Water Resources; and

(d) Decommissioning and Rehabilitation.

The above key environmental 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.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.4. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. 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) Precautionary principle;

(b) Principle of intergenerational equity; and

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

3.1 Vegetation and Flora

Description

Project footprint

Mining operations will disturb approximately 184 ha of land, which will result in 12.6 ha of remnant native vegetation and 8.6 ha of planted native and non-native vegetation being cleared. The main components occupying the disturbed area are:

- Mine pits 74 ha (~40%) ;
- Stockpiles (overburden, topsoil) 22 ha (~12%); and

- Mine infrastructure (solar drying dams, water dams, concentrator, workshop, roads) 88 ha (~48%).

Existing vegetation
The project area is located within the South West Botanical Province (SWBP) of Western Australia, which is characterised by relatively infertile soils supporting species rich ecosystems. The SWBP has been identified as one of the world's 25 biodiversity hotspots (Myers *et al*. 2000).

Due to extensive clearing for agriculture, the native vegetation at the site has been reduced to scattered pockets of remnant vegetation and isolated trees.

The proponent commissioned a botanical survey in October 2003, which consisted of vegetation sampling at 16 locations across the project area (see Figure 3). A total of 155 flora species was recorded during this survey. An additional vegetation survey was undertaken in August 2005 in two of the previous locations (9 and 16), plus Mullins Sumpland after it was identified these areas might have additional local significance by containing Threatened Ecological Communities (TECs).

The project area includes elements of three broad vegetation types:
- Darling Scarp Complex;
- Forrestfield Complex; and
- Guildford Complex.

Historically, approximately half of the project area would have been covered by vegetation of the Guildford Complex (west), half would have been covered by vegetation of the Forrestfield Complex (east), with small pockets of Darling Scarp Complex along the eastern margins.

Presently, the condition of remnant vegetation in the disturbance zone varies across the area. Of the 12.6 ha of native vegetation to be cleared, 12.4 ha is representative of the Forrestfield Complex and 0.2 ha is representative of the Guildford Complex. Of the Forrestfield vegetation, approximately 1.3 ha (in pockets across locations 8, 9 and 16) is considered to be in very good condition, and the remaining 11.1 ha (across locations 7, 13, 16 and isolated pockets in paddocks) varies between good to completely degraded, consistent with the Bush Forever Condition Scale Rating.

The 0.2 ha of Guildford vegetation located along the Ferraro Brook (location 11) is considered to be degraded to completely degraded. While the Darling Scarp vegetation surveyed generally ranges between good to degraded, however none of this vegetation complex will be disturbed.

Priority and Declared Rare Flora
A search of the Department of Conservation and Land Management (CALM) Priority and Declared Rare Flora (DRF) database within and surrounding the project area identified 19 Priority and four DRF potentially occurring within 1 km of the project area.

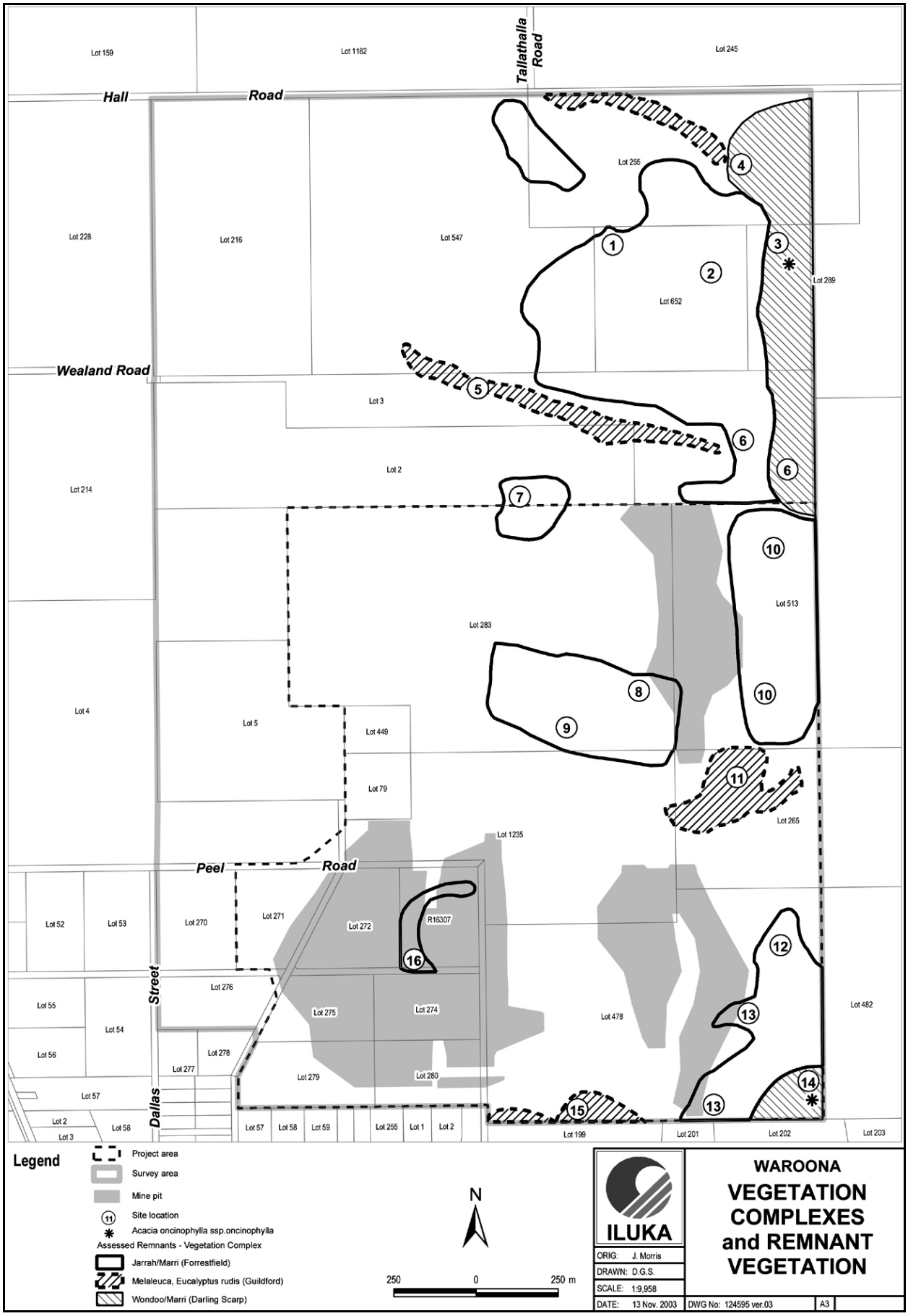

Figure 3: Survey locations

During the October 2003 survey, one Priority 3 (P3) flora species, *Acacia oncinophylla* subsp. *oncinophylla* was recorded at two locations (3 and 14). A total of four individual plants was recorded.

No Priority flora or DRF were recorded during the August 2005 survey.

Threatened Ecological Communities
Three records of Threatened Ecological Communities (TECs) listed on CALM's Threatened Ecological Community Database are located two kilometres north-west of the project area (see Figure 4). All three TECs occur within parkland and Conservation Reserve 31437. The three TECs represent community types 3a, 8 and 10a as recognised by Gibson *et al*. (1994).

Results from the vegetation surveys at locations 8, 9 and the southern portion of 16 indicated a floristic composition consistent with the vulnerable TEC community types 3b and 20b as recognised by Gibson *et al*. (1994). Analysis of survey data by CALM has indicated that the vegetation from all three locations more closely correspond to TEC type 20b.

As part of the project, location 16 will be completely cleared (2.9 ha), of which 0.5 hectares is considered to be TEC type 20b. Additionally, 0.8 ha of TEC type 20b will be cleared at location 8, resulting in a total of 1.3 ha of TEC that will be cleared as a result of the proposal.

Weeds
A total of 33 introduced and non-local native flora species belonging to 24 genera was identified within the study area.

Of the weed species recorded, four are declared weeds listed by the Western Australian Department of Agriculture under the *Agriculture and Related Resources Protection Act (1972)* as being of particular significance:

- *Zantedeschia aethiopica* (Arum lily);
- *Gomphocarpos fruiticosus* (Cotton bush);
- *Rubrus ulmifolius* (Blackberry); and
- *Solanum linnaeanum* (Apple of Sodom).

Proposed Environmental Offsets
Due to extensive clearing on the SCP for agriculture and development purposes, both the Forrestfield and the Guildford Complexes are below 30% of the pre-settlement area (Forrestfield 17.5%, Guildford 5% in accordance with EPA Guidance Statement 10), and are therefore considered to be regionally significant. To mitigate the further loss of regionally significant vegetation and/or TECs, Iluka propose an offset package as per EPA Position Statement 9 (see Figure 5):

- It is proposed to protect 35.8 ha of Forrestfield vegetation by means of fencing, infill planting and placement of conservation covenants over the highest conservation areas. This includes fencing and covenanting 6.9 ha of locations 8 and 9 with clearing, development and stocking restricted in those areas. (The protection of locations 8 and 9 also serves to offset the clearing of location 16 and

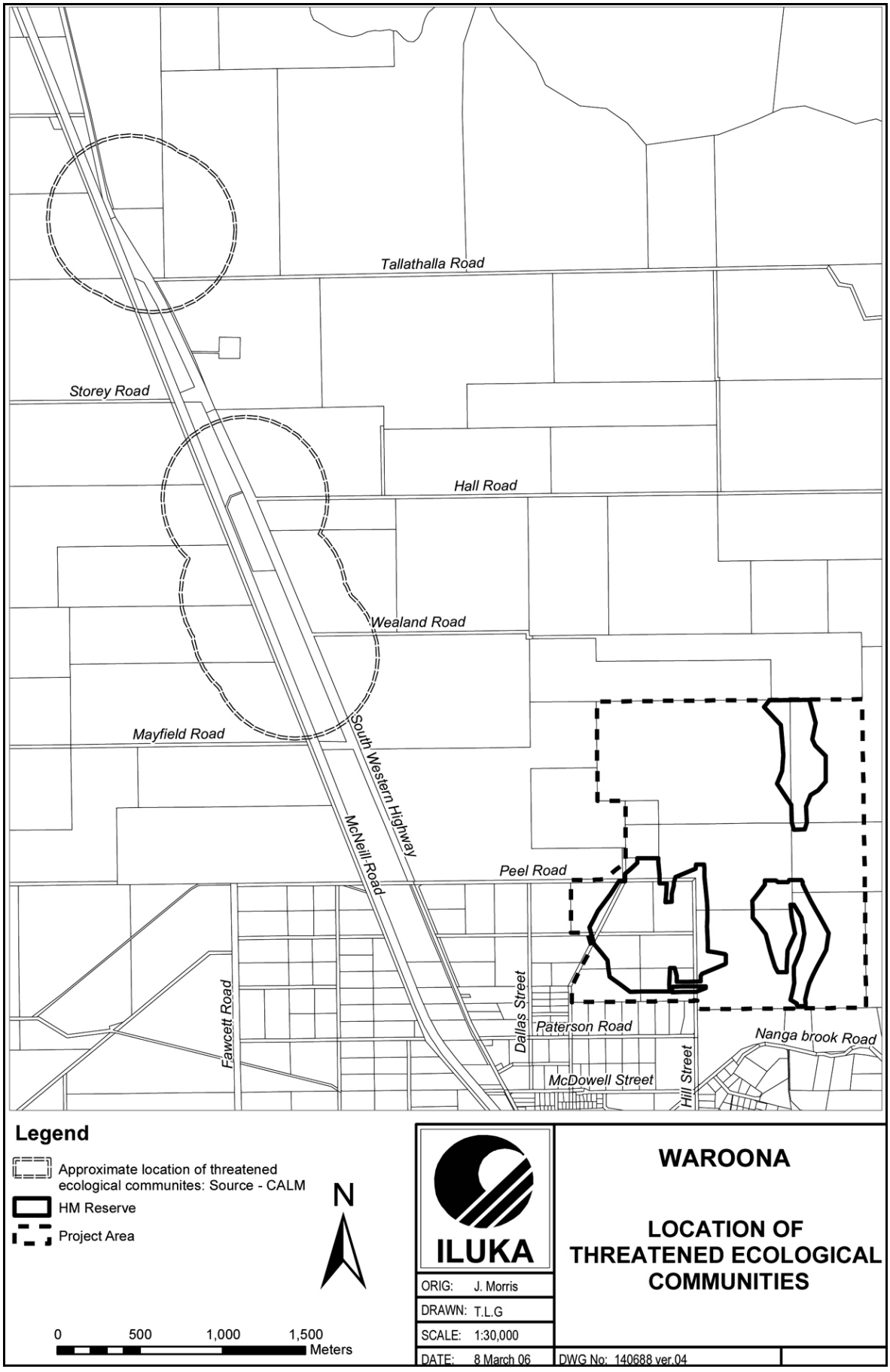

Figure 4: TEC locations

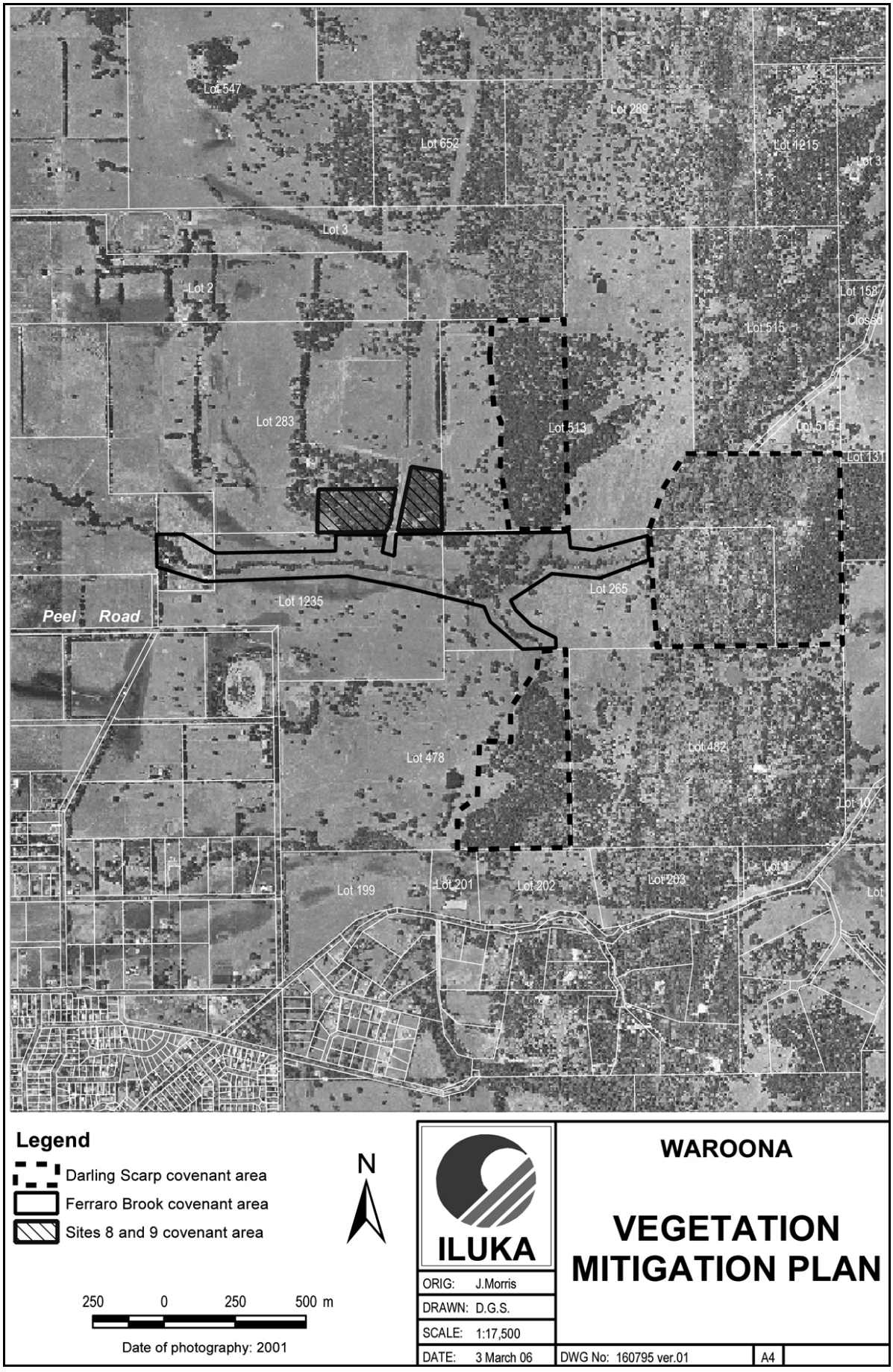

Figure 5: Proposed offsets

- portion of location 8 which has been identified as containing TEC type 20b (see section *Threatened Ecological Communities* below).

- The proposal includes a 20 m vegetation buffer between locations 8 and 9 and Ferraro Brook (using seed and other material collected from the project area as well as a trial translocation of flora from location 16).

- Fencing and infill planting of 3.5 ha of Guildford vegetation adjacent to the Ferraro Brook is proposed as part of restoration of riparian vegetation. The banks of the brook have been severely degraded and the fencing and infill planting of riparian vegetation will improve the health and visual amenity of the area.

- Fencing of 45 ha of Darling Scarp vegetation adjacent to State Forest 14 is proposed. The intention is to create a corridor between the covenanted Forrestfield vegetation/TEC 20b at locations 8 and 9, the restored section of Ferraro Brook and the abutting State Forest. The proponent proposes to place covenants allowing development of building envelopes inside this area, however any development of these areas would require additional assessment under Part IV of the *Environmental Protection (EP) Act 1986.*

Submissions

A total of 12 submissions was received, comprising 1 submission from members of the public, 2 submissions from non-government organisations and 9 submissions from government agencies. The main points raised in the submissions regarding this factor were:

- Requirement for greater detail in the proposed Vegetation Mitigation Plan;
- Support for the retention of trees with hollows and their use within the rehabilitation areas;
- Local seed and vegetative material should be collected and used in all rehabilitation areas;
- The translocation of flora in the disturbance zone to rehabilitation areas is supported;
- Disagree that clearing of 21.2ha will only have impact on flora/fauna at a local scale and will not affect overall biodiversity of the area, as in heavily cleared areas all fragments and remnants have considerable biodiversity value;
- Disagree with the clearing of 2.9 ha at location 16 and 0.8 ha at location 8, believe the area should be retained and managed for conservation;
- The conservation area of sites 8 and 9 should be extended to include all of sites 8 and 9 and incorporated into the fenced vegetation blocks with buffer areas;
- Attention to weed management for specific weeds needs to included in management strategies;
- Risk of spreading weeds during trial flora translocations needs to be addressed and managed;
- Concerns that allowing future development in some proposed offset areas will decrease value of the land and diminish the intent of the proposed offset;
- Details of the vegetation complexes and their condition for the vegetation located on Lot 478, Lot 513 and Lot 265 have not been adequately identified;

- Concerns if the proposed offsets will sufficiently protect biodiversity of the area; and
- The clearing of remnant native vegetation containing TEC or Forrestfield Vegetation Complex is not supported.

Assessment

The area for assessment has been identified as mining tenements M70/735, M70/979 and M70/1089.

The EPA objectives in regards to this factor are:

- To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through avoidance or management of adverse impacts and improvement of knowledge;
- To ensure that native flora species are conserved consistent with the *Wildlife Conservation Act (1950)* and *Environmental Protection and Biodiversity Conservation Act (1999)*;
- To meet *National Objectives and Targets for Biodiversity Conservation 2001 – 2005* (Commonwealth of Australia 2001a) by retaining 30% or more of the pre-clearing extent of each ecological community to ensure protection of Australia's biodiversity; and
- To protect the environmental values of areas identified as having significant environmental attributes, such as Threatened Ecological Communities.

Priority and Declared Rare Flora

The single Priority flora species identified inside the project area, *Acacia oncinophylla* subsp. *oncinophylla* is a medium sized shrub endemic to the south west of Western Australia. This species has been classified as Priority 3 by CALM, which is defined as 'taxa, which are known from several populations, at least some of which are not believed to be under threat' (Atkins, 2001).

A total of four individual plants was identified during botanical surveys at the site. The EPA considers that this species is unlikely to be impacted by mining as the two locations where it was identified (3 & 14), are outside of the mine disturbance zone. Additionally this species is inside two of the sections of Darling Scarp vegetation proposed to be covenanted as part of the offset package.

Threatened Ecological Communities

The EPA considers that the three areas of TEC located outside of the project area (see Figure 4) are unlikely to be directly affected by mining activities, as the nearest TEC is located approximately 2 km from the nearest pit. Ferraro Brook runs through the TECs downstream of the project area, however due to the seasonal nature of surface flow, and alteration of drainage from human activities, the EPA considers that it is unlikely the TECs will be impacted from reduced flow.

To mitigate the loss of 0.5 ha of TEC 20b at location 16 and 0.8 ha of TEC 20b at location 8, it is proposed to protect 6.9 ha of the same TEC type on locations 8 and 9. The proposed offset area is to fenced and have CALM conservation covenants placed over the areas with clearing, development and stocking not allowed. In addition to this, weed control will be carried out and vegetation buffers established, including trial translocations of flora from location 16.

The narrow crescent shape of the remnant vegetation at location 16 leaves it vulnerable to edge effects, plus it is relatively isolated from other remnants in the area. The compact shape and proximity of locations 8 and 9 to each other, Ferraro Brook and State Forest makes it a suitable offset for the loss of location 16. The protection and improvement of vegetation at locations 8 and 9 will increase the representation of TEC type 20b in secure tenure.

Weeds
The project area contains numerous weed species including four declared agricultural weeds, which are also recognised as environmental weeds. Location 16 has a considerably higher instance of weed invasion than locations 8 and 9. This is most likely attributed to shape of the remnant and previous human use as an amateur speedway.

Weed control on the project area will be carried out as part of the rehabilitation and management of the site. Weed control is proposed in all offset areas and measures will be taken during mining operations to ensure weeds are not spread from areas of high invasion to areas less affected.

The EPA recommends that a condition be imposed requiring the proponent to prepare a Vegetation and Flora Management Plan. The plan should include, but not be limited to, weed control, hygiene protocols, fire and dieback control, describing a program and methodology of management. The EPA also considers the proposed offset measures to be environmentally acceptable and notes that the proponent has committed to prepare a Vegetation Mitigation Plan detailing the above offsets.

Conclusion
The EPA concludes that the proposal can be managed to meet the environmental objectives for this factor provided that:
- The proponent's commitments in relation to vegetation offsets (i.e. Vegetation Mitigation Plan) are implemented; and
- A condition is imposed requiring the proponent to prepare and implement a Vegetation and Flora Management Plan.

3.2 Fauna and Habitat

Description
The proponent commissioned a desktop study of Western Australian Museum records and a review of published and unpublished data on fauna potentially occurring within the project area, followed by a field survey in October 2003. An additional fauna survey including a literature review and field survey was conducted in September 2005.

The combined field surveys identified:
- 50 native bird species;
- 2 introduced bird species;
- 4 native mammal species;
- 3 introduced mammal species;
- 7 native reptile species; and

- 6 native frog species.

This includes three significant species:
- *Isodon obesulus fasciventer* (Quenda) Priority 5;
- *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) Priority 3; and
- *Calyptorhynchus baudinii* (Baudin's Cockatoo) Schedule 1.

Within the disturbance zone of the project area, three main areas have been identified as providing noteworthy habitat for fauna species:
- Location 16 (specifically the south-west corner);
- North-east corner of location 8; and
- Mullins Sumpland.

All three areas will be cleared as a result of mining, which has the potential to displace native fauna species.

The Priority 5 Quenda was noted to be residing in location 16 around the speedway and the Common Brushtail Possum was noted as using hollows in trees in location 8. The Priority 3 Forest Red-tailed Black Cockatoo was observed feeding within and flying over the project area and the Schedule 1 Baudin's Cockatoo was observed feeding on Marri trees in the project area. Three frog species were recorded as being present in Mullins Sumpland.

Submissions

A total of 12 submissions was received, comprising 1 submission from members of the public, 2 submissions from non-government organisations and 9 submissions from government agencies. The main points raised in the submissions regarding this factor were:
- Support for the retention of trees with hollows and their use within the rehabilitation areas;
- The Fauna Management Plan needs to provide specific detail on Environmental Management points listed in Table 18 and the Proponent Commitments in the PER;
- The capture and relocation program is supported and should also include any birds using the hollows of any trees to be cleared, as well as the Quenda and Brushtail Possums;
- Impacts to amphibians occupying Mullins Sumpland should be addressed;
- All sites proposed as vegetation mitigation areas should be fenced to prevent stock access.

Assessment

The area for assessment has been identified as mining tenements M70/735, M70/979 and M70/1089.

The EPA objectives in regards to this factor are:
- To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through avoidance or management of adverse impacts and improvement of knowledge;

- To ensure that native fauna species are conserved consistent with the *Wildlife Conservation Act (1950)* and *Environmental Protection and Biodiversity Conservation Act (1999)*;

Vegetation clearing for mining activities will impact fauna via loss of habitat. Additionally, there is potential for fauna mortality from increased vehicular movement through the area.

The EPA notes that location 16, the largest remnant to be cleared, has been identified as providing habitat for some animals. However, due to the small size, isolation and degradation of the remnant it is unlikely fauna species living locally solely rely on this area for survival. The EPA considers that the species likely to suffer the greatest impact on a local scale by the removal of this remnant, is the Quenda. This is due to the isolation of this habitat type and lack of additional suitable habitat nearby, thereby making the loss of habitat at location 16 very significant to local individuals. The Quenda is native to the south-west of Western Australia and has suffered a great decline in numbers due to habitat destruction and predation from introduced animals.

The EPA notes that the north-east corner of location 8 contains tree hollows, which show evidence of use by the Common Brushtail Possum and that there was no evidence of nesting birds during field surveys.

The EPA notes that a capture and relocation plan has been proposed by the proponent with guidance from CALM, to mitigate the displacement of the Quenda and Common Brushtail Possum. In addition to this, the proponent has committed to inspect trees containing hollows for evidence of breeding/nesting prior to clearing, retain large trees containing hollows wherever possible and in the event trees require removal, they will be salvaged for later use in rehabilitated areas to provide shelter for fauna.

The EPA notes that Mullins Sumpland has been identified as providing habitat for three frog species, the Quacking Frog, Squelching Frog and Lea's Frog. Mullins Sumpland is thought to have arisen due to changes in the water table as a result of land clearing (see section *3.3 Water Resources*). This area has been further affected by changes in drainage patterns from human activities and water levels fluctuate with the seasons. The sumpland is degraded and polluted from livestock, and is significantly affected by weed species.

None of the frog species present are listed as Priority/Threatened and all are abundant across the south-west of Western Australia. Due to the seasonal nature of the sumpland and level of degradation, it is unlikely to be important habitat for any of the frog species. Where removal of Mullins Sumpland will result in loss of habitat and potential frog mortality, the conservation significance of the species is unlikely to be impacted. Additionally, the proponent has committed to reinstate the soil profile at Mullins Sumpland upon cessation of mining (see section *3.4 Decommissioning and Rehabilitation*).

Several bird species were recorded at the three sites during field surveying, however it appears that none of these remnants solely support any bird species. Neither of the two Priority/Scheduled bird species identified were found to be nesting in the area. However, tree hollows will be inspected for nesting birds as well as possums prior to

site disturbance. In addition to salvage of trees with hollows on the site, seed and other vegetative material will be collected from trees noticed to be favoured by feeding birds to be used in rehabilitation works.

The works proposed as part of the offset package and rehabilitation will increase vegetation on a local scale and provide linkage between the TECs at locations 8 and 9, Ferraro Brook and the abutting State Forest thereby providing a corridor fauna species in the greater area. The EPA recommends that a condition be imposed requiring the proponent to prepare a Native Fauna Relocation and Habitat Plan detailing the capture and relocation program for the Quenda and Possums.

Conclusion

The EPA concludes that the proposal can be managed to meet the environmental objectives for this factor provided that:

- The proponents commitments in relation to fauna are implemented;
- The proponents commitments in relation to Mullins Sumpland are implemented; and
- A condition is imposed requiring the proponent to prepare and implement a Native Fauna Relocation and Habitat Plan.

3.3 Water Resources

Description

Surface water features

The project area lies within the Harvey River Basin catchment area. Four surface water features occur within and adjacent to the project area. The Ferraro Brook traverses between the proposed mine pits, the Nanga Brook flows along the southern mining boundary, Mullins Sumpland occurs on the western portion of the Main pit and the Wealand Brook is located approximately 250m north of the North pit.

The Ferraro and Nanga Brooks have been monitored by the proponent since 1994, and the Wealand Brook since 2004. A survey of the aquatic ecosystems was undertaken along 12 sites at the three brooks and along two connected drains (Upper Mayfield and Drakesbrook drains) in October 2004. From this survey and from data collected during previous monitoring, it is known all three brooks are seasonal by nature with some small permanent pools that are maintained by groundwater. The aquatic biota study revealed little difference in taxa richness between the drains and the brooks. This is believed to be due to disturbance of the riparian zone, loss of habitat and eutrophication. Mullins Sumpland is a surface feature that is believed to have arisen due to clearing and alteration to local hydrology within the area. A channel was cut by the previous landowner to drain the sumpland into the Nanga Brook.

The proposal has the potential for impacts on surface water resources by interruption to surface water flow, particular in the Ferraro and Nanga Brooks, plus there is potential for impact from an increase in sediment loads. Additionally, Mullins Sumpland will be completely removed as result of mining in the Main pit.

Groundwater features
The project area is located within one of the recharge zones for the Southern Perth Basin aquifer system. The aquifer systems underlying the project area consist of the Superficial Aquifer found within the Yoganup Formation extending to approximately 30 m, the Leederville Aquifer from 10 to 30 m, and Cattamarra Coal Measures at depths below 130 m. Groundwater quality within the Superficial Aquifer and shallow Leederville Aquifer is fresh to brackish, with salinity increasing with depth.

Groundwater levels will be impacted locally by dewatering connected with the mining operations. The proponent carried out comprehensive site investigations of the Waroona deposit to develop an understanding of the local aquifer systems, groundwater resources and potential impacts of mining, between November 2000 to April 2001.

Groundwater drawdown may impact on groundwater-dependent ecosystems near the mining area. There have been previous instances where groundwater drawdown from mineral sands mining in Western Australia has been associated with the death of nearby native vegetation. In the present proposal, this is most likely to be an issue at the North pit because it lies immediately next to (and partly overlaps) one of the areas of native vegetation (location 8), which has been identified as a TEC. The proponent carried out additional site investigations around the North pit and location 8 in February 2006 in an effort to reconcile this issue.

The EPA also notes that the proponent has carried out an additional drilling program to determine the presence of potential acid sulfate soils (PASS) in the proposed area of mining (February 2006). The Department of Environment has advised that, while the sampling program has been carried out to a high standard, further sampling and laboratory analyses are required to fully evaluate the PASS risk at the site.

Submissions
A total of 12 submissions was received, comprising 1 submission from members of the public, 2 submissions from non-government organisations and 9 submissions from government agencies. The main points raised in the submissions regarding this factor were:

- Concerns that discharge may occur to Ferraro Brook if more water is produced than can be stored;
- The proponent should include the monitoring of surface water quality;
- Three of the proposed mine pits will be in direct hydraulic connection with the regional groundwater system;
- Concerns that over time mining operations will potentially have a detrimental impact on fresh groundwater of the region;
- Acid mine drainage is not mentioned in the PER and it should be identified whether or not it is an issue;
- Long term monitoring of the effects of the Pits and remediation measures is required;
- The mine closure plan should recognise that rehabilitation, monitoring and remediation of water courses will be required well beyond the life of the mine;
- Acid sulfate soil issues have been addressed briefly in the document and it is understood that further investigations are continuing; and

- An Acid Sulfate Soil management plan may be required if potential or actual acid sulfate soils are found within the mine area or in an area that may be impacted by the dewatering cone of influence.

Assessment

The area for assessment has been identified as mining tenements M70/735, M70/979 and M70/1089.

The EPA objective in regards to this factor is:

- To maintain the quality of water so that existing and potential environmental values, including ecosystem maintenance, are protected.

The EPA notes that the proponent has been proactive and has committed to prepare and implement a project-wide Water Resources Management Plan for the proposal. The EPA commends this initiative and recommends that it be formalised through a Ministerial Condition. This condition will include relevant criteria related to surface and groundwater monitoring and management (flow rates, water quality etc) to maintain the environmental values of the aquifers and surface water systems.

The EPA also notes and supports the proponent commitment to reinstate the soil profile at Mullins Sumpland during rehabilitation works (see section *3.4 Decommissioning and Rehabilitation*).

Locations 8 and 9 are proposed to be retained, rehabilitated (through weed control and infill planting with local native species) and protected in perpetuity through a Conservation Covenant as offsets (see section *3.1 Vegetation and Flora*). The latest groundwater modelling (February 2006) indicates an expected drawdown of 0.5 m at the boundary of the North pit and this area of vegetation. The proponent has acknowledged drawdown impacts on locations 8 and 9 and is committed to modification of the mining schedule to ensure optimum timing for mining in the area to minimise risk to the adjacent TEC.

In respect to this issue, the EPA recommends that a specific Ministerial condition be imposed. This condition would require the proponent to install additional monitoring points around the vegetation at location 8 near the boundary of the North pit. The condition would also require the proponent to develop "management criteria" as an indication of vegetation health based on monitoring data collected at the site over the first 2-3 years of mining in the South and Main pits. The proponent would also be required to develop a Groundwater Level Contingency Plan outlining management actions to be taken should monitoring indicate groundwater is dropping below "management criteria". In the worst case scenario, should monitoring indicate that drawdown will have a negative impact on locations 8 and 9 the proponent must cease mining in areas adjacent to these native vegetation remnants.

In respect to PASS, the EPA recommends that a condition be imposed requiring the proponent to complete further sampling to conclusively identify PASS and likely impacts at the site.

The EPA also notes that the proposal will require approval and licensing under the provisions of the *Rights in Water and Irrigation Act 1914*.

Conclusion

The EPA concludes that the proposal is capable of being managed so that the its environmental objectives for this factor are not compromised provided that conditions are imposed requiring that the proponent:

- Develop and implement a project-wide Water Resources Management Plan;
- Before mining or dewatering at the North pit, install additional monitoring wells, develop "management criteria" related to vegetation health of adjacent remnants (based on monitoring data collected at the site during mining in other areas) and develop and implement a Groundwater Level Contingency Plan;
- Carry out additional sampling and laboratory analysis for PASS on the site prior to ground disturbing activities.
- Obtain approval and licensing under the provisions of the *Rights in Water and Irrigation Act*.

3.4 Decommissioning and Rehabilitation

Description

The Waroona Mineral Sands Project will disturb approximately 184 ha of land over the four year life of the project. The project is located in former agricultural land approximately 1 km from the nearest township (Waroona) and 0.8 km from State Forest. The project involves the creation of three mine pits, solar drying dams, stockpiles and associated mine infrastructure all of which will need to be decommissioned and removed/rehabilitated upon cessation of mining at the site. If these areas are not appropriately decommissioned and rehabilitated, it could result in the reduction of the environmental values of the area.

Iluka propose to rehabilitate all areas disturbed by mining in the project area through the implementation of a detailed Decommissioning Plan. The plan will include completion criteria for the rehabilitation to be undertaken incorporating the works committed to as offsets. The plan will be prepared in accordance with the ANZMEC & Minerals Council of Australia - *Strategic Framework for Mine Closure* (2000).

Rehabilitation of the project area will involve progressive backfilling of pits as space and fill material become available. Upon cessation of mining, infrastructure at the site including buildings, concrete pads and footings will be removed. However, in line with the proposed end landuse for public open space and future residential development, installation of roads and retention of some power lines may be included.

After removal of infrastructure, soils and landforms will be replaced, followed by seeding and infill planting using local seed and vegetative material. This includes returning the soil profile in Mullins Sumpland to recreate the wetland and enhance the environmental values of the surface water feature. Remnants and paddocks will be fenced with two brook crossings and stock watering points incorporated at selected locations along Ferraro Brook (see Figure 5).

Submissions

A total of 12 submissions were received, comprising 1 submission from members of the public, 2 submissions from non-government organisations and 9 submissions from government agencies. The main points raised in the submissions regarding this factor were:

- The lack of a preliminary closure plan with the PER document was noticed and not supported;
- There is an expectation that the proponent will rehabilitate the site to include components such as open space, farmland or future residential use;
- Support the proponent's commitment to complete mining in South pit within one year; and
- There is an expectation the proponent will abide by their commitment to limit the mining program to four years.

Assessment

The area for assessment has been identified as mining tenements M70/735, M70/979 and M70/1089.

The EPA objectives in regards to this factor are:

- To ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values;
- That soil profiles and the ecological functions of soils after mining are as close as possible to those which occurred before mining; and
- That self sustaining native vegetation communities are returned to the area after mining, which in species composition and ecological function, are as close as possible to those that naturally occurred in the area.

The EPA notes the proponent has developed a conceptual rehabilitation strategy (see Figure 5). In developing this strategy, the proponent has liaised with the EPA Service Unit and CALM in regard to optimising the conservation values of native vegetation remnants post-closure through provisions of vegetation corridors, re-planting riparian vegetation and placing conservation covenants over key areas.

The EPA considers that the proposed rehabilitation strategy is appropriate. The proposed rehabilitation of land disturbed by mining will achieve a mixture of land returned for future agricultural or residential use, public open space and native vegetation conservation areas. The proponent's proposed rehabilitation works will also allow for the enhancement of:

- Ecological linkage with the abutting State Forest;
- Rehabilitation of degraded riparian vegetation on the Ferraro Brook; and
- Enhancement of the visual amenity of the area for future compatible land uses.

The EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Preliminary Decommissioning Plan prior to construction and completion of the Final Decommissioning Plan at least 18 months prior to decommissioning of the site.

Conclusion
The EPA concludes that the proposal can be managed to meet the environmental objective for this factor provided that:

- A condition is imposed requiring the proponent to prepare and implement a Decommissioning Plan prior to commencement of ground disturbing activities; and
- The proponent's commitments in relation to offsets are implemented.

3.5 Relevant environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the *Environmental Protection Act (1986).* Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the 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.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 4, should be made enforceable. These are:

- Vegetation offsets (including conservation covenants);
- Fauna habitat;
- Landform and soils;
- Dust; and
- Noise

4.2 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Iluka Resources to develop a mineral sand mine, is approved for implementation.

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

(d) That the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;

(e) A Vegetation and Flora Management Plan be prepared and implemented;

(f) A Native Fauna Relocation and Habitat Plan be prepared and implemented;

(g) A Water Resources Management Plan be prepared and implemented;

(h) Additional monitoring wells be installed, "management criteria" be developed for vegetation health and a Groundwater Level Contingency Plan be prepared and implemented;

(i) An additional round of sampling and analysis for Potential Acid Sulfate Soils be carried out prior to ground disturbing activities; and

(j) A Decommissioning Plan be prepared and implemented.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- Works Approval/Licensing under Part V of the *Environmental Protection Act 1986*; and
- Permits and Licensing under the provisions of the *Rights in Water and Irrigation Act 1914*.

5. Other Advice

Noise

Due to the proximity of the mining operations to nearby residents, noise specifically from mining equipment and vehicles has been identified as a potential issue on the site particularly under certain wind conditions. Several measures are proposed by the proponent to manage this issue, which will be detailed in a Noise Management Plan for the site.

Specific measures include limiting hours of mining operations from 7am to 7pm six days a week with no mining on Sundays and Public Holidays. Additionally, noise bunding will be installed around the perimeter of the pits and active mine area and the proponent is presently in contact with the Department of Industry and Resources regarding other safety mechanisms to replace reversing beepers on vehicles.

Wind direction, speed and frequency will be continuously monitored at the plant site and at several locations surrounding the project area. The noise monitoring equipment will be linked by telemetry to the concentrator control room, which will allow the

operator to alter the machinery operation when noise regulations are likely to be exceeded. It is also proposed to include regular communication with nearby landowners and implementation of a complaint system should noise become a concern. If noise levels cannot be reduced down to resident's expectations, the proponent will consider noise attenuation options for each affected property.

The EPA notes the proponent has committed to prepare and implement a Noise Management Plan detailing the above management actions. The EPA notes this issue can be adequately managed under Part V of the *EP Act 1986*.

Dust

Due to the proximity of the mining operations to nearby residents and the nature of soil type and prevailing winds in the area, dust has been identified as a potential issue on the site. Several measures are proposed by the proponent to manage this issue, which will be detailed in a Dust Management Plan for the site.

Extensive modeling of expected dust emissions has been carried out for the site. This information will be used as baseline data for comparison between pre-mining and active mining dust emissions. The EPA acknowledges that the modeling has indicated the potential for PM_{10} concentrations at some residences may exceed the National Environmental Protection Measure (NEPM) standard of 50 $\mu g/m^3$ during more than 5 days. However, the EPA also acknowledges that the modeling is indicative only and has limitations associated with predictions of particulate emissions rates and due to the proximity of the project area to the Darling Scarp and the effects of local scale meteorology.

Dust monitoring sites will be installed around the perimeter of the mine area, and the data collected will be reviewed regularly (see Figure 6). In addition to this, it is proposed to hold regular communications with nearby landowners and implementation of a complaint system, including investigation, action and feedback.

Other specific measures proposed by the proponent include:

- Minimising land clearing;
- Not disturbing soil stockpiles until required;
- Use of biodegradable dust suppressants;
- Use of temporary crops to bind soil and prevent wind erosion;
- Sprinkler systems used to wet down stockpiles;
- Use of over sized material where possible; and
- Sealing roads if necessary.

The EPA notes the proponent has committed to prepare a Dust Management Plan detailing the above management actions. The EPA notes this issue can be adequately managed under Part V of the *EP Act 1986*.

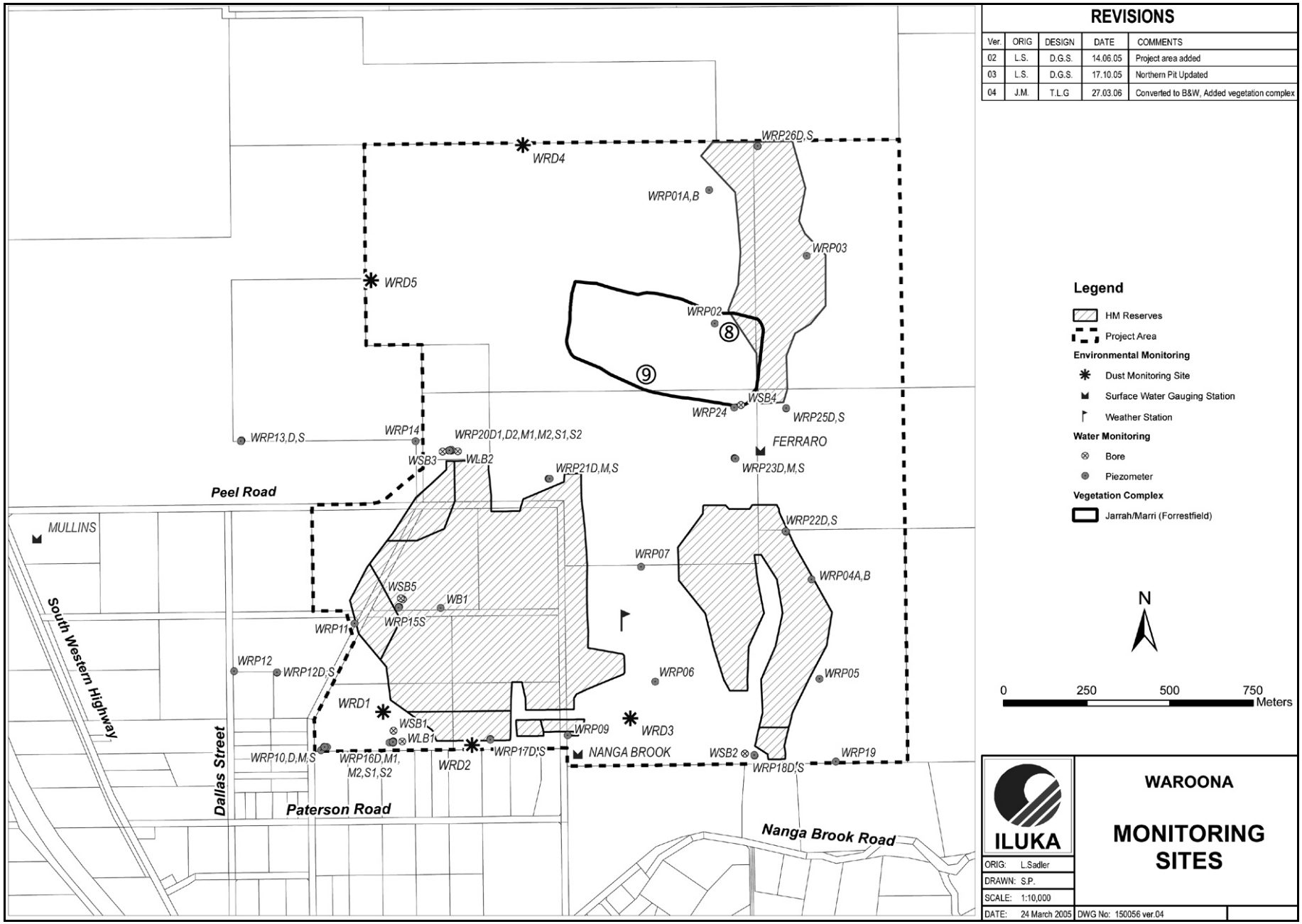

Figure 6: Monitoring sites

6. Conclusions

The EPA has considered the proposal by Iluka to develop a new mineral sand mine 1 km north of the township of Waroona, approximately 140 km south of Perth.

The EPA notes in regard to vegetation and flora:
Regionally significant vegetation belonging to the Forrestfield and Guildford Vegetation Complexes will be cleared as a result of mining. Both vegetation complexes are below 30% of the pre-settlement area on the SCP. Additionally, TEC type 20b has been identified within Forrestfield Complex remnant vegetation that is to be cleared.

To mitigate the loss of this regionally significant vegetation, Iluka has committed to undertake several works as offsets, which are to be detailed in a Vegetation Mitigation Plan. The plan will include, but not be limited to, fencing and covenanting adjacent native vegetation belonging to all three vegetation complexes, fencing and covenanting adjacent vegetation with representation of TEC type 20b, infill planting riparian vegetation along the Ferraro Brook and infill planting vegetation buffers around rehabilitated remnants.

Additionally, the EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Vegetation and Flora Management Plan. The plan will include, but not be limited to, weed, dieback and fire control measures.

The EPA notes in regard to fauna and habitat:
Two Priority and one Scheduled fauna species were identified as utilising remnant native vegetation as habitat and feeding grounds within the proposed mine area. The Priority 5 Quenda and Common Brushtail Possum are the fauna species expected to have the greatest impact as a result of clearing on the site. To mitigate the displacement of these species, a fauna capture and relocation program has been proposed. The details of this program will be prepared in consultation with CALM and contained inside a Native Fauna Relocation and Habitat Plan.

The EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Native Fauna Relocation and Habitat Plan detailing the fauna capture and relocation program.

In addition to this, the proponent has committed to undertake works in an effort to minimise impact to fauna in the area such as: surveying trees containing hollows inside the project area for nesting animals, protection of trees favoured by black cockatoos as a food source and salvaging trees with hollows inside the clearing zone to be used later in rehabilitation works. The proponent has also committed to reinstate the soil profile at Mullins Sumpland and improve the wetland values.

The EPA notes in regard to water resources:
To protect potentially groundwater dependant ecosystems the EPA has recommended a condition be imposed requiring the proponent to install additional monitoring wells and develop “management criteria” for water levels based on monitoring carried out on the site during the life of the project. Additionally the proponent must prepare and

implement a Groundwater Level Contingency Plan in the event reduced groundwater levels are identified as impacting vegetation.

In relation to PASS, the EPA recommends a condition be imposed requiring the proponent to undertake additional site sampling and analysis to conclusively identify PASS and the likely impacts on the site.

The EPA also notes the proponents commitment to prepare a project wide Water Resources Management Plan, and suggests this be formalised in the form of a condition including all relevant criteria for monitoring and management of surface and groundwater resources to maintain environmental values of the aquifers and brooks on the site.

The EPA notes in regard to decommissioning and rehabilitation:
Iluka have consulted with the EPA Service Unit and CALM regarding rehabilitation works to be carried out at the site. It is understood that Iluka has prepared a conceptual rehabilitation strategy and that a comprehensive Decommissioning Plan will be prepared, including completion criteria.

Rehabilitation will be carried out progressively on the site and seed, vegetative material and habitat trees will be salvaged from native vegetation remnants within the clearing zone. Clearing will be kept to a minimum and salvaged vegetative material etc will be stockpiled for later use in rehabilitation works.

The EPA has recommended that a condition be imposed requiring the proponent to prepare and implement a Preliminary Decommissioning Plan prior to construction and completion of the Final Decommissioning Plan at least 18 months prior to decommissioning of the site.

The EPA also notes the proponents other commitments in regards to landforms and soil, dust and noise.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4, and summarised in Section 4.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the Iluka Resources Waroona Mineral Sands Project;
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in

Appendix 4, and summarised in Section 4, including the proponent's commitments; and

4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Government:
Department of Conservation and Land Management
Department of Environment
Department of Indigenous Affairs
Peel Development Commission
Shire of Waroona

Organisations and the Public:
Individual submitter
Peel-Harvey Catchment Council
Wildflower Society of Western Australia

Appendix 2

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Appendix 3

Summary of identification of relevant environmental factors and principles

Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Flora and Vegetation	Mining operations will require 184 ha of disturbance of which 12.6 ha is remnant vegetation and 8.6 ha is planted native and non-native vegetation. 1.3 ha of native vegetation is in very good condition and will be cleared. The Forrestfield Complex is below 30% of the pre-settlement area and therefore this native vegetation has regional significance. One Priority Species was identified within the project area but will not be affected by mining operations.	<u>Department of Environment</u> • The PER needs to provide more detail of the proposed Vegetation Mitigation Plan especially completion criteria. <u>Public</u> • The PER does not clearly identify that the proponents have already undertaken a habitat assessment of all the mature trees, dead and alive, that will be cleared as part of this proposal. • A tree survey should be undertaken of all vegetation that is under threat of clearing, including within the paddocks, and that all habitat values are identified. • The tree survey should be presented as a layer over an aerial map and will indicate the extent to which the project will impact upon mature trees with hollows. • Support the removal of hollows and their use within the rehabilitation and mitigation areas. This should include the installation of hollows into trees as well as at ground level. • Local seed should be collected for all revegetation activities. • Whilst the proposal to establish buffers is supported, the proposal to only establish buffers around the areas of vegetation with best conditions (Vegetation and Flora Mitigation Plan, p17) is not supported. • The translocation of flora is encouraged. This translocation commitment will require a dieback management plan to ensure no Phytophthora cinnamomi infested soil is moved into dieback-free areas. • A trial translocation of understorey flora from the Speedway site should not occur. The flora should be retained in-situ and managed for conservation. • The occurrence of Forrestfield Complex on the proposed site is	**Considered to be a relevant environmental factor and is discussed in section 'Vegetation and Flora'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		regionally significant because less than 17.5% of the original area remains (PER, p.51). • Do not agree that the clearing of 21.2ha "will have a local impact at a flora/fauna level with negligible impact on biodiversity" (PER, p.80). In the heavily cleared wheatbelt where remnant vegetation remains in a fragmented landscape, ALL remnants have considerable biodiversity value.	
Threatened Ecological Communities	Three previously recorded TECs are located two kilometres north-west of the project area. Three of the surveyed locations (8, 9 & 16) contain vegetation consistent with TEC type 20b.	<u>Public</u> • The identification of TEC SCP 20b within the proposed mining area has been omitted from Table 18 and must be included. • Site 16 (speedway): 2.9 ha of vegetation will be cleared of which 0.5ha vegetation is in very good condition and consistent with TEC type 20b. The site should be retained and managed for conservation. • Site 8: 0.8ha very good condition vegetation of TEC SCP 20b will be cleared. • The conservation area of sites 8 and 9 should be extended to include all of sites 8 & 9 and incorporated into the fenced vegetation blocks with buffer areas as proposed (PER p.79). • The PER (p. 52). It is suggested that Iluka fund the development and implementation of a Management Plan the three TECs identified (Figure 19) and that the Plan considers the management of all the remnant vegetation in this area regardless of vesting.	**Considered to be a relevant environmental factor and is discussed in section 'Vegetation and Flora'.**
Fauna	Two field surveys identified: • 50 native bird species; • 2 introduced bird species; • 4 native mammal species; • 3 introduced mammal species; • 7 reptile species; and • 6 frog species; One Priority 5 species, Quenda	<u>Department of Environment</u> • The Fauna Management Plan needs to provide specific detail on Environmental Management points listed in Table 18 and the Proponent Commitments dot-points included in section 8.2.4. <u>Public</u> • The capture and relocation program is supported and should also include any birds using the hollows of any trees to be cleared, as well as the Quenda and Brushtail Possums. • Six species of frogs were identified at Mullin's Sumpland (Ninox &	**Considered to be a relevant environmental factor and is discussed in section 'Fauna and Habitat'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	(*Isodon obesulus fasciventer*) was noted to be using Site 16 around the speedway. One Priority 3 species, Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) and one Schedule 1 species, Baudin's Cockatoo (*Calyptorhynchus baudinii)* was observed feeding within and flying over the project area.	GHD). The PER does not address the impacts or suggest mitigations that the mining of this sumpland will have on these populations.	
Surface water	The project area lies within the Harvey River Basement catchment area. Ferraro Brook traverses the project area. Nanga Brook and Wealand Brook are south and north of the project area respectively. Several small areas within the project area are classified as multiple use wetlands. The Mullins Sumpland will be mined as part of the main pit. Water flows from Mullins Sumpland to Nanga Brook will be substantially reduced by approximately 95%.	<u>Department of Environment</u> • Discharge may occur to Ferarro Brook if more water is produced than can be stored. Little information is provided as to when this will happed and to where along the brook this will occur. • Page 81, Table 18 - Surface Water Systems: Environmental Management should state "Surface water monitoring program *including surface water quality,* implemented including upstream and downstream of minesite." • Page 104, 8.6.4 - The Proponent Commitments should include the monitoring of surface water quality. • Page 112, 8.7.2, Table 22 - under the Indicator Nutrients, Allowable Change should state "No more than +/- 10% increase" rather than 'No excessive nuisance algal growth.' • Figure 3: shows an "Internal Mine Road" crossing over Ferraro Brook but there is no mention of the bed and banks management of the installation of the road or it's decommissioning. <u>Public</u> • It is important that the mineral sands mining process does not contribute to nutrient levels in the waterways of the Peel-Harvey. • Iluka should establish a water quality monitoring program of post-mining water to determine the nutrient levels within this water,	**Considered to be a relevant environmental factor and is discussed in section 'Water Resources'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		especially in regard to phosphorous and nitrogen. • The proposed mining activities along Ferraro Brook will affect the existing overland paddock flows into the brook. Retention of winter flows for maintenance of pool morphology is recommended. • Maintenance of water levels within pools along Ferraro Brook within the proposed covenant area and downstream (Lot 5) should be made a condition of any future mining approval.	
Groundwater	The major aquifer zones that occur locally are the superficial aquifer in the Yoganup Formation (<30 metres), the Leederville aquifer (10-30 – 130 meters) and the Cattamarra Coal Measures (>130 meters). It is estimated, that up to a maximum of 300 ML of groundwater would be abstracted annually for dewatering purposes. There is no impact from drawdown predicted on neighboring properties. Groundwater quality in the superficial aquifer and the shallow Leederville aquifer is fresh to brackish with salinity typically increasing with depth.	<u>Department of Environment</u> • Three of the proposed mine pits will be in direct hydraulic connection with the regional groundwater system. • Over time mining operations will potentially have a detrimental impact on fresh groundwater of the region. • As the mine site will be directly up-gradient of the Harvey River Alluvium it is important to ensure that any potential brackish to saline plumes beneath the pits are contained at or close to the site. • Mullins Sumpland will be part of the mine pit, reducing water flows from Mullins Sumpland to Nanga Brook by approx. 95%. It should be clearly demonstrated how Public landowners that are utilising the water from Mullins Sumpland will be dealt with. • The soil profile underlying the sumpland should be well understood and documented. • Rehabilitation should focus on replacing the clays and loams to restore the soil profile and re-instating an appropriate topography to facilitate the re-establishment of a landform that retains its key hydrologic and botanical properties. • Acid mine drainage is not mentioned in the PER and it should be identified whether or not it is an issue. • Groundwater extraction including dewatering will require a Groundwater Well Licence from the Department of Water. • Long term monitoring of the effects of the Pits and remediation measures is required. • The mine closure plan should recognise that rehabilitation, monitoring and remediation will be required well beyond the life of	**Considered to be a relevant environmental factor and is discussed in section 'Water Resources'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		the mine. • ·Statewide policy No. 10 (Use of operating strategies in the Water Licensing process) should be taken into consideration when addressing the requirements for a Licence to take Groundwater and therefore included within Table 3 Regulatory and Policy Framework. • Page 77, 6.5 - This section should state all the environmental management plans to be developed including a Water Management Plan to address surface water and groundwater management and monitoring, and a Stormwater Management Plan to address all site drainage management. • Page 81, Table 18 - Environmental Management should state that "Management plan for water resources that includes monitoring and reporting of groundwater levels, *groundwater quality*, water abstraction rates and water usage." <u>Public</u> • Support Mattiske's recommendation to monitor tree health at site 9 to ensure de-watering doesn't affect the water table and in turn the heath of the trees [p7]. • Should identify the actions they will take should monitoring identify water- table draw-down is affecting tree health at these sites. • The PER has not identified any commitment to re-instating the Sumpland and its associated flows.	
POLLUTION			
Acid Sulfate Soil	The soils are associated with the Ridge Hill Shelf geology and consist primarily of sands and sandy gravels. A baseline investigation for Potential Acid Sulfate Soils (PASS) was conducted. No indication of PASS was	<u>Department of Environment</u> • Acid sulfate soil issues have been addressed briefly in the document and it is understood that further investigations are continuing. • An Acid Sulfate Soil management plan may be required if potential or actual acid sulfate soils are found within the mine area or in an area that may be impacted by the dewatering cone of influence. • The potential for acid mine drainage post mining has not really been mentioned.	**Considered to be a relevant environmental factor and is discussed in section 'Water Resources'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	identified. Additional investigations at the site indicated no PASS present.		
Salinity	Generally the groundwater quality within the Superficial Aquifer and shallow Leederville Aquifer is fresh to brackish, with measured salinity in the range 70 to 3,200 mg/L Total Dissolved Solids (TDS). Typically, the salinity increases with depth within the different aquifers. Runoff from rainfall is the major component of streamflow, particularly within the upper catchment areas. Water quality within the upper catchment areas is usually fresh, with salinity ranging up to 300 mg/L TDS.	No comments received	Water quality will be monitored during, pre and post mining. Due to the large extent of clearing that has already occurred within the area, salinisation is not expected to worsen from the relatively small amount of clearing associated with the proposed mine. Additionally, mine pits will be backfilled to above the ground water level upon cessation of mining. **Factor does not require further EPA evaluation.**
Dust	Particulate concentrations at the proposed mine locations are not available, however baseline dust monitoring has been conducted at Waroona since September 2004 and background TSP and PM_{10} levels are available for nearby Wagerup. Monthly total insoluble dust levels have ranged from 0.2 to 2.3 g/m^2/mth with an average of 0.81 g/m^2/mth.	<u>Department of Environment</u> • The Department's air quality modeling guidelines require that electronic versions of model input and output files be provided; this has not been done. • It should be noted that that the meteorological pre-processor (Calmet) cannot effectively incorporate the effects of rotors on particulate entrainment and these effects have not been included into the modeling. • Model estimated 24 hourly average dust concentrations exceed PM10 and TSP goals at the nearest residences. Given the proximity of the sand mining operations to these residences this is a significant concern.	The proponent has investigated this issue and taken steps to mitigate impacts, including: • Minimising land clearing; • Not disturbing soil stockpiles until required; • Use of biodegradable dust suppressants; • Use of temporary crops to bind soil and prevent wind erosion;

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	Modelled dust levels are shown to exceed both the TSP and PM_{10} limits at several residential locations, however modeling is indicative only. The model also incorporates conservative assumptions regarding the location of mining and the existing ambient dust levels.	• the modeled impact of dust on nearby residences appears to be unacceptable and more stringent dust management will be required. • Reservations with the use of Perth Airport cloud data for estimating atmospheric stability. It needs to be noted that this raises the level of uncertainty in the modeling. <u>Shire of Waroona</u> • Issues with noise in high wind events. The management of machinery during these events is of critical importance. • The location of noise monitors should be designed to ensure compliance in all weather events. • Due to the summer 'catabatic' wind events, the management of dust from the site will be of importance. • The location of dust monitors should be designed to ensure measure compliance in all weather events. <u>Public</u> • Dust Management Plan needs to address in detail the prevailing wind conditions. • The use of sprinklers to provide dust suppression, and other such management actions, must involve a management regime that provides for sprinklers to activate at these times. • Any associated noise implications from operating pumps associated with sprinklers during the night must be addressed in the respective management plan. • Concern in the ability to control noise and dust pollution from the operation given properties elevation and proximity to the minesite.	• Sprinkler systems used to wet down stockpiles; • Use of over sized material where possible; • Installation of dust monitoring equipment; • Monitoring wind direction and frequency; and • Sealing roads if necessary. The proponent has also committed to prepare and implement a Dust Management Plan detailing the above management actions, plus including community consultation during the life of the mine. **Factor does not require further EPA evaluation.**
Noise & vibration	Mining will occur in daytime hours only, excluding Sundays and Public Holidays. Processing will occur 24 hours a day. Noise modelling has shown that under the majority of weather	<u>Department of Environment</u> • Using the base assigned levels of 35 dB(A) at night and 45dB(A) during the day, (0dB Influencing Factor), the assessment could be considered conservative. • The SVT report assumed that the noise emission contains no annoying characteristics such as tonality, modulation or	The proponent has investigated this issue and taken steps to mitigate impacts, including: • Limiting hours of operation in the mine;

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	conditions noise limits can be met. The environmental background noise levels were measured on two occasions with maximum daytime LA90 levels ranging between 45 - 55 dB(A) and minimum evening LA90 levels ranging between 21 - 34 dB(A).	impulsiveness, but gives no basis for this assumption. Noise from earthmoving plant such as a haul truck commonly exhibits tonality ("humming, whining"). • If the noise emission is tonal, the further changes to equipment usage will be needed to achieve compliance may not eventuate. • Consideration should be given to extending the earth bund further to the north to provide better screening. • There does not appear to be an earth bund at Mining Location 5 and consideration should be given to this control measure. • The commitment in the Noise Management Plan (NMP) to "regular checking of noise levels of site machinery" will need to be implemented, and supplemented by a requirement to verify the noise levels before the machinery comes on site. • The NMP should address possible ameliorative measures such as temporary relocation of residents in the event that noise emissions become unmanageable. • The NMP should address noise from audible alarms on mobile plant, with a view to the replacement of reversing beepers by less intrusive alternative safe systems of work. Similarly for audible alarms and PA systems on the processing plant, which can be intrusive at night. • The NMP should be to the satisfaction of the DoE. • Construction of the earth bund may be considered "construction noise" under noise regulation 13, and its recommend that an approved construction noise management plan be required under regulation 13 to ensure that these activities are carried out in the best practicable manner. <u>Public</u> • The PER doesn't address alternatives to reversing beepers, rather it states that liaison with DoIR will be undertaken. • Concern in the ability to control noise and dust pollution from the operation given properties elevation and proximity to the minesite.	• Removal of reversing beepers on vehicles; • Noise bunding around perimeter of mine; • Location of the concentrator in low topography; • Installation of noise monitoring equipment; and • Monitoring of wind direction and frequency. The proponent has also committed to prepare and implement a Noise Management Plan detailing the above management actions, plus including community consultation during the life of the mine. **Factor does not require further EPA evaluation.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Light	Artificial light in the project area is restricted to vehicle movements on public roads, town lighting, residential lighting and farming activities. The lighting of mobile and fixed plant operations is required for 24 hour processing.	<u>Public</u> • It is suggested that Iluka implement actions that would make these additional emissions "carbon-neutral".	Mine vehicles will not be active on the mine past 7pm, so light overspill from vehicles is not expected to be an issue. The ore concentrator is located in naturally low land close to the Ferraro brook, therefore light overspill into adjacent dwellings will be as minimal as possible. Noise bunds between the Main pit and the nearest residents will also act to block light overspill from the concentrator area. Additional measures such as light positioning, screening and choice of bulbs will also be utilised. **Factor does not require further EPA evaluation.**
Greenhouse gases	Anticipated carbon dioxide emissions of 40 kt/annum mainly from electricity and diesel fuel consumption.	No comments received	At the predicted emission levels this project will be a minimal contributor to State greenhouse gas emissions. **Factor does not require further EPA evaluation.**
Waste materials	Mining operations will generate solid wastes including domestic waste, recyclables (for example paper, steel, waste oil, tyres, batteries) and septic waste. No	No comments received	Excavated materials unearthed during mining and process waste (ie. clays and silts) will be used to backfill pits progressively during the life of mining, and also used in

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	chemical waste will be generated in association with the mining operations. The handling, use, storage, and disposal of hydrocarbons will be managed to ensure that their use results in minimal environmental impact. Wastes will be managed in a manner that does not result in long-term impacts on groundwater, surface water and the natural environment.		rehabilitation works upon cessation of mining. Domestic waste will be separated to remove all recyclables, and the remainder transported to a licensed landfill facility. **Factor does not require further EPA evaluation.**
Weeds	A total of thirty three species of introduced and non-endemic species were identified within the study area. The diversity of weed species is high with twenty four genera represented. Amongst the weed species there were four declared weeds, which are listed by the Department of Agriculture under the Agriculture and Related Resources Protection Act (1972) as being of particular significance.	<u>Department of Environment·</u> • The PER needs to provide more detail on proposed weed control <u>Public</u> • The bushland and the TECs are threatened by weed invasion as weeds are also spread through fire-break and drainage management practices. • Small patches of African Lovegrass occur in the vicinity of Sites 8 and 9. • Attention to weed management for kikuyu and African lovegrass and Adenanthos meisneri (planted) (PER, p53) need to part of any commitments / conditions of the mining licence. • The proposed transfer of understorey from Site 16 to another site also has the potential for the transfer of weeds. • The commitments to undertake weed control require far greater detail. Will this be a once-off event or will ongoing management take place until the weeds are controlled?	**Considered to be a relevant environmental factor and is discussed in section 'Vegetation and Flora'.**
SOCIAL SURROUNDINGS			

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Heritage	Three ethnographic sites were identified as occurring within and immediately adjacent to the project area. No European heritage sites have been listed as occurring within the project area.	Department of Heritage • In section 10.3.4 statements made in relation to the discovery of skeletal and/or cultural material during ground disturbing works are limited and need to be expanded. • If cultural material is discovered work should cease until an evaluation has been made of the material and a determination made as to if a section 18 is required under the *Aboriginal Heritage Act 1972* to disturb material.	The three sites of aboriginal significance are not expected to be impacted from mining activities. If any Indigenous or European artifacts are encountered during mining operations they will be immediately reported to the Department of Indigenous Affairs and/or Australian Heritage Commission, Heritage Council of WA, National Trust of Australia and the Shire of Waroona respectively. **Factor does not require further EPA evaluation.**
Transport route	The project area is located less than two kilometres from the South West highway off Peel Road. Peel Road is a gravel no-though road to the Speedway reserve. The Peel Road – South West Highway intersection will be upgraded to Main Roads Western Australia requirements.	Shire of Waroona • The impact of the increased heavy truck movements on the Town Centre should not be underestimated and the statement that "there will be minimal impact on current traffic numbers..." is not supported. • The Shire does not object at this stage to the proposal to transport 24 hours per day, 7 days per week but would welcome the opportunity to review the arrangement 6-months after operations commence. • A traffic management plan should be prepared which outlines measures, which, as a minimum, ensure truck movements avoid school opening and closing times and peak traffic associated with the Wagerup Alumina Refinery.	The South West Highway is already utilised by heavy vehicles as a transportation route. Any increase in traffic along this route as a result of the Waroona Mineral Sand Mine will be minimal. Other alternatives were considered, however road transportation was deemed to be safer, have less environmental impact and be more cost effective. **Factor does not require further EPA evaluation.**
Visual amenity	The project area is located in	Public	The South pit (which is closest to

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	close proximity to residents. The landscape is undulating and some residents have extensive views that include the project area.	• Concern that operations will create a large, unsightly scare on the landscape. • Concern that given the change on landscape and resulting views have the potential to have a negative effect property value. • Concern at the lack of any agreed process as Iluka do not think that their operations will not have a negative effect.	residents with views) will be mined in the first phase of mining so that it can be progressively backfilled and rehabilitated as soon as possible. Active mining in this area is anticipated to be no longer than 12 months. Tree belts have been planted in areas around the project area boundary near resident locations in an attempt to provide some screening of the mine. Additionally, the life of mine is four years with an estimated three years to completely rehabilitate the project area. Therefore, the visual amenity of the area will not be impacted for a significant period of time. **Factor does not require further EPA evaluation.**
OTHER			
Mine Closure and Rehabilitation	Closure procedures have been developed in accordance with the Australia and New Zealand Minerals and Energy Council (ANZMEC) Strategic Framework for Mine Closure (2000) which outlines a range of objectives and principles	<u>Department of Environment</u> • Considering the short life of the mining proposal (4 years) it would be reasonable to prepare a Closure Plan as part of the approvals process and not during or cessation of mining. <u>Shire of Waroona</u> • It is the community's expectation that Iluka will present the site back to it with rehabilitation, including vegetation, consistent with	**Considered to be a relevant environmental factor and is discussed in section 'Decommissioning and Rehabilitation'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	including stakeholder involvement, planning, financial provisioning, implementation, standards and relinquishment and the Minerals Council of Australia Mine Closure Policy (1999). Rehabilitation will incorporate the works committed to as offsets by the proponent. Rehabilitation will restore agricultural systems and productivity. Restoration of degraded native vegetation not affected by mining will be conducted.	end land use of open space, farmland or future residential use. • Iluka must keep its commitment for a four year mining program • Iluka's commitment to complete mining in the southern pit within one year is noted and welcomed.	
Offsets	Due to the regional significance of Sites 8, 9 and 16 and the Forrestfield Complex, mechanisms were developed to address the impact on conservation values and the protection of biodiversity. Proposed offsets for vegetation clearing include fencing to prevent stock access, infill planting of local, native species and weed control.	<u>Department of Environment</u> • Detailed management plans are not part of this current PER document but are part of the commitments (section 6.5). • Proposed offsets indicate that there will be no net loss of native vegetation; this is particularly important considering that the proposal includes clearing of 12.6 ha of remnant vegetation. <u>Department of Conservation and Land Management</u> • Table 21 page 88, Under the Feature "Sandslope - Site 8 and 9" which states; "Infill plant a 20m vegetation buffer around both sites where possible using upland species". CALM suggests a change to that sentence to read "Infill plant a 20m vegetation buffer around both sites using the same plant species present at Sites 8 and 9". <u>Public</u>	**Considered to be a relevant environmental factor and is discussed in section 'Vegetation and Flora'.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		• All sites proposed as vegetation mitigation areas are currently unfenced and therefore able to be grazed by stock. Best practice land management suggests that, as current owners and land-managers, Iluka should fence these areas to prevent stock access, especially Sites 8 and 9. • At present it is intended that the land upon which it is proposed to place covenants will remain in the future as Public land. Future planning processes may decrease the value of these areas as offsets. • It is suggested that the covenanted areas should become future public land as referred to in section 6.4.1 • The details of the vegetation complexes and their condition for the vegetation located on Lot 478, Lot 513 and Lot 265 that is proposed to be fenced as offsets have not been identified. • it is requested that the Coolup and Harvey River LCDCs and officers of the PHCC be consulted during the development of the implementation and completion criteria for the Vegetation Mitigation Plan. • The clearing of remnant native vegetation containing TEC or Forrestfield Vegetation Complex should not be approved. • No clearing of endangered ecological communities such as TEC 20b should be approved as it contributes to the long-term decline in the quality and extent of Australia's native vegetation cover. • The proposed offset to fence 76ha on Lots 478, 265, and 513 is to be questioned as to the future efficacy to conserve and protect vegetation / biodiversity values. • Currently the remnant vegetation proposed for covenant areas on Lots 513 (Site 10) and 478 (Site 12/13) are intact and in good condition. Any proposal to subdivide for residential development will significantly reduce the biodiversity values. • The proposed perimeter fencing of Lots 513 (Site 10) and 478 (Site 12/13) will have no benefit to biodiversity conservation nor contribute to a flora/vegetation offset package if it is subdivided for development.	

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 – • careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and • an assessment of the risk-weighted consequences of various options.	Yes	In considering this principle, the EPA notes that: • Clearing has been minimised wherever possible; • Clearing of regionally significant vegetation will be offset to mitigate losses; • The proponent will salvage seed, vegetative material and tree hollows from areas to be cleared, for later use in rehabilitation works; • Fauna displaced as result of clearing will be captured and relocated, in consultation with CALM; and • Mullins Sumpland will be re-established upon cessation of mining.
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	In considering this principle, the EPA notes that: • The proponent has committed to minimise waste generation by recycling whenever possible; • No chemical waste will be produced in association with mining operations; • The proposed offsets will increase the environmental values of the land through rehabilitation of degraded areas, creation of vegetation corridors with abutting State Forest and increase the amount of regionally significant vegetation in secure landhold; • The visual amenity of the area will be increased as result of the rehabilitation works and offsets; and • The proponent will contribute to economic development within the Waroona area.
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	In considering this principle, the EPA notes that: • The conservation status of Priority and Declared Rare Flora is unlikely to be impacted as a result of the project; • The conservation status of Priority and Scheduled fauna is unlikely to be impacted as a result of the project; and • The proposed offsets for the project provide for a net environmental benefit.

Appendix 4

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

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

WAROONA MINERAL SANDS PROJECT,
WAROONA, SHIRE OF WAROONA

Proposal: To construct and operate a mineral sands mine, within Mining Tenements M70/735, M70/797 and M70/1089, approximately one kilometre north of the township of Waroona. The proposal is further documented in schedule 1 of this statement.

Proponent: Iluka Resources Limited

Proponent Address: Level 23, 140 St George's Terrace, PERTH WA 6000

Assessment Number: 1510

Report of the Environmental Protection Authority: Bulletin 1217

The proposal referred to above may be implemented by the proponent subject to the following conditions and procedures:

1 Proposal Description

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Environmental Management Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

3-2 The proponent shall notify the Chief Executive Officer of the Department of Environment (CEO) of any change of the name and address for the serving of a notice or other correspondence within 30 days of such change.

4 Time Limit of Authorisation

4-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years of the date of this statement if the proposal to which this statement refers is not substantially commenced.

4-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

5 Compliance Reporting

5-1 The proponent shall submit to the CEO Compliance Reports in accordance with a schedule approved by the CEO.

5-2 The Compliance Report shall be prepared in accordance with the CEO's guidelines entitled *Compliance Monitoring Guidelines for Proponents*, and the Compliance Report shall:

1. describe and provide evidence of the status of implementation of the proposal;
2. include evidence of compliance with the conditions, procedures and commitments of this statement;
3. provide a review of the effectiveness of corrective and preventative actions contained in the environmental management plans and programs;
4. provide verifiable evidence of the fulfilment of requirements specified in the environmental management plans and programs;
5. identify all confirmed non-conformities and non-compliances and describe the related corrective and preventative actions taken; and
6. identify potential non-conformities and non-compliances and provide evidence of how these are being determined for corrective action.

6 Fauna Relocation and Habitat

6-1 Prior to ground-disturbing activities, the proponent shall prepare a Native Fauna Relocation and Habitat Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and in consultation with the Department of Conservation and Land Management.

This plan shall:

1. detail actions to relocate native fauna to other suitable habitats;

2. address relocation of the following fauna species:

- Quenda (*Isodon obesulus fasciventer*);
- Possums of any species; and
- Any other fauna species which the Department of Conservation and Land Management advises should be relocated;

3. include such monitoring of the success of relocation of fauna, as advised by the Department of Conservation and Land Management; and

4. address the salvage and relocation of tree hollows and habitat logs from active mining areas to provide habitat for fauna species in rehabilitation areas.

6-2 The proponent shall implement the Native Fauna Relocation and Habitat Plan required by condition 6-1.

6-3 The proponent shall make the Native Fauna Relocation and Habitat Plan required by condition 6-1 publicly available.

7 Safety Alarms ("beepers")

7-1 The proponent shall use that form and type of safety alarm or "beeper" on items of equipment, which produces the least noise while complying with all statutory requirements.

8 Vegetation and Flora

8-1 Prior to ground-disturbing activities, the proponent shall prepare a Vegetation and Flora Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and in consultation with the Department of Conservation and Land Management.

The objectives of this Plan are:

1. to minimise disturbance of vegetation communities and significant flora; and
2. to identify rare and priority flora species and ensure that they are protected during mining operations.

8-2 The Vegetation and Flora Management Plan required by condition 8-1 shall:

1. identify vegetation communities of conservation significance and priority or declared rare flora in or surrounding the proposal area;
2. include the management, monitoring and reporting of impacts on the defined vegetation communities and any identified declared rare flora and priority flora species within the proposal area;
3. include management and mitigation measures for dieback, fire and weeds;
4. avoid unnecessary impacts on vegetation and flora from mine operations; and
5. include any management or mitigation actions required, including modification to the mine layout to provide for retention of significant flora.

8-3 The proponent shall implement the Vegetation and Flora Management Plan required by condition 8-1.

8-4 The proponent shall make the Vegetation and Flora Management Plan required by condition 8-1 publicly available.

9 Groundwater Level Management – North pit and vegetation location 8

9-1 Prior to ground-disturbing activities, the proponent shall install additional groundwater monitoring bores and/or pits adjacent to the North pit, including within areas of

vegetation adjacent to vegetation location 8, as indicated in Figure 3 of schedule 1 (attached).

9-2 Prior to ground-disturbing activities at the North pit, the proponent shall complete at least two summers of groundwater level monitoring in the bores required by condition 9-1.

9-3 Based on the groundwater monitoring, the proponent shall establish "management criteria" with the objective of ensuring that the health of the vegetation at location 8 is maintained during mining of the North pit.

9-4 During mining in the North pit, the proponent shall monitor bores required by condition 9-1 at least once every seven (7) days.

9-5 The proponent shall not commence ground disturbing activities for the North pit shall not commence until the "management criteria" have been endorsed by the Minister for the Environment on advice of the Environmental Protection Authority.

9-6 Prior to ground-disturbing activities for the North pit, the proponent shall prepare a Groundwater Level Contingency Plan setting out management actions to be implemented if the monitoring indicates groundwater levels have fallen below the "management criteria" required by condition 9-5.

9-7 In the event that "management criteria" fall below, the proponent shall:
1. notify the Department of Environment immediately;
2. implement management measures, set out in the Groundwater Level Contingency Plan required by condition 9-6;
3. report the outcome of management measures taken to the Department of Environment;
4. cease all mining which has the potential to further lower the groundwater in the vegetation adjacent to the North pit.

10 Water Resources Management

10-1 Prior to ground-disturbing activities, the proponent shall prepare a whole-of-site Water Resources Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This plan shall address:
1. monitoring and reporting of groundwater levels;
2. monitoring and reporting of stream flow and potential impacts of reduced stream flows in Nanga and Ferraro Brooks;
3. monitoring of aquatic biota in Nanga and Ferraro Brooks;
4. measurement and recording of water abstraction and usage;
5. monitoring of water quality and water levels within the piezometer network; and
6. hydrocarbon management.

10-2 The proponent shall provide biannual reports of monitoring results to the Department of Water.

11 Potential Acid Sulphate Soils Management

11-1 Prior to excavation activities, the proponent shall, in consultation with the Department of Environment, undertake sampling for Potential Acid Sulphate Soils (PASS), to demonstrate that the impacts from PASS can be managed to avoid pollution or environmental harm.

12 Decommissioning

12-1 Prior to ground disturbing activities, the proponent shall prepare a Preliminary Decommissioning Plan for approval by the CEO, which provides:

1. rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;
2. long-term management of ground and surface water systems affected by the mining operations, including groundwater drawdown and diversion; and

12-2 At least 18 months prior to the anticipated date of decommissioning , or at a time agreed with the CEO, the proponent shall prepare a Final Decommissioning Plan to the requirements of the Minister for the Environment on advice from the Environmental Protection Authority, for:

1. removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
2. long-term management of ground and surface water systems affected by the operations, including groundwater drawdown and diversion; and
3. identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

12-3 The proponent shall implement the Final Decommissioning Plan required by condition 12-2 until such time as the Minister for the Environment on advice from the Environmental Protection Authority determines, that the proponent's decommissioning and closure responsibilities have been fulfilled.

12-4 The proponent shall make the Final Decommissioning Plan required by condition 12-2 publicly available.

Notes

1. Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment for the preparation of written notice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment.

3. Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environment.

4. The proponent is required to apply for a Works Approval and Industry Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

5. The proponent is required to apply for the appropriate Licences / Permits for this project under the provisions of the *Rights in Water and Irrigation Act 1914* and the *Rights in Water and Irrigation Regulations 2000.*

Schedule 1

The Proposal (Assessment No. 1510)

The project is to construct and operate mineral sands mine within mining tenements M70/735, M70/797 and M70/1089, 1 kilometre north of the township of Waroona (Figures 1 & 2). The project involves the progressive mining of shallow ore bodies for Titanium minerals and Zircon using dry mining techniques. The project is expected to yield 245,000 tonnes of Heavy Mineral Concentrate (HMC) per annum over the four year life of the mine.

The major components of the operation include:

- Three new mine pits;
- Solar drying dams;
- Ore concentrator;
- Associated mine infrastructure; and
- Upgrade to Peel Road and intersection of Peel Road and South West Highway.

The main characteristics of the proposal are summarised in Table 1.

Table 1: Summary of Key Proposal Characteristics

Element	Description
MINE	
Life of Mine (Mine Production)	Approximately 4 years
Size of Ore Body	Approximately 10.8 Mt
Area of Disturbance	Approximately 184 ha
Vegetation Disturbance	Approximately 21.2 ha
ORE PROCESSING	
Nominal Processing Rate	300 t/h
Heavy Mineral Concentrate production	Approximately 245,000 t/a (0.245 Mt/a)

Abbreviations:

ha – hectare
Mt – mega tonnes
Mt/a – mega tonnes per annum
t/a – tonnes per annum
t/h – tonnes per hour

Figures (attached)

Figure 1 – Project site location.
Figure 2 – Project site plan
Figure 3 – Proposed offset areas
Figure 4 – Project monitoring locations.

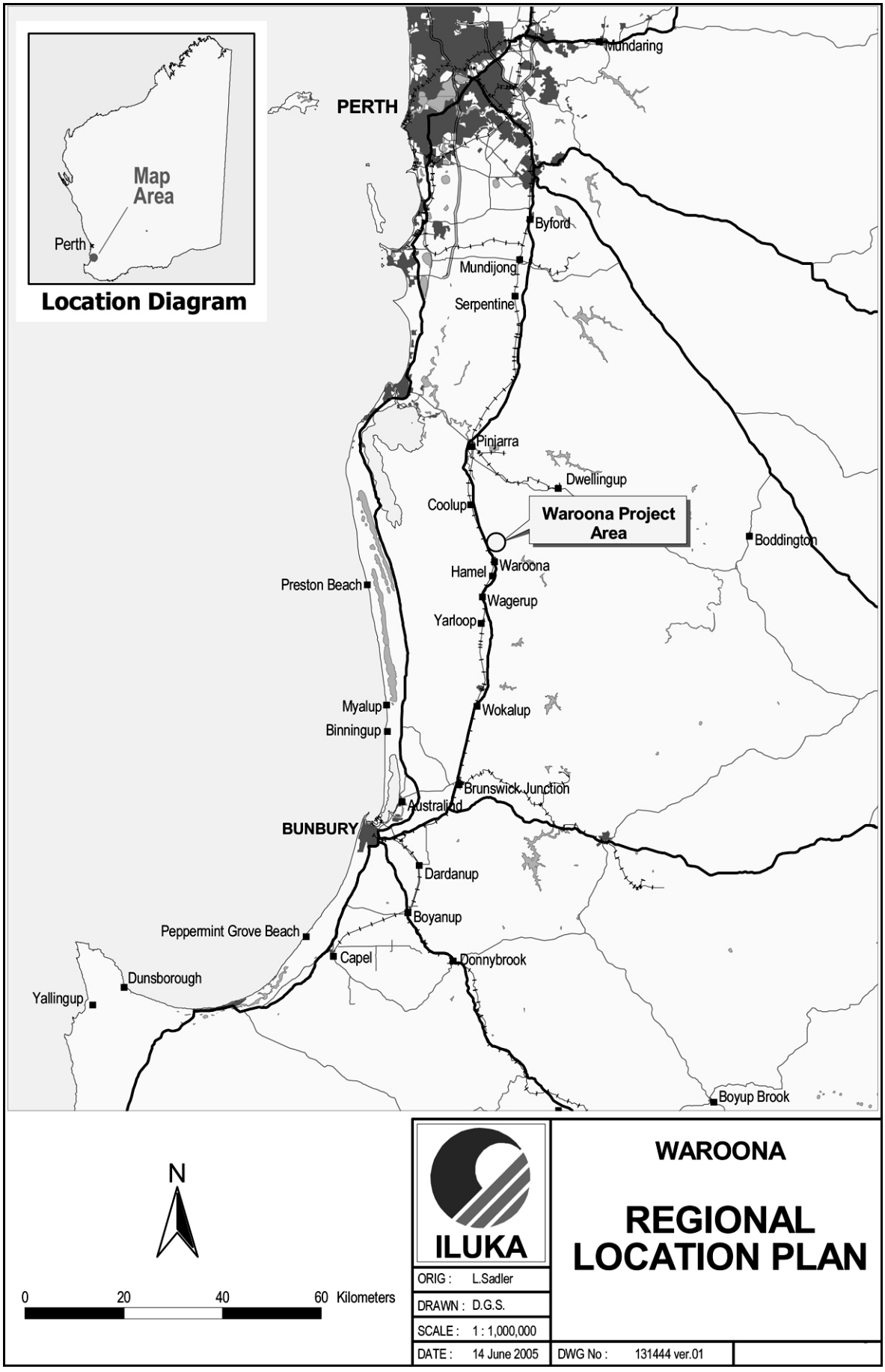

Figure 1 – Project site location.

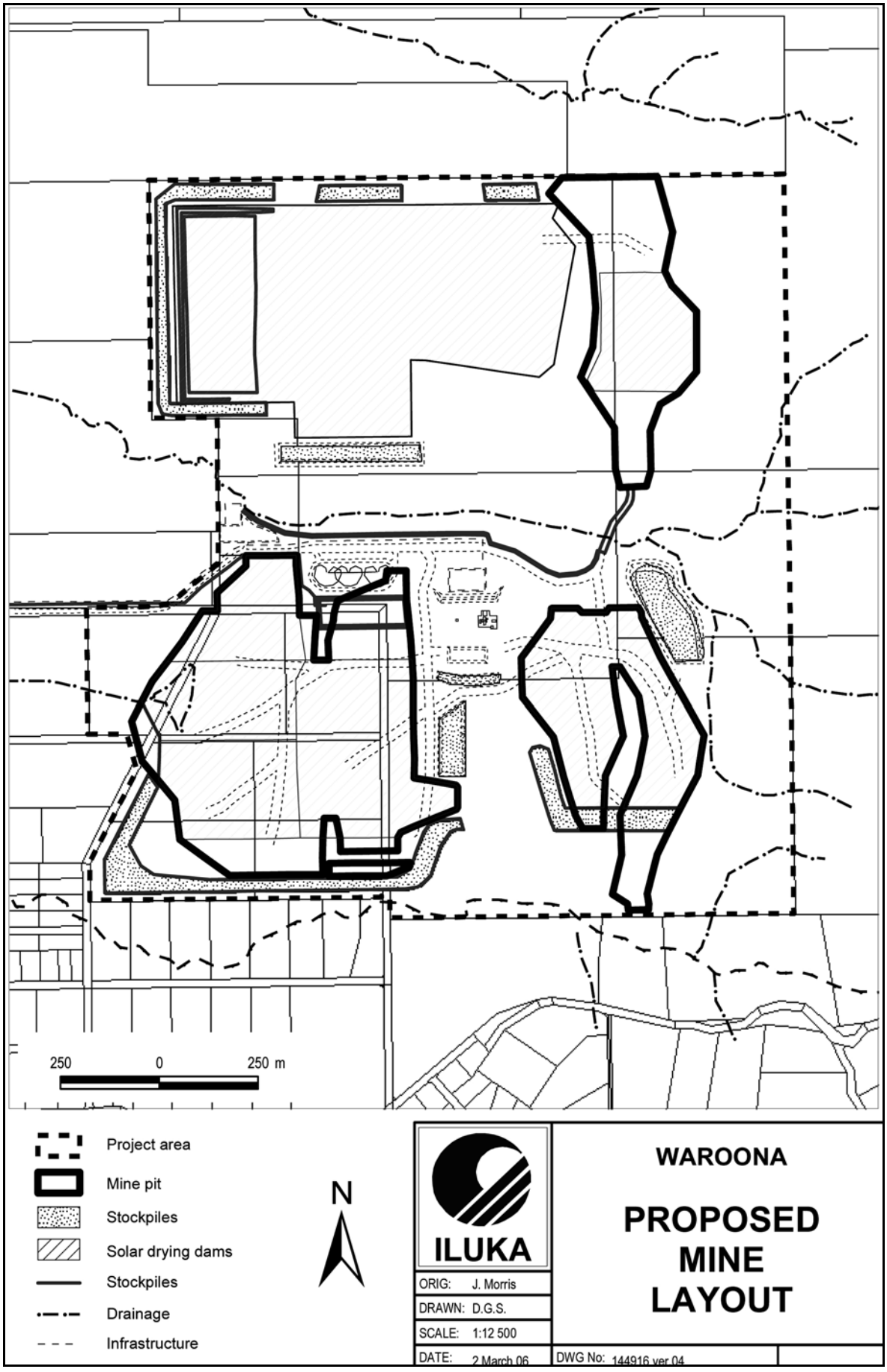

Figure 2 – Project site plan

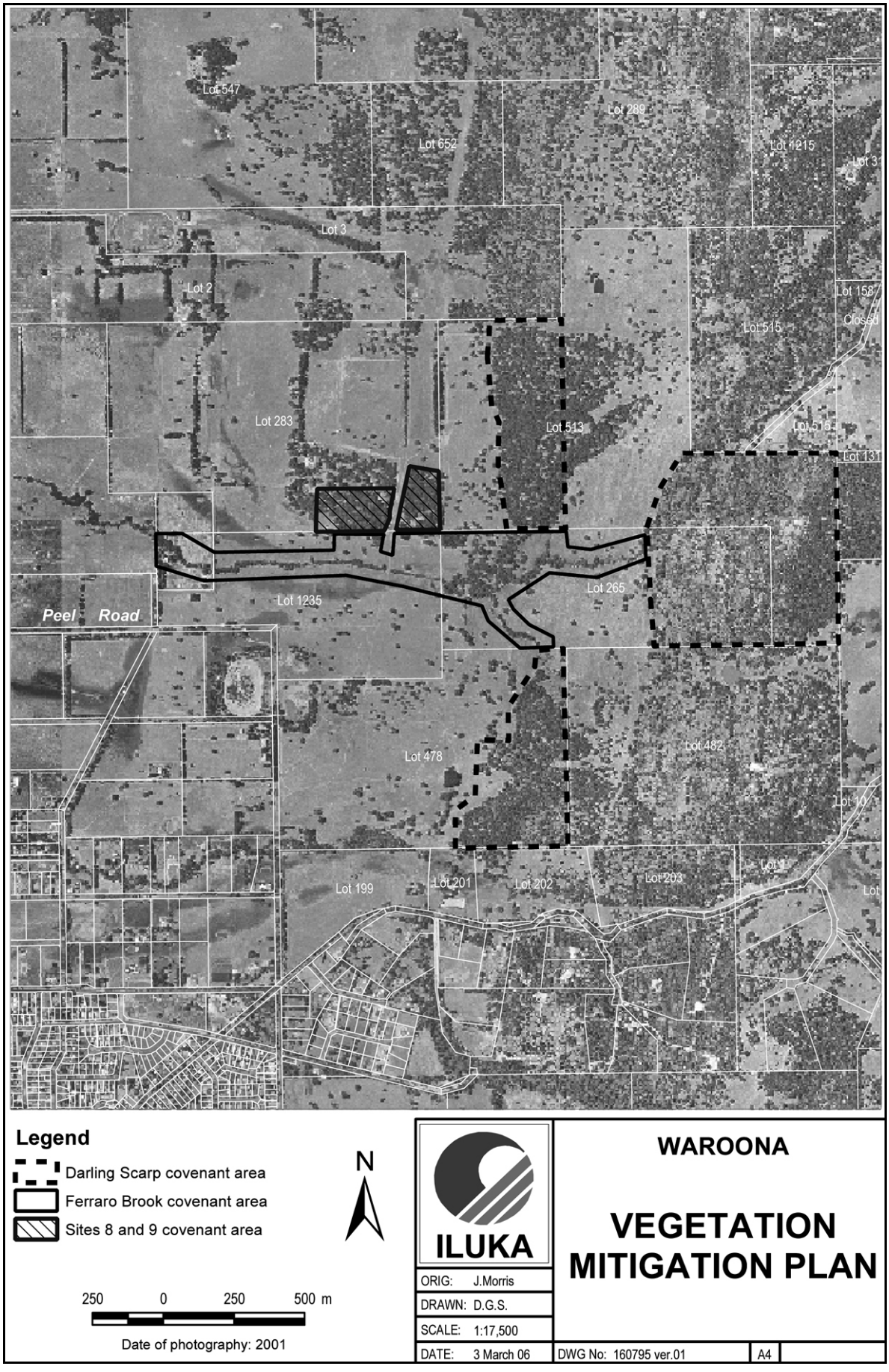

Figure 3 – Proposed offset areas

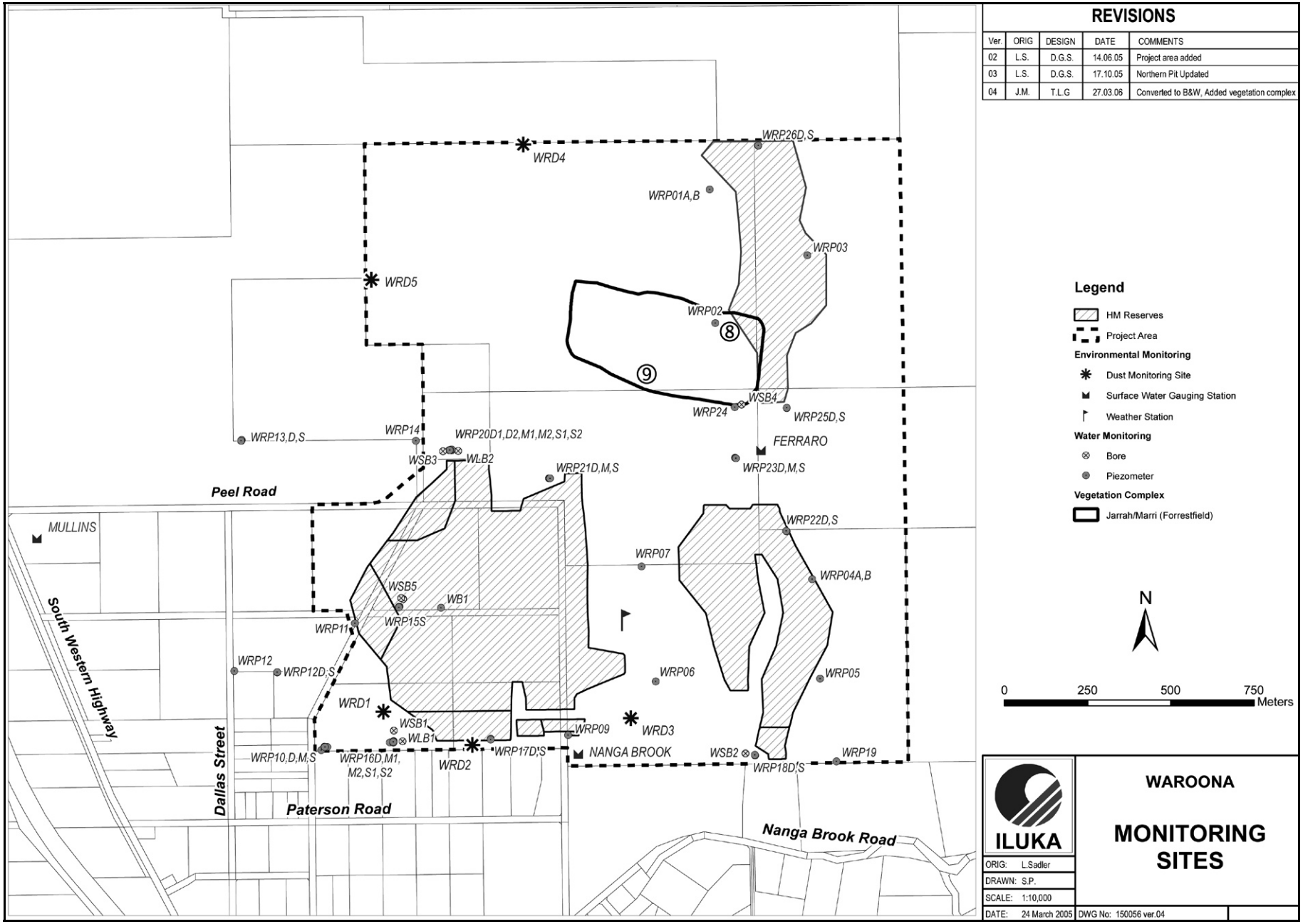

Figure 4 – Project monitoring locations.

Schedule 2

Proponent's Environmental Management Commitments

April 2006

WAROONA MINERAL SANDS PROJECT
SHIRE OF WAROONA

(Assessment No. 1510)

Iluka Resources Limited

Proponent's Environmental Management Commitments – April 2006

WAROONA MINERAL SANDS PROJECT, WAROONA, SHIRE OF WAROONA (Assessment No. 1510)

Note: The term "commitment" as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the 'action' to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environment.

Table 2: Environmental Management Commitments

No.	Topic	Objective	Action	Timing	Advice
1	Flora and Vegetation (see Figure 3)	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	Prepare a Vegetation Mitigation Plan that addresses the following: 1. Fence Ferraro Brook and buffer area, Sites 8 and 9 with buffer areas and the remnant vegetation blocks; 2. Undertake weed control within these areas; 3. Infill plant these areas with native species, including riparian species around the brook and upland species in other areas; 4. Trial translocation of understorey flora from the Speedway site (location 16); and 5. Placement of appropriate CALM Conservation Covenants over the identified blocks of remnant native vegetation.	Before Construction	CALM
2	Flora and Vegetation		Implement the Vegetation Mitigation Plan in proponent commitment 1.	Before Construction	CALM

No.	Topic	Objective	Action	Timing	Advice
3	Fauna Habitat	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	1. Preferentially retain trees identified with hollows on site; 2. Inspect those trees within the clearing envelope with hollows for signs of bird nesting; 3. Remove hollows from any suitable cleared trees and use within the rehabilitation and mitigation areas as fauna habitats; 4. Protect Marri trees favoured by Baudin's Cockatoo as food sources from where practicable; and 5. Use seed from Marri trees favoured by Baudin's Cockatoo in the Vegetation Mitigation Plan.	Before Clearing	CALM
4	Landform and Soils	To maintain the integrity, ecological functions and environmental values of the soil and landform.	1. Backfill mine voids and grade and shape the surface; and 2. Reinstate the soil profile at Mullins Sumpland.	Upon Decommissioning	
5	Dust (see Figure 4)	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Prepare a Dust Management Plan that includes: 1. Minimising open area; 2. Dust control measures; 3. Monitoring and reporting of dust levels; 4. Review and continuous improvement program; and 5. Community complaints system.	Before Construction	
6	Dust		Implement the Dust Management Plan in proponent commitment 5.	Before Construction	
7	Noise	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements and acceptable standards.	Prepare a Noise Management Plan which includes: 1. Hours of operation; 2. Allowable noise levels of site machinery; 3. Regular checking of noise levels of site machinery; 4. Management of noise during construction; 5. Management of noise during operations; 6. Monitoring and reporting of noise levels; 7. Review and continuous improvement program; and 8. Community complaints system.	Before Construction	
8	Noise		Implement the Noise Management Plan in proponent commitment 7.	Before Construction	

Abbreviations:

CALM = Department of Conservation and Land Management.

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions

1. RESPONSE TO SUBMISSIONS – WAROONA PROJECT PUBLIC ENVIRONMENTAL REVIEW

Number	Submitter(s)	Submission	Response
	State and Local Government		
1.	Department of Indigenous Affairs	Further detail is required in regards to the discovery of skeletal and/or cultural material during ground disturbance works. The information currently in the document needs to be expanded. The following text is recommended for inclusion: If skeletal material is found all works must cease and it be reported to the Police and the DIA simultaneously. A meeting should be arranged on site with the DIA, an Aboriginal community representative(s), and an archaeologist. Once it is confirmed that the remains are of an Aboriginal person, the site should be registered as an Aboriginal site. It is also a legal requirement under the *Aboriginal and Torres Straight Islander Heritage Protection Act 1984 (Section 20(1))* to notify the Commonwealth Minister for Aboriginal Affairs of any discovery of skeletal remains. If skeletal material of Aboriginal origin is located and the development will disturb those remains, the developer will need to seek approval for the development under section 18 of the Aboriginal Heritage Act 1972. In cases where it is not possible to rebury the remains the location that they were discovered, the preferred option is to rebury them as neat as is practicable to their place of discovery. This process should involve consultations with the local Aboriginal community. If however, development of the whole area is unavoidable or if it is the choice of the local Aboriginal people, skeletal material may need to be removed from the site entirely. This should be done under the supervision of the local Aboriginal leaders. The fate of the material is then at their discretion. If other cultural material is discovered, works should cease until and evaluation has been made of the material and a determination as to if a Section 18 is required under the AHA to disturb the material.	Acknowledged. Iluka will incorporate this detail into the day to day mining operations strategy to deal with the potential for the discovery of Indigenous heritage items.
2.	Shire of Waroona	On balance the Shire is supportive of the proposal. The Shire acknowledges the economic and social benefits to the town that will result from the expansion, in particular the employment it will provide.	Acknowledged.
3.	Shire of Waroona	The Shire does not have the expertise to test the environmental modelling and conclusions contained within the PER document. The Shire's comments relate primarily to the social considerations of the proposal. The EPA is urged to	Acknowledged.

Number	Submitter(s)	Submission	Response
		undertake a rigorous review of the environmental outcomes of the proposal.	
4.	Shire of Waroona	It is noted that the PER acknowledges that there will be issues with noise in high wind events. The management of machinery in these events is of critical importance. The Shire would appreciate a presentation on the noise management plan when prepared and the exact mechanisms to be enforced to respond the high wind events and any noise exceedance. The location of noise monitors should be designed to ensure compliance in all weather events.	Iluka will continue to meet with the Shire of Waroona on a regular basis. Updates will include information about all aspects of the operation of the Waroona Mine Site, including the Noise Management Plan.
5.	Shire of Waroona	Due to the summer 'catabatic' wind events, the management of dust from the site is of critical importance. The Shire notes Iluka's commitment to prepare a dust management plan. The location of dust monitors should be designed to ensure compliance in all weather events.	Prior to commencement of mining a dust monitoring network will be installed at the site to measure the baseline dust levels. The information gathered by the sampling program will used to identify conditions that result in high dust events, the composition of dust emissions from the site and allow a refinement of the modelled dust predictions at the site. The on-going monitoring and reporting program for dust emissions from the Waroona project will be developed using this information.
6.	Shire of Waroona	The Shire welcomes Iluka's commitment that it *"will rehabilitate the Project Area to compatible land-uses compatible (sic) and consistent with the Waroona North Structure Plan."* It is the community's expectation that Iluka will present the site back it with rehabilitation, including vegetation, consistent with end land use of open space, farmland or future residential use.	Acknowledged. Iluka has committed to preparing and implementing a Closure Plan that will return the land profile and recreate agricultural productivity to pre-mining values; and a Vegetation and Flora Mitigation Plan to restore and rehabilitate native vegetation. Refer to section 8.4.4 of the Public Environmental Review (PER). Iluka has been an active participant in the Waroona North Structure Plan (WNSP) process since its instigation in 2004. The WNSP aims to develop a land use plan for Waroona North, including Iluka's landholdings, once mining has concluded. Iluka will continue to liaise with the Shire of Waroona and WNSP Steering Committee to ensure that the rehabilitation of the mining area is consistent with plans for future use.
7.	Shire of Waroona	To realise the benefits of releasing the land for alternative land uses and minimise on going impacts, Iluka must keep its commitment to a four year mine program. The commitment to complete mining in the southern pit in one year is noted and welcomed.	Mine production at Waroona will be 4 years, with 6 months of construction activities prior to mining. Post-mining rehabilitation will continue for approximately 3 years. The southern pit will be completed within the first year of mining.

Number	Submitter(s)	Submission	Response
8.	Shire of Waroona	Heavy truck movements as a result of the proposal represent an 8% increase in heavy truck movements during the week and 23% on the weekends. This is of significant concern to the community and the Shire. The transport of material 24hrs/day, 7 days/week is not opposed, but the Shire would like the opportunity to review this 6-months after the commencement of operations. A traffic management plan should be prepared which outlines measures which, as a minimum, ensure truck movements avoid school opening and closing times and peak traffic associated with the Wagerup Refinery.	The movement of vehicles 24hrs/day, 7 days/week was selected to minimise the impact on traffic and avoid peak periods. Iluka will liaise with the Shire to achieve a satisfactory outcome for both parties on the issue of traffic management. Regular, ongoing updates will be held with the Shire. Updates will include information about all aspects of the operation of the Waroona Mine Site, including the transport program. Iluka is an active member of the Waroona Roadwise committee. Together with the company's transport carrier, Iluka is working with Waroona Roadwise to implement a community education program in Waroona, commencing in 2006. This will include specific safety information about heavy haulage through the townsite.
9.	Peel Development Commission	The Commission supports the proposal, provided the best practice measures identified within the document to minimise the impact on the environment, monitor hydrology and minimise noise and pollution to the Waroona community are strictly adhered to.	Acknowledged.
10.	Peel Development Commission	The Peel Development Commission is required to: *Implement strategies that support the use of local employment in mining ventures, particularly using regional centres as employment hubs, and encourage the mining companies to maximise their purchasing of goods and services within regions.* Iluka should make use of the Peel Development Commission's online Peel Capabilities Register, which details of local business across the engineering, building and construction industries.	Iluka has liaised with the Waroona Business and Community Marketing group, as well as made presentations to local businesses about the proposed mining operation. Iluka is liaising with Peel Development Commission officers to investigate local business capability and opportunities for local businesses to supply to Iluka. The company plans to assist relevant local businesses to meet Iluka's requirements to be placed on the project suppliers list. They will then be able to tender for work, particularly during the construction phase of the project.
11.	Department of Conservation and Land Management	The Offset proposal is the PER is considered satisfactory subject to the inclusion of the following recommendation: Table 21. page 88, Under the feature "Sandslope Site 8 and 9" which states; "infill plant a 20m vegetation buffer around both sites where possible using upland species". CALM suggests a change to that sentence to read "Infill plant a 20m vegetation buffer around both sites using **the same plant species**	Acknowledged. The Vegetation and Flora Mitigation Plan will be update to reflect this. The same plant species will be used in the buffer around sites 8 and 9 if soil types are comparable and plant propagules can be obtained.

Number	Submitter(s)	Submission	Response
		present at Site 8 and 9".	
12.	Kwinana Peel Region – Department of Environment	Three proposed mine pits will be in direct hydraulic connection with the regional groundwater system. Mining operations would with time have a detrimental impact on regional groundwater, which is fresh. It should be noted that the mine site is directly up-gradient of the Harvey River Alluvium that contains fresh groundwater. Hence, it will be most important that the Proponent ensures that any potential brackish to saline plumes beneath the pits are contained at or close to site.	No evidence of increases in the salinity of groundwater has been encountered at other Iluka operations. Iluka will maintain its monitoring network of piezometers around the Waroona Project area throughout mining and rehabilitation. Groundwater quality, including TDS, is monitored on a quarterly basis. The short mine-life and dilution during winter should also reduce the consequence of this risk.
13.	Kwinana Peel Region – Department of Environment	It is noted that the proponent has acknowledged that the Mullins Sumpland will be mined as a part of mine pit. Therefore, water flows from Mullins Sumpland to Nanga Brook will be substantially reduced by approximately 95%. There are private landowners utilising the water from Mullins Sumpland. The Proponent has not clearly demonstrated that how to deal with this issue.	Iluka has identified one landowner downstream of Mullins Sumpland that utilises this water for stock. Agreement has been reached to provide this landowner additional water during mining if required.
14.	Kwinana Peel Region – Department of Environment	The soil profile underlying the sumpland should be well understood and documented. Rehabilitation should focus on replacing the clays and loams to restore the soil profile and re-instating an appropriate topography to facilitate the re-establishment of a landform that retains its key hydrologic and botanical properties.	Iluka has experience at managing hydrology via reinstatement of subsurface soil horizons. Studies of the soils present at the site have been conducted and based on this experience Soil Material Management Units for handling during operations have been assigned. Topsoils will be stripped and stockpiled for re-use. Mined overburden, clay and sand fines will be used to backfill mining voids to assist in recreating a soil profile similar in composition and structure to pre-mining profiles and landform.
15.	Kwinana Peel Region – Department of Environment	There is no mention of acid mine drainage in the PER. It is not clear in the PER about the presence of pyritic shales in the mining operations. The Proponent needs to clarify whether acid mine drainage is an issue or not an issue.	Acid Mine Drainage (AMD) (as distinct from Acid Sulfate Soils (ASS)) is not an issue at the proposed Waroona Minesite. The predominately granitic and doleritic rocks of the Darling Range underlie the heavy mineral deposit (Yoganup Formation) and no disturbance to these basement rocks is likely to occur. Although pyrite minerals may occur in small quantities in some dolerites and gneissic rocks in the Darling Range, the geologic and tectonic environment is not conducive to pyrite formation and evolution; hence the oxidation of igneous pyritic minerals and the development of acid rock drainage is therefore unlikely to occur at the Waroona Minesite.

Number	Submitter(s)	Submission	Response
16.	Kwinana Peel Region – Department of Environment	Groundwater extraction including dewatering will require a Groundwater Well Licence from the Department of Environment. A full Hydrogeological Report proving the resource and evaluating potential impacts of the abstraction must support an application for a licence. In addition the land tenure associated with the borefield must match the purpose of the abstraction. As part of the licensing conditions the quality of groundwater being disposed to the environment, needs to conform to existing criteria stipulated by DoE. With regard to regulatory issues a summary of the water related licences required by Iluka is as follows: -Groundwater Exploration licence, -Production licence (construction), -Long term Production licence (dewatering, mineral processing, domestic water etc…) -Production licence (if water is required outside of the catchment), and In addition approval may be required from the Office of Water Regulation should Iluka become a 'water supplier' to third parties.	Iluka will seek all necessary licences for the abstraction of groundwater from the DoE prior to commencement of mining. Studies on the impact of dewatering on local groundwater levels have been completed as part of the PER. All water will be extracted from in-pit sumps and any water disposed of offsite will meet surface water criteria. As Iluka will be purchasing the majority of its process water from an offsite provider, there are no plans to become a 'water supplier'.
17.	Kwinana Peel Region – Department of Environment	Before production licences can be issued all relevant hydrogeological reports need to be submitted. It should also be noted that because of the large volumes of water involved the Proponent will be expected to submit an Operating Strategy. The operating strategy should address issues such as monitoring programs, water use efficiency, contingency measures, etc. Much of this information will be covered in the Water Management Plan, which is submitted to DoE. It is suggested that when writing the plan the proponent contact the Department regional office in Kwinana to obtain any relevant materials (eg guidelines, policies, etc.).	Hydrogeological reports developed as part of the PER will be submitted in support of Iluka's water licence application. The Water Resources Management Plan (WRMP) incorporates the operating strategy for the mine site. Liaison with DoE for licences will be conducted.
18.	Kwinana Peel Region – Department of Environment	It is important that the Proponents commit to long term monitoring of the effects of the Pits and remediation measures if required. Rehabilitation, monitoring and remediation will be required well beyond the life of the mine and this must be recognised in the mine closure plan.	Iluka will continue to monitor groundwater levels and quality throughout mining and rehabilitation. It is expected that rehabilitation will be complete approximately 3 years following completion of mining. The Closure Plan will address the ongoing monitoring carried out in rehabilitation.
19.	Kwinana Peel Region – Department of Environment	The Department would want to have far greater clarity on how some of the commitments are to be met before agreeing to the commencement of mining activity.	The PER contains several of the Environmental Management Plans (EMPs), with the remainder to be completed before mining or closure. The EMPs detail the measures that will be undertaken to prevent and mitigate impacts on the

Number	Submitter(s)	Submission	Response
			environment.
20.	Kwinana Peel Region – Department of Environment	Acid Sulfate soil issues have been addressed briefly in the document and it is understood that further investigations are continuing. An Acid Sulfate Soil management plan maybe required if potential or actual acid sulfate soils are found within the mine are or in an area that may be impacted by the dewatering cone of influence. The potential for acid mine drainage post mining has not really been mentioned.	Iluka are currently carrying out an additional drilling program for acid sulfate soils at Waroona. Iluka will prepare an Acid Sulfate Soil management plan in the event that the additional sampling identifies any acid forming or potential acid forming material. Refer to response 15 for a discussion of acid mine drainage.
21.	Kwinana Peel Region – Department of Environment	The reduction in flows from Mullins Sumpland to Nanga Brook are believed to contribute 30-50% of flows. The reduction in this flow may be of concern as there are existing private landholders who utilise the water from Mullins Sumpland and Nanga Brook.	Refer to response 13 in regards to downstream users of water.
22.	Kwinana Peel Region – Department of Environment	Groundwater licences will be required for groundwater exploration (actual pump tests will need to be undertaken to sure-up theoretical modelling already undertaken) and for Production licenses for during the construction stages and for long term mine dewatering.	Refer to response 16 in regards to ground water licences.
23.	Kwinana Peel Region – Department of Environment	It is understood that discharge may occur to Ferraro Brook if more water is produced than can be stored. Little information is provided as to when this will happen and to where along the Brook this will occur. A Permit to modify Bed and Banks under the Rights in Water and Irrigation Act will also be required if: 1. the raw water dam is located on Ferraro Brook 2. creation of stream crossings 3. creation of a discharge point into Ferraro Brook	Iluka will apply for a licence to discharge water to Ferraro Brook prior to the commencement of mining. A full proposal for the construction of the discharge point will be included in the works approval. Permits to modify Bed and Banks under the Rights in Water and Irrigation Act will be sought for the construction of stream crossings and the discharge point into Ferraro Brook. Locating the raw water dam on Ferraro Brook was evaluated as an option but has been ruled out due to environmental considerations.
24.	Kwinana Peel Region – Department of Environment	Statewide Policy No. 10 (Use of operating strategies in the Water Licensing process) should be taken into consideration when addressing the requirements for a Licence to take Groundwater and therefore included within Table 3 Regulatory and Policy Framework.	Acknowledged.
25.	Kwinana Peel Region – Department of Environment	Location of Raw Water Dam Option A	Refer to response 23.
26.	Kwinana Peel Region – Department of Environment	Section 6.5 should state all the environmental management plans to be developed including a Water Management Plan to address surface water and groundwater management and monitoring, and a Stormwater Management Plan	Iluka have committed to preparing a WRMP that addresses surface and ground water management. Refer to Section 8.7.4 and Section 11 of the PER.

Number	Submitter(s)	Submission	Response
		to address all site drainage management.	
27.	Kwinana Peel Region – Department of Environment	Table 18: Groundwater Systems – Environmental Management: should state that "Management plan for water resources that includes monitoring and reporting of groundwater levels, ***groundwater quality***, water abstraction and water usage".	Acknowledged. The WRMP incorporates measurements of groundwater quality as part of the quarterly monitoring carried out at the site.
28.	Kwinana Peel Region – Department of Environment	Table 18: Surface water Systems – Environmental Management: should state "Surface water monitoring program ***including surface water quality***, implemented upstream and downstream of mine site.	Acknowledged. The WRMP incorporates measurements of surface water quality as part of the quarterly monitoring carried out at the site.
29.	Kwinana Peel Region – Department of Environment	Section 8.6.4 – Surface Water Quality: The proponent commitments should include the monitoring of surface water quality.	Refer to response 28.
30.	Kwinana Peel Region – Department of Environment	Section 8.7.2 – Surface Water Quality, Table 22: under Indicator nutrients, Allowable change should state "no more than +/-10% increase" rather than 'No excessive nuisance algal growth'.	Acknowledged. The WRMP will be updated to reflect this. This is an extract from Water Quality Protection Guidelines No. 11 – Mining and Mineral Processing, Mine de-watering (WRC 2000).
31.	Kwinana Peel Region – Department of Environment	Section 2.2.3, Figure 3: The figure shows an "Internal Mine Road" crossing over Ferraro Brook but there is no mention made of the bed and banks management of the installation of the road or its decommissioning.	Appropriate Bed and Banks Permits for the construction of the crossing will be sought prior to the commencement of mining in the works approval. The crossing will be permanent and constructed to appropriate specifications (concrete culverts or similar).
32.	Terrestrial Ecosystems Branch – Department of Environment	Detailed management plans are not part of this current PER document but are part of the commitments (section 6.5). These need to be provided to ensure that management commitments and proposed offsets are adequate for the project to be fully assessed. Proposed offsets indicate that there will be no net loss of native vegetation; this is particularly important considering that the proposal includes clearing of 12.6 ha of remnant vegetation. The PER needs to provide more detail of the proposed Vegetation Mitigation Plan especially completion criteria and more detail on proposed weed control.	The Vegetation and Flora Mitigation Plan contains details on the completion criteria for the rehabilitation and mitigation works that will be carried out at the site and the weed control program. This was included as a supporting document in the PER.
33.	Terrestrial Ecosystems Branch – Department of Environment	The Fauna Management Plan needs to provide specific detail on Environmental Management points listed in Table 18 and the Proponent Commitments in Section 8.2.4.	Due to the minimal impact of the project on fauna Iluka believe that the commitments contained in Section 8.2.4 are more than sufficient to mitigate any impacts. Prior to ground disturbance at the site, Iluka will prepare a Fauna Management Plan detailing the measures to be implemented by the commitments in Section 8.2.4.

Number	Submitter(s)	Submission	Response
34.	Terrestrial Ecosystems Branch – Department of Environment	Considering the short life of the mining proposal (4 years) it would be reasonable to prepare a Closure Plan as part of the approvals process and not during or cessation of mining.	Iluka are in the process of developing a Closure Plan for the site. Following the completion of detailed engineering and prior to ground disturbance, a preliminary Closure Plan will be prepared.
35.	Air Quality Division – Department of Environment	The Department's air quality modelling guidelines require that electronic versions of model input and output files be provided; this has not been done. This is a significant problem in that we are not then able to adequately examine the derived meteorology files used in the air dispersion modelling	Acknowledged. The input and output files for the Waroona modelling will be provided to the Air Quality Division - DoE.
36.	Air Quality Division – Department of Environment	We agree with the modeller's conclusion that the greatest uncertainty in the modelling is in the estimation of fugitive particulate emissions. Fugitive dust dispersion modelling is best used in a comparative sense to compare the relative effects of different dust management practices.	Acknowledged.
37.	Air Quality Division – Department of Environment	The modeller notes that there are significant effects on the local scale meteorology from the close proximity of the Darling escarpment, and describes the effects of gully winds and rotors. It should be noted that that the meteorological pre-processor (Calmet) cannot effectively incorporate the effects of rotors on particulate entrainment and these effects have not been included into the modelling. The vertical motion associated with rotors may increase dust suspension and increase potential dust impacts though it is not possible to estimate the magnitude of this effect.	It is considered that with this affect, the vertical motion in the air only really starts tens of metres above the ground. At ground level there is no appreciable vertical motion. As such, if there is an updraft zone above the area of interest due to a rotor, the dust emissions should be less than an area closer to the scarp with stronger winds. i.e. the areas of updraft will tend to decrease dust emissions and also increase dispersion of dust that has been emitted upwind. Iluka acknowledges that the inability to model these will increase the potential for uncertainty associated with the dust modelling.
38.	Air Quality Division – Department of Environment	Model estimated 24 hourly average dust concentrations exceed PM_{10} and TSP goals at the nearest residences. Given the proximity of the sand mining operations to these residences this is a significant concern. Situations such as this require ongoing particulate monitoring at sensitive receptors and quick response adaptive management practices undertaken to ensure that guideline values are not exceeded. As it stands, the modelled impact of dust on nearby residences appears to be unacceptable and more stringent dust management will be required.	Due to the degree of uncertainty associated with aspects of the modelling, in particular the fugitive emissions from the site, the modelling is best utilised as an indication of where concentrations are likely to be highest. More reliance should be made on the concentration contours rather than the absolute values predicted. In order to manage emissions from the site Iluka have committed to the preparation and implementation of a Dust Management Plan prior to construction. Major facets of this plan include: • Installation of a dust monitoring network at Waroona to measure compliance against appropriate guidelines and

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			provide real time measurements of dust emissions. The network will include 3 HiVol air samplers, 1 PM_{10} air sampler and 1 TSP TEOM for real time dust sampling; • Where possible, no disturbance of topsoil during summer months and only disturbing soil under calm conditions; • Water carts to be present during removal of all topsoil, and regular watering and grading of all haul roads; • Sealing the haul road, processing and stockpile areas to prevent dust lift off; • Planting of cereal grasses on exposed stockpiles and bunds; • Implementing specific management measures for high winds events from the east, north and north east; • Identification of responsible personnel for site shutdown under adverse conditions; • Undertaking an annual review of monitoring and management measures to further refine and update dust management measures; • Use of clay slimes or other dust suppressants to control dust in exposed areas; and • Spraying ore stockpiles and heavy mineral concentrate (HMC) storage areas to reduce dust.
39.	Air Quality Division – Department of Environment	We have reservations with the use of Perth Airport cloud data for estimating atmospheric stability. It is unlikely that there are better nearby sources of cloud data, but it needs to be noted that this raises the level of uncertainty in the modelling.	Use of this data will increase the uncertainty. However it is thought that this uncertainty is relatively small, with the greatest uncertainty in the emissions, which have been stated in the report. Also as stated in the report the numbers are not to demonstrate compliance but to indicate areas with potential highest concentrations occur and indicate the need for comprehensive management.
40.	Environmental Noise Management – Department of Environment	The noise criteria are correctly based on the *Environmental Protection (Noise) Regulations 1997*. In determining assigned noise levels, the Influencing Factor has been given as 0dB in both the SVT report and the PER. I would consider	Acknowledged. Iluka has used the residential assigned levels to assess the impact for the current situation at the site. It is Iluka's aim to operate its mine sites with minimum noise

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		the land on which the mining pits and processing plant are located to be "Industrial" under the noise regulations, and as some residences on the southern side are within 450m of these areas, there may be an Influencing Factor that would increase the assigned levels. By using the base assigned levels of 35 dB(A) at night and 45dB(A) during the day, (0dB Influencing Factor), the assessment could be considered conservative.	emissions. The mine will be located in an area zoned rural where extractive industry is permitted. The area is also identified in the Peel Regional Scheme as a Strategic Mineral and Basic Raw material Resource area. Based on this an influencing factor would be applicable at some of the nearest residences.
41.	Environmental Noise Management – Department of Environment	The SVT report assumed that the noise emission contains no annoying characteristics such as tonality, modulation or impulsiveness, but gives no basis for this assumption. Noise from earthmoving plant such as a haul truck commonly exhibits tonality ("humming, whining"). Further technical detail on the issue should be requested as part of the proponent's response to submissions.	Tonality, modulation and impulsiveness are not expected to be issues. Experience at other Iluka sites in the south west shows no evidence of emissions of this nature. Previous assessments of Iluka's operations have not considered tonality to be an issue. The majority of mining will take place greater than 500 m from residences. Ambient noise levels are likely to be more significant at a receiver than any tonality. In any case, the noise abatement measures to be applied to the equipment will reduce any tonality that is present. Iluka will undertake monitoring of tonality from equipment prior to commencement of operations. The permanent noise monitoring equipment to be installed at the site will be capable of recording any tonal characteristics.
42.	Environmental Noise Management – Department of Environment	The noise emissions have been modelled using the ENM software in accordance with draft Guidance No.8 - Environmental Noise, and the methodology is accepted. The 8 mining scenarios modelled for Mining Locations 1 to 8 as shown in the SVT report appear to be reasonably representative of the range of noise emissions likely to occur over the life of the project. The model assumes an earth bund would be constructed on the southern and south-western sides of the site to act as a noise barrier. The results of the modelling for day time mining operations indicate exceedances of the base assigned noise level of 45dB(A) of - • up to 3dB(A) at Mining Locations 1 and 2, for residences to the south-west of the pit; • 5dB(A) at Mining Location 5, for one residence immediately to the south of the pit; • 1dB(A) at Mining Location 6, for residences to the south-west of the	Acknowledged. Iluka have not included an influencing factor in the modelling. If an influencing factor was to be included then noise levels would be in compliance. Refer to response 40 in regards to the influencing factor. The results of the modelling have been used to identify the potential for exceedances of the regulations and assist in the management of noise emissions from Iluka's operations. Refer to response 41 in regards to tonality and other intrusive characteristics.

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		pit; and • 2dB(A) at Mining Location 7, for one noise-sensitive receiver to the south and south-west of the pit. The noise emissions that appear to be exceedances of up to 3dB(A) may in reality be in compliance if the Influencing Factors are taken into account as outlined above. This is provided the noise emission is not tonal, in which case a 5dB(A) adjustment would be made to the predicted noise level, placing it well above the assigned level. In the case of Mining Location 5, the Influencing Factor resulting from the presence of the pit would be small, perhaps 1dB, therefore the predicted noise level may well show an exceedance.	
43.	Environmental Noise Management – Department of Environment	The PER report indicates that noise emissions will be monitored, and if exceedances are detected, the equipment usage will be reduced to achieve compliance. Given the small exceedances likely to be encountered, this strategy should be effective. However, a simple "dB(A)" meter may well not detect tonality, and if the noise emission is tonal, the further changes to equipment usage needed to achieve compliance may not eventuate. This issue needs to be addressed initially through the request for information as outlined above, but ultimately through the Noise Management Plan.	Refer to response 41 in regards to tonality and other intrusive characteristics.
44.	Environmental Noise Management – Department of Environment	In relation to the noise emissions to the south-west, consideration should be given to extending the earth bund further to the north to provide better screening. In the case of Mining Location 5, there does not appear to be an earth bund, and consideration should be given to this control measure.	Extension of the main earth bund to the north is not possible due to the location of the main mining pit. A bund around the southern mine pit was evaluated but the extremely short period that earthworks and mining will take place in this area means that it is not practicable. A bund will be constructed across the southern mine pit to the north to reduce noise from longer term mining activities, as shown on Figure 3 of the PER. Extensive liaison has been carried out with the nearest landowner to the southern pit. Liaison will be ongoing throughout mining and alternative arrangements will be made in the event that noise management cannot limit noise emissions below the resident's expectations.
45.	Environmental Noise Management – Department of Environment	The predicted noise levels are strongly dependent on the source sound power levels used in the model. The SVT report indicates that the sound power levels of the various mining plant items were based on measurements of noise levels	The earthmoving contractor will be required to noise suppress all equipment to the maximum extent practicable. The noise levels of all equipment brought onsite will be

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	Environment	of other Iluka plant items, and then reduced by 7dB(A) to represent the quietest level to which these items could reasonably be reduced by engineering noise control methods. The resulting sound power levels are at the lowest end of the range of sound power levels for such large earthmoving plant, and I would be concerned at the level of difficulty for the contractor in achieving and maintaining these levels. Because the predicted noise levels are close to the assigned levels in the cases noted above (and above in one case), any increase in the sound power levels beyond those in the model would be likely to result in further noise exceedances. The management approach of reducing equipment usage is likely to become unworkable in this case, especially if the noise emission was tonal as well. I therefore remain concerned that the manageability of the noise emissions is only marginal.	measured prior to coming on site and will also be measured annually to ensure that it meets requirements. Measures to reduce emissions from equipment will include: • Affixing noise baffles to radiators; • Installation of sound enclosures lined with absorbent material around the engine bay; • Installation of noise curtains behind engines; • Installation of rubber seals to noise suppression equipment; • Installation of special mufflers and redirection of exhaust to maximise ground absorption; and • Modifications to engines. If these measures are not sufficient to reduce noise levels, further controls would be imposed on numbers of machinery operating. The noise management plan will detail the noise management measures that will be undertaken to meet regulations. This will be submitted to the DoE for approval prior to construction and regularly updated. Refer to response 41 in regards to tonality and other intrusive characteristics.
46.	Environmental Noise Management – Department of Environment	Clearly the commitment in the NMP to "regular checking of noise levels of site machinery" would need to be implemented well, and supplemented by a requirement to verify the noise levels before the machinery comes on site. The NMP should also address possible ameliorative measures such as temporary relocation of residents in the event that noise emissions become unmanageable by equipment usage methods.	Iluka have committed to checking the noise levels of all on site mobile machinery on an annual basis. Mobile equipment will also be checked as it comes onto site prior to beginning operations. Iluka believe that the suite of management measures in the Noise Management Plan, including the potential noise treatment of residences, will be sufficient to meet the Noise regulations. Iluka would only consider the relocation of residents once it has exhausted all other avenues for the management of noise emissions.
47.	Environmental Noise Management – Department of Environment	I would also like to see the NMP address noise from audible alarms on mobile plant, with a view to the replacement of reversing beepers by less intrusive alternative safe systems of work. Similarly for audible alarms and PA systems	Following analysis of public complaints, Iluka have determined that approximately half have resulted from reversing beepers. In response, alternative low noise safety

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		on the processing plant, which can be intrusive at night.	systems have been fitted at several sites in WA. Iluka have committed to discussions with the Department of Industry and Resources (DOIR) on the use of alternative low noise safety equipment at Waroona. Iluka believe that these systems will be necessary at the site. No public address systems are located at the plant. Iluka are currently investigating less intrusive alternative audible safety alarms to reduce the potential for impacts at night.
48.	Environmental Noise Management – Department of Environment	The NMP should be to the satisfaction of the DoE.	Acknowledged.
49.	Environmental Noise Management – Department of Environment	I would accept that construction of the earth bund may be considered "construction noise" under noise regulation 13, and would recommend that an approved construction noise management plan be required under regulation 13 to ensure that these activities are carried out in the best practicable manner.	Acknowledged. The NMP prepared as a part of the PER incorporates noise management during the construction period.
50.	Environmental Noise Management – Department of Environment	The PER indicates that ore will be trucked along Peel Road to the South-West Highway and thence to Bunbury, on a 24-hour basis at the rate of 36 movements per day. There appears to be no assessment of the impact of trucking noise on any residences along Peel Road. If there are residences within say 100m of this road, assessment of noise impacts should be carried out in accordance with preliminary draft Guidance No.14 - Road and Rail Transportation Noise.	The nearest residence is over 250m away from Peel Road. Movement of heavy vehicles along Peel Road will have negligible noise impact.
	Community Groups		
51.	Peel Harvey Catchment Council – Crossing the Boundaries	*Fencing*: All sites proposed as vegetation mitigation areas are currently unfenced and therefore able to be grazed by stock. Best practice land management suggests that, as current owners and land-managers, Iluka should fence these areas to prevent stock access, especially Sites 8 and 9. It is suggested that sites 8 and 9 be fenced immediately and that the fencing is of a standard to also deter feral pigs, which are common in the area, from accessing and degrading these sites.	Acknowledged. Iluka will arrange to fence these areas immediately with standard rural fencing. Fencing of a standard to prevent feral pig access will also deter use by native fauna.
52.	Peel Harvey Catchment Council – Crossing the Boundaries	*Weed control*: Small patches of African Lovegrass occur in the vicinity of Sites 8 and 9. Any disturbance to sites 8 and 9 could allow Lovegrass to become established in this area. It is suggested that African Lovegrass control should be implemented immediately.	Weed control is undertaken as a part of Iluka's ongoing land management operations. Weed management at these two sites is incorporated into the Vegetation and Flora Mitigation Plan. Further liaison on weed management will be carried

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		The commitments to undertake weed control require far greater detail. It is suggested that a weed management plan be developed that outlines in detail, including a time-line, what will be undertaken and where.	out with the PHCC. Weed treatments have been undertaken annually at the Waroona site and will continue through the life of mine and rehabilitation.
53.	Peel Harvey Catchment Council – Crossing the Boundaries	Local seed should be collected for all revegetation activities. It is suggested that sites 8 and 9 may be better left to regenerate naturally following the weed control rather than having infill planting at this sites.	Local provenance seed will be used as far as is practicable for revegetation. The limited area available on site for seed collection will mean that some seed stock will have to be sourced from offsite areas with similar vegetation communities. Total eradication of weeds will not be possible due to the close proximity of weed sources. Infill planting will be required to promote competition by native species following the initial weed treatment at sites 8 and 9 due to the lack of mid-storey species.
54.	Peel Harvey Catchment Council – Crossing the Boundaries	Whilst the proposal to establish buffers is supported, the proposal to *only* establish buffers around the areas of vegetation with best conditions is not supported. It is suggested that buffers should be established around all of the boundaries of sites 8 and 9 (unless topography prevents this), including the in the Western Power easement. It is understood that low-growing vegetation, up to 3 metres, may be established within the easement.	The 20 metre buffer areas around both sites will lower the opportunity for invasion by weed species present around sites 8 and 9. Topsoil contaminated with weeds will be removed. Other areas already have weed invasions and so a buffer will serve little purpose. Discussions with Western Power (Environmental and Land Management Branch) indicate vegetation up to 3 metres in height can be planted in the easement, provided that an access track remains clear. Iluka will undertake infill planting of a buffer within the easement using appropriate species. A suitable access track will be retained.
55.	Peel Harvey Catchment Council – Crossing the Boundaries	The translocation of flora is encouraged and will require a dieback management plan. This commitment requires far more detail in regard to what amount of understorey flora will be translocated and to what sites; when will this occur and, what will be done to prevent transfer of weeds. It is suggested that the translocation of grass trees (*Xanthorrhoea* sp.) and *Kingias* must be part of the commitment. Further, the translocation provides the opportunity to trial the translocation of larger trees that aren't usually considered as part of such an action. It is suggested that Iluka implement a small trial for the translocation of larger trees.	Details of the trial translocation of flora will be developed prior to the clearing of speedway site. Translocated material will be used in the buffer area around Sites 8 and 9. Grass trees will be included in the trial. Pervious experience at other Iluka sites indicates that the translocation of larger trees is not successful, except to retain hollows for bird breeding. The usefulness of translocation is propagating plants that can't be propagated by other means or propagating very slow growing species.
56.	Peel Harvey Catchment Council – Crossing the Boundaries	*CALM Conservation Covenants*: At present it is intended that the land upon which it is proposed to place covenants will remain in the future as private land.	Any further development of the land identified as part of the conservation covenants would be a new proposal and subject

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	– Crossing the Boundaries	Future planning processes may decrease the value of these areas as offsets due to clearing for building envelopes, fire breaks etc. It is suggested that the covenanted areas should become future public land as referred to in section 6.4.1 where the vision for Waroona North states, "*An abundance of quality public park land and open space is the 'jewel in the crown' of the area*…". PHCC also requests the opportunity to provide input into the detail of the conservation covenants and associated management plans that will be developed with CALM.	to separate environmental approval. Placement of this vegetation under covenant was agreed with CALM to be the best means of preservation. The detail of the conservation covenants will be agreed between Iluka and CALM prior to the completion of operations. Iluka will liaise with the PHCC in regards to the detail of the conservation covenants and management plans developed with CALM. Future decisions on the land use in the area and the use of those areas that have covenanted would be in line with the Waroona North Structure Plan.
57.	Peel Harvey Catchment Council – Crossing the Boundaries	*Monitoring tree health:* Mattiske recommends monitoring tree health at site 9 to ensure de-watering doesn't impact on trees. We support this recommendation and suggest Iluka establish monitoring and identify the actions to be taken if there are impacts.	Ground water modelling of the potential drawdown indicated that draw down would be contained in the pit near Site 8. Since this modelling was conducted, the northern pit has been reduced in size adjacent the vegetation. This will minimise the potential for dewatering to impact outside of the northern pit. The Water Resources Management Plan includes the establishment of photo control points and monthly monitoring of piezometers adjacent site 9. Remedial actions that will be implemented in the event that the monthly photo surveys/groundwater monitoring stress on vegetation will include: • Contacting the DoE; • A review of monitoring information; • Artificial recharge of water levels to support vegetation under stress; and • Infill planting of local native vegetation if vegetation deaths do occur.
58.	Peel Harvey Catchment Council – Crossing the Boundaries	*Proposed offsets for vegetation clearing*: A review of the PER has not identified details of the vegetation complexes and their condition for the vegetation located on Lot 478, Lot 513 and Lot 265 that is proposed to be fenced as offsets.	This vegetation on these lots is identified as Sites 12-14, 10 and 11 in Table 8 of the PER. Vegetation at the rear of lots 513 and 265 has not been surveyed, but is contiguous with State Forest 14 and so provides an important link between the site and this area.

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			Any further development of the land identified as part of the conservation covenants would be a new proposal and subject to separate environmental approval.
59.	Peel Harvey Catchment Council – Crossing the Boundaries	The PER identifies that three TECs occur approximately 2km from the nearest pit within Parkland and Conservation Reserve 31437. This Reserve is bounded by Southwest Highway to the east, the railway line to the west and Mayfield Road to the south. No Management Plan exists for this reserve, the surrounding vacant crown land or the adjacent Reserve 20585. It is understood that the Reserves are vested with the Shires of Murray and Waroona. The bushland and the TECs are threatened by weed invasion. Some portions of the reserve are almost totally dominated by Watsonia, African Lovegrass and Victorian Tea Tree. In the past few years fires have provided opportunities for these weeds to spread through the reserve and threaten the long-term survival of the indigenous flora. Weeds are also spread through fire-break and drainage management practices. It is suggested that Iluka fund the development and implementation of a Management Plan for these important areas of remnant indigenous vegetation and that the Plan considers the management of all the remnant vegetation in this area regardless of vesting. It is suggested the Management Plan would be developed in partnership with CALM, Coolup LCDC, the Shires of Waroona and Harvey and PHCC officers based at the Waroona Landcare Centre.	The TEC's located in Conservation Reserve 31437 are well outside the project area and will not be impacted by Iluka's operations at the site. Iluka believes that the maximum environmental benefit will be gained from undertaking rehabilitation and protection of vegetation within the project area, as these areas are not currently protected. Iluka will liaise with the PHCC regards to the detail of the conservation covenants and management plans developed with CALM for sites within the project area.
60.	Peel Harvey Catchment Council – Crossing the Boundaries	*Rehabilitation implementation and completion criteria*: It is requested that the Coolup and Harvey River LCDCs and officers of the PHCC be consulted during the development of the implementation and completion criteria for the Vegetation Mitigation Plan, and that these groups be kept informed by Iluka of their progress. It is suggested that the provision of copies of the annual Statutory reports that Iluka will produce may suffice for this request.	Iluka will provide the PHCC and the LCDCs with copies of the annual environmental report.
61.	Peel Harvey Catchment Council – Crossing the Boundaries	*Identification of trees with hollows:* It is not clear that a habitat assessment of all the mature trees that will be cleared as part of this proposal has been undertaken. It is requested that a tree survey be undertaken of all vegetation that is under threat of clearing and identify any hollows that are impacted. These trees should then be clearly tagged to maximize the opportunities to "preferentially retain trees identified with hollows". We support the removal of hollows and their use within the rehabilitation and mitigation areas. This should include the installation of hollows into trees as well as at ground level.	Since the release of the PER a survey of the trees at Waroona has been conducted. Two possible nest hollows were inspected, of which one had evidence of nesting by Cockatoos, probably Forest Red-tailed Black Cockatoos. This is located outside of the main mining pit and will be retained. The other hollow has been invaded by bees. Prior to clearing, the identified hollow will be marked for removal. Any other trees found to contain hollows within the area of disturbance at Waroona will also be utilised

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			within the vegetation mitigation.
62.	Peel Harvey Catchment Council – Crossing the Boundaries	*Translocation of Fauna*: The capture and relocation program is supported and should also include any birds using the hollows of any trees to be cleared, as well as the Quenda and Brushtail Possums as indicated. Six species of frogs were identified at Mullin's Sumpland (Ninox & GHD). The PER does not address the impacts or suggest mitigations that the mining of this sumpland will have on these populations.	Iluka will prepare and implement Fauna Management Plan that will detail the capture and relocation program for the Quenda and Brushtail Possums. All frog species identified at Mullins Sumpland are common and widespread in the region and none are considered rare, threatened or vulnerable. The removal of the sumpland will only have a minor impact on species numbers.
63.	Peel Harvey Catchment Council – Crossing the Boundaries	*Post-mining water quality:* The Peel Inlet and Harvey Estuary and the associated rivers and waterways of the Swan Coastal Plain have a history of eutrophication. It is important that the mineral sands mining process does not contribute to nutrient levels in the waterways of the Peel-Harvey. It is suggested that Iluka establish a water quality monitoring program of post-mining water to determine the nutrient levels within this water, especially in regard to phosphorous and nitrogen. Preliminary discussions with regard to this proposed action took place with Lisa Sadler, Senior Environmental Adviser – Iluka, during the November 21st site visit.	The surface water quality monitoring program following mining will be detailed in the Closure Plan. This will broadly follow the water quality program set out in the WRMP, which includes the measurement of nitrogen and phosphorus.
64.	Peel Harvey Catchment Council – Crossing the Boundaries	*Re-instatement of Mullins Sump*: The PER states that the flow from Mullins Sumpland contributes between 30% and 60% of the flows recorded in Nanga Brook at Mullins gauging station, and that the percentage contribution from the Sumpland is even higher during summer months. A review of the PER has not identified any commitment to re-instating the Sumpland and its associated flows, though it has been indicated that this re-instatement is a proposed action of Iluka's.	The preliminary Closure Plan will contain details of the measures Iluka will use to recreate the subsurface soil horizons within Mullins sumpland. A return to current water flows is not guaranteed following reinstatement of the sumpland.
65.	Peel Harvey Catchment Council – Crossing the Boundaries	*Dust Management Plan*: Easterly winds during summer at night pose a considerable threat and have been raised by Landcare members as an issue. The use of sprinklers to provide dust suppression, and other such management actions, must involve a management regime that provides for sprinklers to activate at these times. Any associated noise implications from dust management during the night must be addressed in the noise management plan.	Refer to response 38 in regards to the major facets of the DMP. Iluka are aware of the night time high wind events and will actively manage to avoid emissions during these events. Detailed implementation of the DMP will be carried out at an operation level. Trials are currently underway for the use of sprinklers for dust control at Iluka's Wagerup operation.
66.	Peel Harvey Catchment Council – Crossing the Boundaries	*Reversing Beepers:* This issue was raised by the community during the consultation meeting in December 2004. Iluka indicated they were investigating alternatives. It is disappointing that, nearly 12 months later, the PER doesn't address these alternatives. We suggest that there has been	Refer to response 47. Replacement of reversing beepers is dealt with in the Project Management Plan which is submitted to DOIR before operations for their approval. This management plan covers safety aspects, and details

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		adequate time for this liaison with DOIR to have occurred and ideally outcomes should have been listed as part of the PER.	alternative to beepers. Iluka use alternatives to reversing beepers at other sites and believe that they are necessary for the Waroona project.
67.	Peel Harvey Catchment Council – Crossing the Boundaries	*Greenhouse Gas* (9.7 p. 128): Iluka (p.130) state that, "There will not be a significant increase in greenhouse emissions from Iluka operations resulting from the operation of the Waroona mine. The major source of greenhouse emissions is an existing concentrator that will be relocated to Waroona from another mine with no change in emissions". They also state that, "The small increase in annual emissions will be due to fuel consumption by increased transport distance. There will also be some clearing of degraded native vegetation that will result in emissions." It is suggested that Iluka implement actions that would make these additional emissions "carbon-neutral". One suggestion is that they liaise with Men of the Trees in regard to their "Carbon Neutral Program". Further, it would be ideal if Iluka's entire Waroona Production, including that at Wagerup, were operated on a carbon-neutral basis.	CO_2 equivalent emissions are taken into consideration when ever developing and operating a site. Consideration is given to electricity, diesel, natural gas, LPG, fuel oil, petrol, loss of vegetation in calculating the overall and initial and ongoing impact of operations with relation to greenhouse emissions. The Waroona operation will be benchmarked against other sites for its efficiencies in energy usage per tonne of product at each stage of the process to ensure continual improvement. Waroona will be required to: • Promote a philosophy of energy efficiency through education, purchasing and liaison with the community; • Monitor energy usage; • Review opportunities for improved efficiency and implement energy reduction practices which are documented and audited annually; and • Maintain records of energy use and efficiency to enable reporting to internal and external stakeholders. Iluka will be required to meet the requirements of the WA greenhouse gas inventory (WAGGI) program commencing in 2006. Additionally, Iluka will continue to focus on the reduction of energy usage and greenhouse emissions as a principle of best practice.
68.	Wildflower Society	TECs: SCP 20b (Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands) is considered by CALM to occur on Sites 8,9 and 16. It is listed as a TEC with an Endangered category under the Commonwealth *EPBC Act 1999*. The identification of TEC within the proposed mining area has been omitted from Table 18: Environmental Factor and Management Register and must be included. It is misleading to state that previously recorded TEC's are located outside the project area with no mention of the new identification of TEC within the project area. Site 16 (speedway): 2.9ha of TEC SCP 20b will be cleared of which 0.5ha	CALM consider the vegetation at Sites 8, 9 and 16 to be the type 20b Threatened Ecological Community (TEC). This TEC is not listed under the Commonwealth EPBC Act. These vegetation communities are discussed in Table 18 of the PER. Site 16 is located within main mine pit so avoidance and retention of this area is not possible. Of the total area, 0.5 ha is considered to be representative of the 20b TEC, with the remainder of the area heavily infested with weeds.

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		vegetation is in very good condition. The Society believes the site should be retained and managed for conservation. Attention to weed management for kikuyu and African lovegrass and *Adenanthos meisneri* (planted) (PER, p53) need to part of any commitments / conditions of the mining licence. We do not believe that the trial translocation of understorey flora from the Speedway site should occur. The flora should be retained in-situ and managed for conservation. In-situ conservation is the first principle for the conservation of biological diversity and ecological integrity at both the national (*National Strategy for the Conservation of Australia's Biological Diversity* Commonwealth of Australia 1996) and State level (EPA Position Statement #8, p.4). The proposed transfer of understorey from Site 16 to another site also has the potential for the transfer of weeds. Site 8: 0.8ha very good condition vegetation of TEC 20b will be cleared. The Society believes that the conservation area of sites 8 and 9 should be extended to include all of sites 8 & 9 and incorporated into the fenced vegetation blocks with buffer areas as proposed (PER p.79);	Refer to response 52 in regards to weed treatment and management. Iluka believes that the trial translocation maximises the rehabilitation opportunity of using the material present at Site 16. Weeds are already present at the periphery of Sites 8 and 9 so the transfer of any weeds will have minimal impact. The 0.8 ha of vegetation to be cleared at the northern pit has been identified as having good to very good condition. A significant area of the northern pit has already been excised following discussions with CALM to minimise impact on site 8. The area to be cleared is needed for access to the northern pit Both sites 8 and 9 will have conservation covenants placed over them and will have native vegetation buffers planted to prevent weed invasion. By translocating the plant material from site 16 the fragmentation of native vegetation at the site will be partially offset.
69.	Wildflower Society	*Forrestfield Complex*: The occurrence of Forrestfield Complex on the proposed site is regionally significant because less than 17.5% of the original area remains, which is well below the recommended 30% representation for biodiversity conservation as required by element 4 of EPA Position Statement #2. A proposal should *demonstrate that the vegetation removal would not compromise any vegetation type by taking it below the "threshold level" of 30% of the pre-clearing extent of the vegetation type."* Forrestfield Complex occurs in the following sites and portions will be cleared: Site 13 - *Eucalyptus marginata / Corymbia calophylla* woodland (good condition); Site 16 - 2.9ha of *Eucalyptus marginata / Corymbia calophylla* and scattered *Banksia grandis / B.attenuata* woodland (poor to excellent condition). Sites 8 & 9 - *Eucalyptus marginata* on sandy slope with occasional *Xylomelum occidentale* (good to very good condition) 0.8ha at Site 8 adjacent to the northern pit proposed for clearing.	The Waroona Project has been designed to minimise the area of vegetation disturbed. The project will result in the clearing of 12.4 ha of Forrestfield complex vegetation. This is less than 0.38% of the existing extent of the vegetation complex. The vegetation proposed to be cleared is of variable condition due to grazing and weeds, is badly fragmented and in many cases is susceptible to 'edge effects' due to the elongated shapes of the vegetated areas. The offsets package that is proposed by Iluka will protect a total of 38 ha of Forrestfield Complex which will result in a significant improvement in the area in secure tenure from 61 ha by approximately 60%.
70.	Wildflower Society	*Biodiversity:* The Society does not agree that the clearing of 21.2ha (12.6ha of remnant native vegetation and 8.6ha of planted native and non-native trees)	By designing the Waroona Project to minimise the area of the vegetation at the site that will be cleared Iluka have

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		"will have a local impact at a flora/fauna level with negligible impact on biodiversity". In the heavily cleared wheatbelt where remnant vegetation remains in a fragmented landscape, ALL remnants have considerable biodiversity value.	attempted to minimise the impact on biodiversity. Of the vegetation that will be cleared many areas have varying condition, are fragmented and are susceptible to 'edge effects'. Iluka believes that the restoration and protection of vegetation and linking of isolated vegetation blocks through native vegetation corridors will improve the biodiversity of the area following mining.
71.	Wildflower Society	*Offsets:* Fencing and protection of 111ha of vegetation, and infill planting of native species along Ferraro Brook and within other vegetation blocks, establishing linkages. Conservation covenants to protect remnant vegetation. Whilst the proposed offsets for vegetation clearing would contribute to the protection of vegetation, we do not believe that the clearing of remnant native vegetation containing TEC or Forrestfield Vegetation Complex should be approved. No clearing of endangered ecological communities such as TEC 20b should be approved as it contributes to the long-term decline in the quality and extent of Australia's native vegetation cover (Bushcare Program of the Natural Heritage Trust Partnership Agreements). Furthermore, the proposed offset to fence 76ha on Lots 478, 265, and 513 is to be questioned as to the future efficacy to conserve and protect vegetation / biodiversity values. We note that any conservation covenant covering these sites allows for housing envelopes. Currently the remnant vegetation proposed for covenant areas on Lots 513 (Site 10) and 478 (Site 12/13) are intact and in good condition. Any proposal to subdivide for residential development will significantly reduce the biodiversity values (clearing for building envelopes, access roads, firebreaks, passive clearing from human activity & edge effects). The proposed perimeter fencing of these areas will have no benefit to biodiversity conservation nor contribute to a flora/vegetation offset package if it is the landowners (Iluka Resources) intention to subdivide for development.	Refer to responses 56 regarding conservation covenants and 67 regarding the TECs. Iluka believes that the offsets package proposed will give a net environmental benefit at the site through better protection (through covenants) and linkages for native vegetation (by rehabilitation between currently isolated vegetation). This will improve the quality and extent of Australia's native vegetation cover.
72.	Wildflower Society	*Ferraro Brook:* The proposed mining activities along Ferraro Brook will affect the existing overland paddock flows into the brook. *Retention of winter flows for maintenance of pool morphology is recommended, in order that pools continue to provide a summer dry-season refuge for macroinvertebrate species and to a lesser extent, long-necked tortoises* (PER, p.43). Maintenance of water levels within pools along Ferraro Brook within the proposed covenant area and downstream (Lot 5) should be made a condition of any future mining approval.	It is not anticipated that any reduction in overland flows will have a significant impact on pool morphology. During low flow periods the pools are maintained through groundwater inflows, which are not anticipated to be impacted by Iluka's operations. Clean runoff from paddocks not impact by mining or infrastructure will be released to Ferraro Brook. Current flows are considerably in excess of historical flows

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			due to clearing for agriculture.
	Individual		
73.	Individual	We are local landholders who have a property situated at the south eastern corner of Iluka's proposed mineral sands operation. Our property has very scenic and expansive views which overlook the proposed area of Iluka's minesite. We are concerned that Iluka's operations will create a large, unsightly scare on the landscape which is of great concern to us. We are also concerned that given the change on landscape and resulting views, that this very much has the potential to have a negative effect on our property value should we wish to sell. We have had several discussions with Iluka representative regarding this issue and to date have been unable to reach any satisfactory resolution. It has simply been stated to us that should we choose to sell our property during the life of mining operations, and at that time we could reasonably establish that our property had been devalued as a consequence of mining operations, then Iluka will provide reasonable compensation to reflect the devaluation in property price. We are concerned at the lack of any agreed process as we do not share Iluka's optimism that their operations will not have a negative effect.	Iluka is experienced in operating mine sites close to residential areas. For example, the Yoganup North project at Boyanup operated from 1986 to 1998. Neighbouring landowners did not report any negative impact on the value of their properties. Following mining, this area has been developed as the Joshua Brook rural residential estate and Public Open Space (POS) in partnership with the Shire of Capel and the local community. This has had a positive impact on nearby property values. The area proposed for mineral sands mining at Waroona will initially be rehabilitated to agricultural land. This area has been identified by the Shire of Waroona as the only direction for the Waroona townsite to expand. Future use of this land may include a mix of special residential, rural residential, landscape protection, recreation, and POS areas. The land use is being determined by the Waroona North Structure Planning process, coordinated by the shire. Iluka is committed to our position on devaluation concerns, as discussed with landowners, as follows: *We acknowledge your advice that, at this time, you have no intention of selling your property at Lot XXX. Should your circumstances change and you choose to sell your property during the life of our mining operations, and at that time you can reasonably establish that your property has been devalued as a consequence of the mining operations, then Iluka will provide reasonable compensation to you to reflect the devaluation in property price.* Iluka has been liaising with landowners in the Waroona area for over ten years. A more comprehensive program of consultation has taken place since 2004. Regular contact with surrounding landowners will continue throughout the mining and rehabilitation phases of the

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			project.
74.	Individual	We are also concerned in Iluka's ability to control noise and dust pollution from their operation given our elevation and proximity to their minesite. We have been supplied data by Iluka on prominent weather conditions for 2003 - 2004 and we note with interest that the data supplied indicates, that wind direction from the north or the north west, at any speed occurred 0.0% of the time. This is of concern to us as that is certainly not our experience and our property has a north north-westerly aspect.	Refer to responses 40-50 in regards to noise and 38 in regards to dust. Iluka notes that in the 2003-2004 weather record that no northerly or north westerly winds occurred. Iluka agrees that these wind conditions do occur based on previous years records and are likely to occur in the future. As such northerly wind conditions have been included in the noise and dust modelling for the site. The elevation and proximity of residences was also taken into account for this modelling.