Conservation Estate Management Plan

Iron Ore Mine and Downstream Processing, Cape Preston, Western Australia

Mineralogy Pty Ltd

June 2005

MAUNSELL | AECOM

Conservation Estate Management Plan

Prepared for

Mineralogy Pty Ltd

Prepared by

Maunsell Australia Pty Ltd
Level 1, 629 Newcastle Street, PO Box 81, Leederville 6902, Western Australia
T +61 8 9281 6100 F +61 8 9281 6295 www.maunsell.com
ABN 20 093 846 925

June 2005

74300904.07

Quality Information

Document	Conservation Estate Management Plan
Ref	74300904.07
Date	June 2005
Prepared by	Jamie Shaw
Reviewed by	Paul Holmes

Revision History

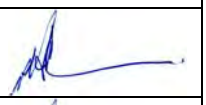
Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	01/10/2004	First draft for review	Paul Holmes Environmental Manager	
B	13/12/2004	Draft incorporating client comments	Paul Holmes Environmental Manager	
C	25/02/2005	Final draft for submission to EPA	Paul Holmes Environmental Manager	
D	01/06/2005	Final incorporating comments from DoE	Paul Holmes Environmental Manager	

Table of Contents

1.0 Introduction

1.1 Background

Mineralogy Pty Ltd (the proponent), proposes the development of an iron ore mine and downstream processing facilities at Cape Preston, 80km south west of Karratha.

In response to project environmental impact assessment requirements as determined by the Environmental Protection Authority (EPA), a Public Environmental Review (PER) was submitted to the Authority in December 2000 (HGM, 2000). The PER was supplemented with a Supplementary Environmental Review (SER) in February 2002 to address changes to the project design being sought by the proponent (HGM, 2002). Under the proposal assessed by the EPA pursuant to the PER and SER, and a subsequent successful application for a non-substantial change to the assessed project pursuant to Section 45(c) of the *Environmental Protection Act 1986,* the project would entail an annual mining rate of approximately 67.4 Mt and annual production of the following:

- concentrate – approximately 19.6 Mt
- pellets – approximately 13.8 Mt
- direct reduced/hot briquetted iron – approximately 4.7 Mt

(Maunsell, 2004)

Figure 1 shows the location of the project area in a regional context.

The Ministerial Statement for the project was issued in October 2003, subject to a number of Conditions and the Proponent's Commitments. One of these Conditions was for the preparation of a Decommissioning and Closure plan for the mine.

1.2 Relevant Legislation and Guidelines

State Government Legislation	**Application**
Environmental Protection Act 1986	PER assessment and Ministerial approval process, and Section 45 (C) non substantial change
Conservation and Land Management Act 1984	Protection of designated marine areas
Mineralogy (Iron Ore Processing) Agreement Act 2002	Overrides all State Acts, other than *Environmental Protection Act*, and the Commonwealth *Native Title Act*, and is the primary legislation relating to the project

1.3 Purpose of this Document

The purpose of this document is to satisfy the conditions set down by the Minister for the Environment in Condition 15.2 of the Ministerial Statement No. 000635 (Minister for the Environment, 2003). Ministerial Condition 15.2 requires that:

> *Prior to construction of the Port facility, the proponent shall incorporate the mitigatory measures referred to in condition 15-1 into a Conservation Estate Management Plan which addresses the following:*
>
> *(i) the effect of the port facility on the conservation values of the Great Sandy Island Nature Reserve, of which Preston Island is part;*
> *(ii) the potential effects of the port development, including dredging, spoil dumping and causeway / bridging structures on the Cape Preston area, which is a part of the proposed Dampier Archipelago / Cape Preston Marine Conservation Reserve; and*
> *(iii) mitigatory measures to address the above effects,*
>
> *to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.*

1.4 Objectives of this Document

This Conservation Estate Management Plan is to be read in conjunction with the project Environmental Management System and Construction Environmental Management Plan. The objectives of this Conservation Estate Management Plan are as follows:

- highlight the potential effect of the port development on the conservation values of the Great Sandy Island Nature Reserve and the proposed Dampier Archipelago / Cape Preston Marine Conservation Reserve;
- present strategies to mitigate the above effects; and
- present options for offsetting loss of high conservation habitat.

1.5 Responsibilities and Reporting

During the construction phase of the project, overall responsibility for ensuring that site environmental management requirements are will rest with the proponent's Environmental Manager, while during the operational phase, this responsibility will rest with the Mine Manager. In respect of the Conservation Estate Management Plan, this responsibility will include:

- ensuring that all mine personnel, both the proponent's workforce and contract personnel, conform with requirements pursuant to the Management Plan;
- ensuring that contractor staff are fully inducted and aware of their environmental responsibilities and obligations; and
- ensuring that monitoring requirements are being met.

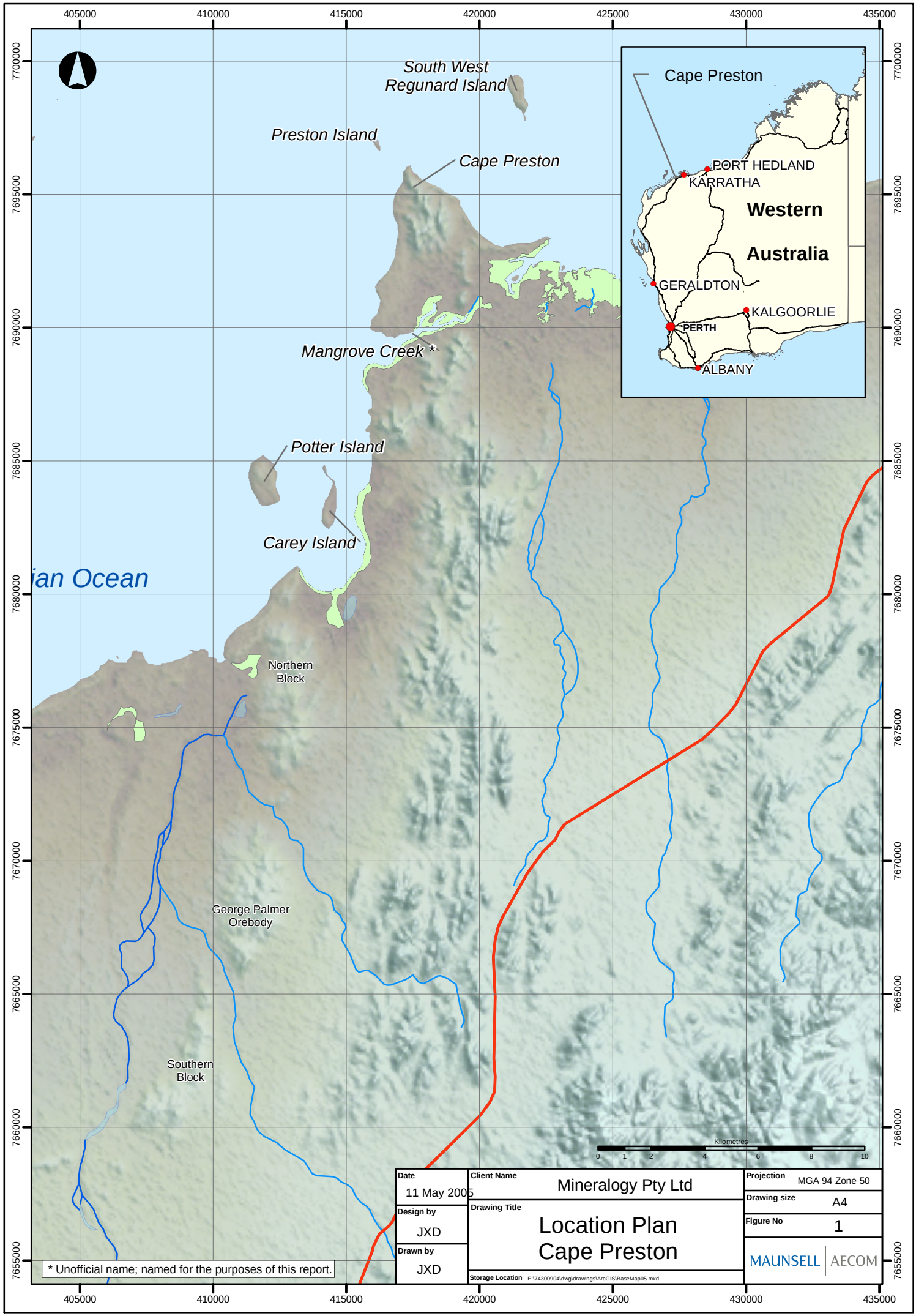
Contracting companies undertaking works at the site will be required to appoint an environmental representative. The key responsibilities of this representative will be to:

- maintain routine contact with the proponent's Environmental Manager to ensure that environmental objectives of this plan are being met;

- provide monthly reports to the proponent's Environmental Manager on environmental issues and conduct regular audits; and
- ensure that all management aims and monitoring requirements of this Conservation Estate Management Plan are being met.

1.6 Consultation

Pursuant to Environmental Impact Assessment requirements under the *Environmental Protection Act (1986)*, Comprehensive consultation with stakeholders and members of the community has been undertaken. The outcomes of these negotiations were used to develop the commitments provided by Mineralogy and presented in the Public and Supplementary Environmental Review documents (HGM 2000, 2002) and, ultimately, in the development of this environmental management plan.


405000
410000
415000
420000
425000
430000
435000
7700000
7695000
7690000
7685000
7680000
7675000
7670000
7665000
7660000
7655000
South West
Regunard Island
Preston Island
Cape Preston
Mangrove Creek *
Potter Island
Carey Island
ian Ocean
Northern
Block
George Palmer
Orebody
Southern
Block
Cape Preston
PORT HEDLAND
KARRATHA
Western
Australia
GERALDTON
KALGOORLIE
PERTH
ALBANY
Kilometres
0 1 2 4 6 8 10
* Unofficial name; named for the purposes of this report.
Date
11 May 2005
Design by
JXD
Drawn by
JXD
Client Name
Mineralogy Pty Ltd
Drawing Title
Location Plan
Cape Preston
Storage Location
E:\74300904\dwg\drawings\ArcGIS\BaseMap05.mxd
Projection
MGA 94 Zone 50
Drawing size
A4
Figure No
1
MAUNSELL AECOM

2.0 Existing Environment

2.1 Conservation Estate

Conservation initiatives in the vicinity of the Cape Preston project area focus on the marine environment. These include the Great Sandy Island Nature Reserve (GSINR), and the Cape Preston Marine Management Area (CPMMA).

The GSINR protects more than 30 islands off the Pilbara coast generally between Cape Preston and Onslow (see Figure 2). The Department of Conservation and Land Management (CALM) has not yet prepared any formal management plan for the Reserve, although its purpose is to provide a sanctuary for the conservation of flora and fauna (D Betts, EPA, pers com 2004). More specifically, the Reserve provides valuable nesting sites for migratory birds which, because of their island location, are generally free from disturbance by introduced predators.

The CPMMA forms an adjunct to the proposed Dampier Archipelago Marine Park (refer to Figure 3). It extends a varying distance offshore generally from the high water mark and proposes creation of a number of different zones. These include flora, fauna and mangrove conservation, commercial purposes and multiple use.

On the mainland, there are no established conservation areas in the immediate vicinity of the project area. Some vegetation communities and individual species, however, have specific conservation value, or are afforded special protection status. A number of issues influencing the conservation values of the immediate region have been identified as relevant to the project site.

2.1.1 Great Sandy Island Nature Reserve

The Great Sandy Island Nature Reserve encompasses the islands off the Pilbara coast within an area extending generally from about 15 km east of Cape Preston to the mouth of the Robe River, and ranging from approximately10 to 35 km offshore. It does not, however, include the surrounding marine waters.

Ministerial Condition 15-2 indicates that Preston Island is part of the Nature Reserve, although a recent CALM plan of the Reserve (refer to Figure 2) suggests otherwise. The Department of Land Information's current Reserve Plan No 185 does, however, confirm that Preston Island is within the Reserve. Accordingly, as development of the port and related facilities will directly affect Preston Island, there will be a consequent affect upon the Nature Reserve. In this regard, however, it is relevant that Section 24 of the *Iron Ore Processing (Mineralogy Pty Ltd) Agreement Act 2002* states as follows:

"The State shall ensure after consultation with any relevant local government that the Mining Leases, any Ancillary Tenements and any lands the subject of any lease licence or easement granted to the Company under this Agreement shall be and remain zoned for use or otherwise protected during the currency of this Agreement so that the activities of the Project Proponents hereunder may be undertaken and carried out without any interference or interruption by the State or any State agency or instrumentality or by any local government on the ground that such activities are contrary to any zoning by-law regulation or order."

Plan 1 in Schedule 1 of the Agreement Act indicates that Preston Island is encompassed by the provisions of the Act. Accordingly, the stated intent of Section 24 of the Act applies to Preston Island.

Insofar as other islands within the Great Sandy Island Nature Reserve are concerned, their separation from the proposed port and associated infrastructure (a minimum of 5 km to the north east) indicates the unlikelihood of indirect adverse affects as a result of the project. Additionally, the project will incorporate a range of environmental management programmes, the implementation of which will further safeguard against the possibility of adverse indirect effects within the Nature Reserve.

2.1.2 Cape Preston Marine Management Area

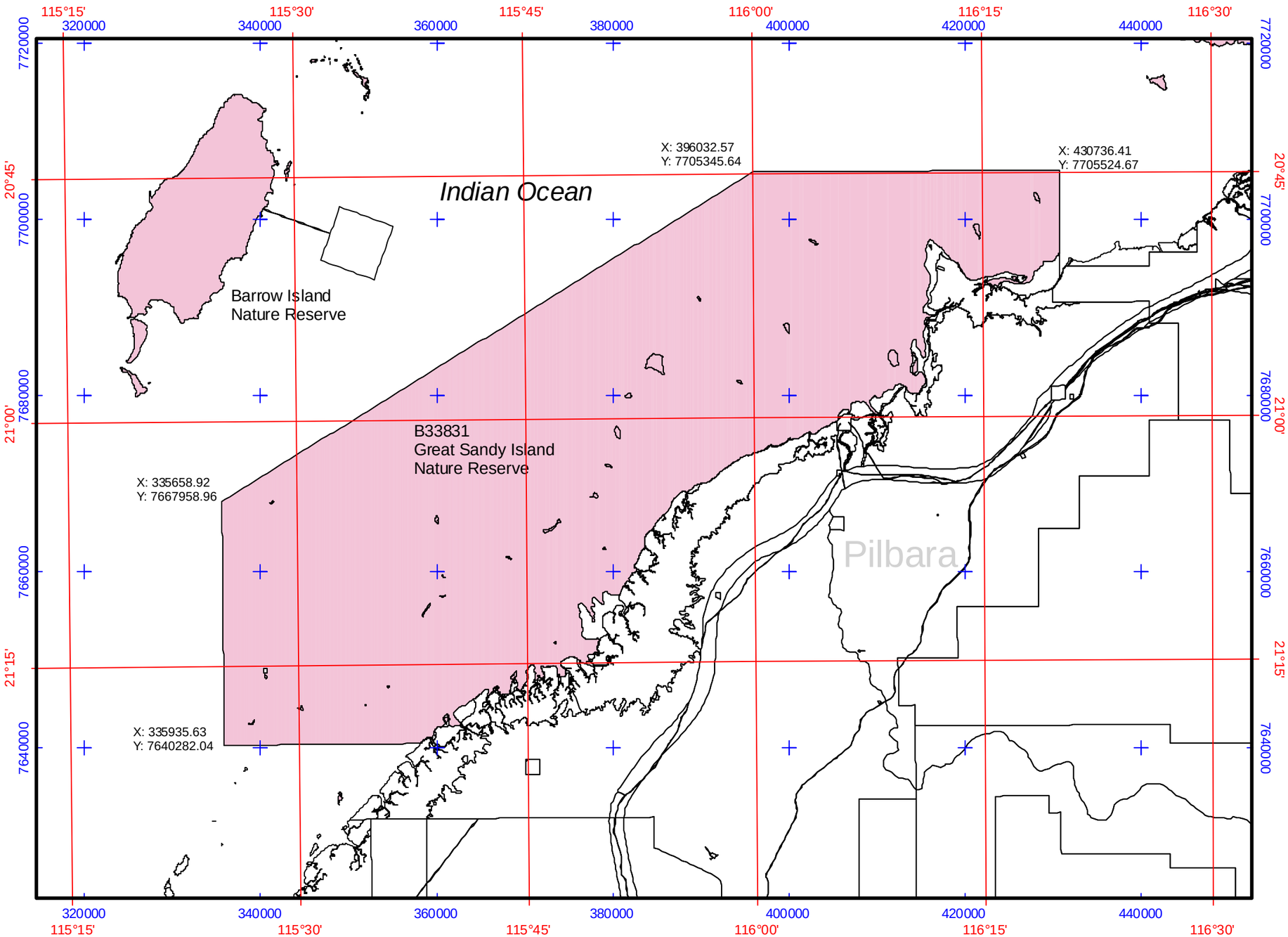
The CPMMA, proposed by CALM, encompasses the waters between the mouth of the Fortescue River and the Port of Dampier shipping channel (Figure 3). The boundaries depicted in Figure 3 are proposals sourced from the Draft Indicative Management Plan (CALM, 2003) and are subject to change as the plans are finalised. A Marine Management Area differs from a marine nature reserve or park in that they allow multiple uses (i.e. uses other than conservation and protection of the marine environment can be accommodated) (CALM, 2003). The *Conservation and Land Management Act 1984* states that a Marine Management Area is established *'…for the purpose of managing and protecting the marine environment so that it may be used for conservation, recreation, scientific and commercial purposes. Commercial purposes include:*

(i) aquaculture, commercial fishing and pearling activity;
(ii) mining, within the meaning of the Mining Act 1978;
(iii) seismic surveys and exploration drilling for petroleum; and
(iv) production of petroleum and associated activities'.

The Cape Preston project predates the proposals for creation of the Marine Management Area encompassing Cape Preston and Preston Island. Additionally, the information pack released by the Department of Environment (DoE) as part of the consultation process for the Pilbara Coastal Water Quality initiative (DoE 2004) includes a figure (Map 3:Cape Preston to Cape Lambert) showing the extent of proposed Marine Management Areas (based on an earlier proposed marine conservation reserve) which acknowledges that *'A large iron ore export port and associated facilities has been approved for Cape Preston…"*

On this basis, it is reasonable to conclude that the proposed development can be regarded as compatible with multiple use orientation of the proposed Marine Management Area, and that proposals for the Management Area are being progressed in the knowledge that development of the Cape Preston project, including the Preston Island port facility, is intended. Section 24 of the *Iron Ore Processing (Mineralogy Pty Ltd) Agreement Act 2002* provides confirmation of this.

Great Sandy Island Nature Reserve

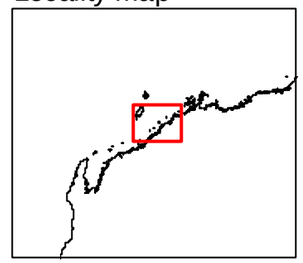


Graticule shown at 15 minute intervals.
Grid shown at 20000 metre intervals.

Legend

Cadastre (Land Parcels)
CALM - Nature Reserve
Cadastre (Land Parcels)

Locality map



N

Scale 1:500,000
1cm represents 0.5km

0 10 20 30 40 Kilometers

Projection: Universal Transverse Mercator, MGA Zone 50. Datum: GDA94

GDA

Western Australia

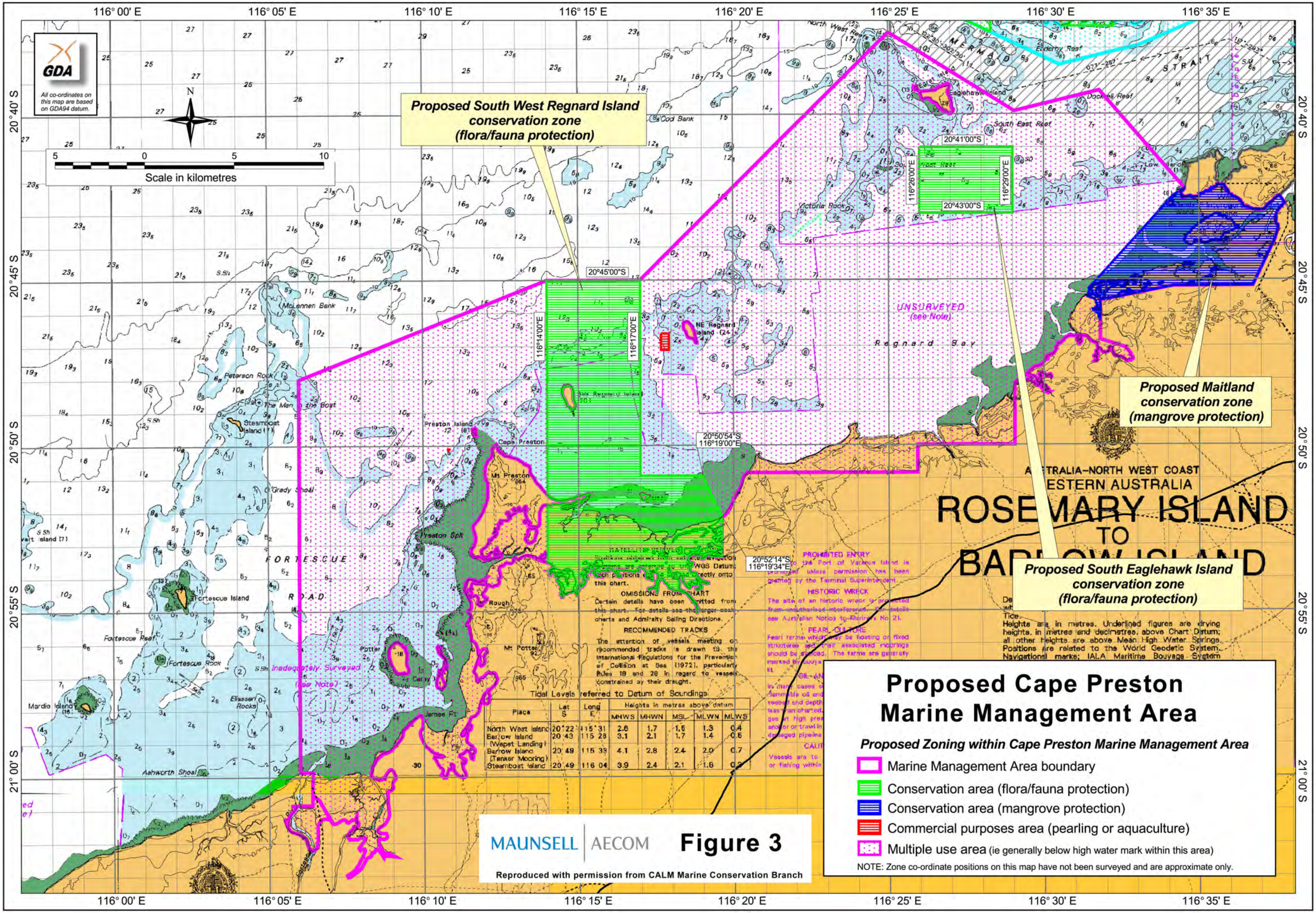
Department of Conservation and Land Management
Conserving the nature of WA

MAUNSELL | AECOM

Produced Under the Direction of
Keiran McNamara Executive Director
Department of Conservation & Land Management.

Figure 2

Produced at 10:55 on April 5, 2004



Proposed Cape Preston Marine Management Area
Proposed Zoning within Cape Preston Marine Management Area
Marine Management Area boundary
Conservation area (flora/fauna protection)
Conservation area (mangrove protection)
Commercial purposes area (pearling or aquaculture)
Multiple use area (ie generally below high water mark within this area)
NOTE: Zone co-ordinate positions on this map have not been surveyed and are approximate only.
Proposed South West Regnard Island conservation zone (flora/fauna protection)
Proposed Maitland conservation zone (mangrove protection)
Proposed South Eaglehawk Island conservation zone (flora/fauna protection)
AUSTRALIA-NORTH WEST COAST
WESTERN AUSTRALIA
ROSEMARY ISLAND TO BARROW ISLAND
GDA
All co-ordinates on this map are based on GDA94 datum.
Scale in kilometres
20°41'00"S
20°43'00"S
116°26'00"E
116°29'00"E
20°45'00"S
116°14'00"E
116°17'00"E
20°50'54"S 116°19'00"E
20°52'14"S 116°19'34"E
Regnard Bay
UNSURVEYED (see Note)
Cape Preston
Preston Island
Fortescue Island
Steamboat Island
Mardie Island
FORTESCUE ROAD
116° 00' E
116° 05' E
116° 10' E
116° 15' E
116° 20' E
116° 25' E
116° 30' E
116° 35' E
20° 40' S
20° 45' S
20° 50' S
20° 55' S
21° 00' S
MAUNSELL AECOM
Figure 3
Reproduced with permission from CALM Marine Conservation Branch

3.0 Proposed Project and Potential Impacts

3.1 Proposed Project

The proponent plans to mine the George Palmer orebody, which is located approximately 80km south west of Karratha and 25 km south of Cape Preston in the Pilbara region of Western Australia. A stockyard and laydown area will be constructed at Cape Preston. Preston Island is the intended location for the port facilities.

The major components of the project are:

- an open pit mine;
- a desalination plant;
- an HBI (Hot Briquetted Iron) plant;
- a DRI (Direct Reduced Iron) plant;
- a tailings dam;
- a system of conveyors and a service road to Cape Preston;
- a causeway to Preston Island;
- a jetty to the load out / port facilities;
- port facilities; and
- accommodation for employees and construction staff.

3.2 Potential Impacts

The Ministerial Conditions establishing the requirement to address the mitigation of impacts on the conservation estate refer both generally to the vicinity of the project area, and more specifically to the GSINR and the Cape Preston area which is part of the proposed Dampier Archipelago – Cape Preston Marine Conservation Reserve (now the CPMMA). The inference that can be drawn from the Ministerial Conditions is that measures proposed to mitigate impacts on the conservation estate will need to address impacts within the marine environment but could also address such within the terrestrial environment.

The project has the potential to affect a number of different components of the natural and human environments, including:

- groundwater and surface water hydrology;
- terrestrial biology;
- subterranean fauna;
- marine and near shore ecology;
- atmospheric emissions / air quality (including Greenhouse emissions);
- noise;
- landform and rehabilitation;
- wastes and hazardous materials;
- Aboriginal and European Heritage;
- recreational and landscape amenity

The environmental impact assessment documents for the Cape Preston project incorporate a range of measures and consequent commitments addressing potential impacts within both the marine and terrestrial environment of the project area. In addition to the Conservation Estate Management Plan, a number of other environmental management and monitoring plans have been prepared as a consequence of the proponent's commitments and the Ministerial Conditions, and these will assist in mitigating project related impacts within the marine and terrestrial environments. The key documents in this regard are the

- Marine Management Plan;
- Marine Wastewater Outfall Management Plan;
- Port Environmental Management Plan;
- Pit Dewatering and Vegetation Monitoring Plan;
- Vegetation (Mangrove) Monitoring Plan;
- Fauna (Turtles and Seabird) Management Plan; and
- Recreational Use Management Plan.

The port development will also entail dredging of a shipping channel linking the facility to deep water and of berthing pockets. The Marine Management Plan establishes the structure for the dredge plan which will then be completed as details of the dredging required are determined. Necessarily, the plan, addressing all relevant issues including spoil disposal and impact mitigation measures, will be prepared, and all necessary approvals gained, prior to commencement of the dredging operation.

3.3 Potential Impacts on the Conservation Estate

As indicated above, potential impacts associated with the Cape Preston project are addressed through a series of environmental management and monitoring plans. Further, as canvassed in Section 2.1, the project area does not impinge on and will not therefore have an impact on, any component of the existing terrestrial conservation estate. There are, however, several initiatives which could be supported through the Cape Preston project that would contribute towards broad terrestrial conservation within the general vicinity of the project area.

Also as canvassed in Section 2.1, beyond the direct impact of the port and associated infrastructure on Preston Island, it is not anticipated that the proposed development will significantly affect the marine conservation estate. In this regard, although the port and associated infrastructure, and the associated dredging, do encroach upon the CPMMA, they are compatible with the multiple use objective of the area. As demonstrated by the Marine Management Plan, the effects of the port and related infrastructure on the prevailing marine processes are limited.

4.0 Mitigatory Measures

4.1 Terrestrial Environment

Liaison with CALM's Karratha office indicates that contributions towards protection of the Roebourne Plain (cracking clays) grasslands habitat, and to the control of the introduced declared species Mesquite (*Prosopis spp.*) would be environmentally beneficial. Additionally, maximum protection of the mangrove population within the tidal watercourse at the base of Cape Preston would be another desirable initiative.

These options are discussed below.

4.1.1 Roebourne Plain (Cracking Clay) Grasslands

There is a small area of cracking clay soils located within the project area, known as the Horseflat land system. It supports a mosaic dominated by *Eragrostis xerophila* open tussock grassland, with *Eriachne benthamii* tussock grasslands, *Sida fibulifera* shrublands and *Acacia sclerosperma* flowlines. More extensive occurrences of the land system occur beyond the proponent's Mining Leases and are not, therefore, within the proponent's direct control.

Although this land system extends along the entire Pilbara coast between Onslow and Port Hedland, historically, it has been poorly represented within the conservation estate and therefore considered of high conservation importance (Van Leeuein, CALM pers com 2004). This status is enhanced by its preferential use as fodder by grazing stock, which has resulted in significant declines in the health of the land system in the region since pastoralism began over 100 years ago. More recently, the State Government's Pastoral Lease relinquishment programme has enabled the protection of large areas of the land system and as a consequence, it is no longer regarded as at risk.

The characteristically flat features of the Horseflat land system mean that it is the most suitable area for establishing most of the project infrastructure. As a result, it is highly likely that the area of cracking clay grasslands found within the project area will be destroyed, although a section of similar vegetation community located within the southern ML will not be impacted by current mining plans (Van Leeuwin, CALM pers com 2004).

On this basis, the proponent will pursue the following initiatives relating to protection of the cracking clays habitat:

- in developing future mining plans for the southern ML, incorporate (if and as practicable) measures to retain and protect the Horseflat vegetation community;
- continue liaison with CALM's regional ecological personnel to identify any actions that could realistically assist efforts to conserve the community more generally and could be realistically implemented as an adjunct of the Cape Preston project; and
- document outcomes from these initiatives in its periodic environmental performance reports.

4.1.2 Mesquite

Mesquite, a native North American species, is thought to have been introduced to the Pilbara as an ornamental plant. It is a perennial shrub or tree up to five metres in height that aggressively colonises degraded, often saline or moist areas, particularly pastoral lands. Infestations of the species frequently occur as dense thickets on river flats. Mesquite is recognised as a Weed of National Significance (Osmond, 2003) and sightings of the species are to be reported to the Department of Agriculture. CALM should also be notified if an occurrence of the species is identified within a National Park or other area of the conservation estate. The area of infestation on Mardi Station is declared as P1 from where any spread of the infestation beyond its existing boundaries should be prevented.

Within the Cape Preston project area, Mesquite is extensively established throughout the Fortescue River Delta and the opportunity to incorporate Mesquite control in the broader project environmental management programme therefore exists.

On this basis, the proponent will pursue the following initiatives relating to control of the environmental weed, Mesquite:

- integrate Mesquite control in the duties of the project field construction and operational phase environmental personnel, including:
  - field monitoring of known occurrences of the species within the project area,
  - assisting CALM / Department of Agriculture in the implementation of control measures, and
  - field identification of any new occurrences within the project area;
- incorporate information outlining the significance of Mesquite as an environmental weed and the consequent importance of controlling its spread and reporting of any newly identified occurrences in workforce inductions;
- continue liaison with CALM regional ecological personnel regarding measures to control the species that could be realistically implemented as an adjunct of the Cape Preston project; and
- document outcomes from these initiatives in its periodic environmental performance reports.

4.1.3 Mangroves

Mangroves are protected throughout Western Australia under the *Environmental Protection Act (1986)*. They are considered an important part of the coastal ecosystem and those found along the Pilbara coastline are the largest single unit of relatively undisturbed tropical arid zone mangrove habitats in the world (EPA, 2001).

A significant mangrove colony occurs within the tidal watercourse at the base of Cape Preston (Mangrove Creek). The CPMMA does not, however, contain any proposals for this colony. The transport corridor linking the mine and processing area to the port facility will pass through the Mangrove Creek colony and impact upon the mangroves will, therefore be unavoidable. Minimising this impact will, however, be a priority in the design, construction and operation of the transport corridor. Additionally, ongoing monitoring of the mangroves is intended (refer also to Vegetation Monitoring Plan) and in the event of unanticipated impact being detected, remedial measures (as realistically practicable) will be determined and implemented in consultation with CALM regional ecological personnel.

On this basis, the proponent will pursue the following initiatives relating to protection of the Mangrove Creek colony:

- Minimising, as practicable, the extent of impact on the colony through design of the transport corridor, and through management of its construction and operation;
- monitoring of the colony and periodic reporting of the outcomes in accordance with the Vegetation Monitoring (mangroves) Monitoring Plan; and
- initiating remedial measures (as realistically practicable) in consultation with CALM regional ecological personnel in the event of unanticipated impact is detected through monitoring.

4.2 Marine Environment

At this time, marine conservation proposals for the Cape Preston area are still evolving and as a result, there is no clear context in which to consider potential project related contributions in this regard. The proponent acknowledges that the proposed port and associated infrastructure will directly affect Preston Island and accordingly, some effect on conservation values within the GSINR will arise. Nevertheless, as indicated in the SER for the Cape Preston project (HGM, 2002), relinquishment of priority access to parts of the Burrup Peninsula in exchange for the right to use Preston Island for port development related purposes has previously been agreed between the proponent and the State Government.

It is not anticipated that the proposed development will significantly affect such values elsewhere within the Reserve.

The proposed port and associated infrastructure facilities are situated within the proposed CPMMA, although these facilities can be regarded as compatible with multiple use orientation of the proposed CPMMA as stated in the *Conservation and Land Management Act 1984*. It is also apparent that proposals for marine conservation within the Cape Preston area have been progressed in the knowledge that development of the Cape Preston project, including the Preston Island port facility, is intended.

The project marine related management plans indicate the unlikelihood of any significant marine impacts in the vicinity of the project area. It is recognised, however, that dredging required for the ultimate port development will contribute to the project related marine impacts. Accordingly, the project's affect on the marine environment will not be fully clarified until the dredging has been completed, and results from the marine monitoring programmes are known.

The proponent's view that third party access requirements of the *Iron Ore Processing (Mineralogy, Pty Ltd) Agreement Act, 2002* limit its capacity to commit to specific actions which could limit access to the area subject of the Agreement, also need to be recognised.

For the following reasons, it is difficult for the proponent to identify specific contributions towards management of the marine environment in the vicinity of the project area to which commitments could be provided at this time:

- the uncertainty stemming from the currently evolving proposals for marine conservation in the vicinity of the project area;
- the uncertainty associated with the administrative and legislative framework applying to the project area; and
- pending outcomes from monitoring that will assist in clarifying the extent and nature of project related marine impacts.

The proponent is, nevertheless, able to indicate its willingness to continue to liaise with CALM's regional ecological personnel in this regard.

5.0 Commitments

5.1 Terrestrial Environment

In respect of contributions towards management of the terrestrial conservation estate, Mineralogy provides the following commitments:

5.1.1 Cracking Clays Habitat

- In developing future mining plans for the southern ML, Mineralogy will incorporate (if and as practicable) measures to retain and protect the vegetation community comprising the Horseflat land system.
- Mineralogy will continue liaison with CALM's regional ecological personnel to identify any actions that could realistically assist efforts to conserve the community more generally and could be realistically implemented as an adjunct of the Cape Preston project.
- Mineralogy will document outcomes from these initiatives in its periodic environmental performance reports.

5.1.2 Mesquite Control

- Mineralogy will integrate Mesquite control in the duties of the project field construction and operational phase environmental personnel, including:
  - field monitoring of known occurrences of the species within the project area;
  - assisting CALM / Department of Agriculture in the implementation of control measures; and
  - field identification of any new occurrences within the project area.
- Mineralogy will incorporate information outlining the significance of Mesquite as an environmental weed and the consequent importance of controlling its spread and reporting of any newly identified occurrences in workforce inductions.
- Mineralogy will continue liaison with CALM regional ecological personnel regarding measures to control the species could be realistically implemented as an adjunct of the Cape Preston project.
- Mineralogy will document outcomes from these initiatives in its periodic environmental performance reports.

5.1.3 Mangrove Protection

- Mineralogy will seek to minimise, as practicable, the extent of impact on the colony through design of the transport corridor, and management of its construction and operation.
- Mineralogy will monitor the Mangrove Creek colony and periodically report the outcomes in accordance with the Vegetation Monitoring (mangroves) Monitoring Plan.

- Mineralogy will initiate remedial measures (as realistically practicable) in consultation with CALM regional ecological personnel in the event that unanticipated impact is detected through monitoring of the Mangrove Creek colony.

5.2 Marine Environment

In respect of contributions towards management of the marine conservation estate, Mineralogy provides a commitment to continue liaison on this matter with CALM's regional ecological personnel.

6.0 References

Betts, D (2004). Environmental Protection Authority. Personal Communication

CALM (2003). *Draft Indicative Management Plan for the Proposed Dampier Archipelago Marine Park and Cape Preston Marine Management Area.* Department of Conservation and Land Management unpublished draft report.

DoE (2004). Pilbara Coastal Waters Consultation. *Map 3. Cape Preston – Cape Lambert.* http://portal.environment.wa.gov.au/portal/page?_pageid=55,84685&_dad=portal&_schema=PORTAL

EPA (2001). *Guidance Statement for Protection of Tropical Arid Zone Mangroves Along the Pilbara Coastline.* Environmental Protection Authority Guidance Statement No 1.

Halpern Glick Maunsell (HGM) (2000). *Iron Ore Mine and Downstream Processing, Cape Preston, Western Australia. Public Environmental Review.*

Halpern Glick Maunsell Pty Ltd (2002). *Iron Ore Mine and Downstream Processing, Cape Preston, WA, Supplementary Environmental Review, February 2002*, Unpublished report prepared for Austeel Pty Ltd

Maunsell (2004). *Iron Ore Mine, Downstream Processing (Direct - Reduced & Hot-Briquetted Iron) and Port Construction Cape Preston, Pilbara.* Section 45C Application for an unsubstantial change. Internal report submitted to the Minister for the Environment.

Minister for the Environment (2003). *Statement that a proposal may be implemented (Pursuant to the provisions of the Environmental Protection Act 1986).* Statement No 00635. October 2003.

Osmond, R. (2003). *Best Practice Manual. Mesquite.* Queensland Department of Natural Resources and Mines.

Van Leeuwen, S. (2004) Department of Conservation and Land Management. Personal Communication.