

**DONALD MINERAL SANDS**

**ASSESSMENT**

under

***ENVIRONMENT EFFECTS ACT 1978***

**Minister for Planning**

**November 2008**

## Glossary

AAV	Aboriginal Affairs Victoria
AHD	Australian Height Datum
ARI	Average Recurrence Interval of rainfall events
AVW	Atlas of Victorian Wildlife
CHMP	Cultural Heritage Management Plan, prepared under <i>Aboriginal Heritage Act 2006</i>
C&LP Act	<i>Catchment and Land Protection Act 1994</i>
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
DMS	Donald Mineral Sands Pty Ltd
DPCD	Victorian Department of Planning and Community Development
DPI	Victorian Department of Primary Industries
DSE	Victorian Department of Sustainability and Environment
EES	Environment Effects Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Victorian Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERC	Environmental Review Committee
ESD	ecologically sustainable development
EVC	Ecological Vegetation Class
FFG Act	<i>Flora and Fauna Guarantee Act 1988 (Vic.)</i>
GHG	Greenhouse Gases
GL	gigalitres
ha	hectares
hha	habitat hectares
HMC	Heavy Mineral Concentrate
IGAE	Inter-Governmental Agreement on the Environment
km	kilometres
LPPF	Local Planning Policy Framework
m, m <sup>3</sup>	metres, cubic metres
MEA	maximum extent achievable
MRSD Act	<i>Mineral Resource (Sustainable Development) Act 1990</i>
MSS	Municipal Strategic Statement
MT	Mega tonne (million tonnes)
NVMF	Victoria's Native Vegetation Management Framework
P&E Act	<i>Planning and Environment Act 1987</i>
PM <sub>10</sub>	particles or "particulate matter" with equivalent aerodynamic diameter of 10 micrometers or less
SEPPs	State Environment Protection Policies
SPPF	State Planning Policy Framework
TDS	Total Dissolved Solids
WCP	Wet Concentrator Plant

# Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Purpose of this Document .....	1
1.2	Background .....	1
1.3	Project Description.....	1
1.4	Site and Environmental Setting .....	4
1.5	Structure of this Assessment.....	5
<b>2</b>	<b>EES and Statutory Processes.....</b>	<b>7</b>
2.1	The EES Process .....	7
2.2	Public Review Process .....	7
2.3	Required Statutory Approvals.....	7
2.3.1	<i>Mineral Resources (Sustainable Development) Act 1990</i> .....	8
2.3.2	<i>Water Act 1989</i> .....	8
2.3.3	<i>Flora and Fauna Guarantee Act 1988</i> .....	8
2.3.4	<i>Planning and Environment Act 1987</i> .....	9
2.3.5	<i>Aboriginal Heritage Act 2006</i> .....	9
2.3.6	<i>Radiation Act 2005</i> .....	9
2.3.7	<i>Commonwealth EPBC Act 1999</i> .....	9
<b>3</b>	<b>Environmental Assessment.....</b>	<b>10</b>
3.1	Approach to this Assessment .....	10
3.2	Efficient Mining of Mineral Resources .....	12
3.3	Economic and Social Effects .....	12
3.4	Terrestrial Ecology, Flora and Fauna .....	15
3.5	Water Resources and Aquatic Environments.....	23
3.6	Cultural Heritage.....	28
3.7	Surrounding Land-uses and Site Rehabilitation.....	31
3.8	Public Health, Amenity and Safety .....	33
3.9	Greenhouse Gas Emissions.....	40
3.10	Environmental Management Framework.....	41
3.11	Ecologically Sustainable Development.....	42
<b>4</b>	<b>Response to Inquiry Recommendations .....</b>	<b>45</b>
	<b>Appendix - Assessment's Legislative and Policy Context.....</b>	<b>50</b>

# 1 Introduction

## 1.1 Purpose of this Document

This document is the assessment of environmental effects (“Assessment”) under the *Environment Effects Act 1978* (EE Act) for the proposed Donald Mineral Sands Project, north-east of Horsham in western Victoria. It represents the final step in the Environment Effects Statement (EES) process under the EE Act by providing advice to decision-makers on the likely environmental effects of the proposal, their acceptability and how they should be addressed through statutory decisions.

This Assessment will inform the statutory decisions required under Victorian law for the Project to proceed, in particular approval of a Mining Licence, Work Plan and Work Authority under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) It will also inform the Australian Government Minister for the Environment, Heritage and the Arts’ decision under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

## 1.2 Background

The ‘Donald deposit’ was originally part of the Wimmera Industrial Minerals (WIM) deposit explored by CRA Exploration (now Rio Tinto) in the 1980s. This deposit forms part of one of the largest undeveloped mineral sands deposits in the world. However, in 1998 Rio Tinto decided the fine-grained deposit was uneconomic and relinquished the exploration licences. GDM Pty Ltd acquired the exploration licences in December 1999 and undertook further investigations. In November 2003, Astron Ltd acquired the exploration rights for the Donald deposit (WIM 250 – refer to Figure 3) and following its own feasibility investigations concluded that it was now economic to develop, because of the improved zircon prices and advances in processing methods.

On 2 December 2005, the then Minister for Planning required Astron Ltd to prepare an EES due to the potential for significant environmental effects resulting from the Project. On 24 November 2005, a delegate of the then Australian Government Minister for the Environment and Heritage decided that the Project was a ‘controlled action’ and therefore also required assessment and approval under the EPBC Act. On 6 February 2006, the EES process was accredited by a delegate of the Australian Government Minister as the required assessment process under the EPBC Act.

Donald Mineral Sands Pty Ltd (a subsidiary of Astron Ltd) (DMS) undertook investigations into potential environmental impacts and prepared the EES. In early January 2008 the Minister for Planning authorised exhibition of the EES for public comment. The EES was then exhibited for six weeks from 4 February to 14 March 2008.

An Inquiry panel was subsequently appointed by the Minister for Planning under the EE Act to inquire into the environmental effects of the Project, based on consideration of the EES and submissions received. The Inquiry’s report was provided to the Minister for Planning on 15 September 2008.

## 1.3 Project Description

DMS is planning to mine the shallow, unconsolidated, fine-grained sand deposit containing accumulations of titanium and zirconium minerals. The valuable minerals (ilmenite, rutile, leucosene and zircon) will be separated into a Heavy Mineral Concentrate (HMC) and then exported. The remaining non-valuable clays and sands will be returned to the soil profile. The final rehabilitation of the mined area is intended to produce a similar landscape to that prior to the mining project, including the restoration of native vegetation, drainage and agriculturally productive land.

Unlike the relatively coarse-grained and linear strandline deposits elsewhere in the Murray Basin (e.g. Wemen, Douglas) this ore occurs as a broad blanket throughout the 2785 hectare (ha) DMS Project area, in an area 10 kilometres (km) long and approximately 5 km wide. Geologically, it sits within the Parilla Sands and is close to the southern margins of the Murray Basin. The area contains a global resource estimated to contain 477 mega tonnes

(MT), containing an average of 6.3 percent of heavy minerals. The ore horizon is 8 to 12 metres (m) thick and is overlain by overburden 5 to 20 m thick and underlain by heavy carbonaceous clay 20 to 30 m thick.

The DMS Project is based on a 25 year conceptual mine plan. It is anticipated that mining would commence with a two-year commissioning period during which the annual mining rate will be increased gradually to 7.5 MT. The actual rate of mining will be determined by market demand for minerals, particularly zircon. However, it is predicted that each year 7.5 MT of ore and 13.5 MT of overburden will be moved during operations. All of the HMC will be ultimately transported to a port for export to an affiliated mineral separation plant in China.

The deposit would be mined using conventional earthmoving machinery such as excavators, trucks, bulldozers and scrapers. In the first 6 to 12 months, topsoil, subsoil and overburden would be stripped and stockpiled, while tailings would be placed in a dedicated tailing storage facility (TSF). After this period, further production of all these materials would be returned to the pit and the mine progressively backfilled. The TSF would then be decommissioned and rehabilitated.

The long-term mining plan is a cell configuration (a series of rectangular cells, each being 125 by 500 metres), advancing at a rate of approximately 9.8 cells per annum. Each cell is likely to be mined over 1 to 2 months, following which it is to be separated from the next cell by an earthen bund. The mined cell will then be temporarily used to store and dry tailings. All topsoil movements will be done in an annual campaign to protect topsoil fertility. Following processing of the heavy mineral ore, the remaining sand and fine tailings are to be returned to the mine void below the watertable. Mined pits will be progressively refilled with sand and clay/silt tailings from which minerals have been removed.

Initially the heavy mineral ore would be processed through a primary mineral separation plant, which will remove mineral sands by wet gravity separation. The HMC would then be refined by wet magnetic separation. The magnetic (mainly ilmenite) and non-magnetic (mainly rutile, zircon and leucoxene) products are to be produced for export. Concentrates would be separately stockpiled on site then progressively transported to port either by road or a combination of road and rail. If rail is selected, a rail siding near Minyip would be used.

There is a progressive cell configuration for the mining, backfilling and rehabilitation, which means the pit would not increase in size during the Project. In effect, the mine would be a moving pit that slowly moves laterally from cell to cell across the landscape, feeding a fixed Wet Concentrator Plant (WCP) – refer to Figures 1 and 2 below.

Essentially the proposal and associated works would involve the following sequence of activities:

- Establishment of project infrastructure (site access and haul roads, possible rail siding, site office and workshop, power and water) and the working mine area;
- De-watering to temporarily decrease the height of the watertable in the area immediately surrounding the area to be mined if required;
- Removal (and stockpiling) of topsoil, subsoil and overburden using conventional earthmoving equipment (eg. excavators, bulldozers, scrapers, front-end loaders and trucks);
- Ore extraction by conventional dry mining/earthmoving equipment;
- Processing of the ore in a fixed WCP;
- Refinement of the ore with magnetic separation;
- Transportation of the HMC by truck and/or rail to a designated Port; and
- Progressive (and ultimately final) rehabilitation of the mined areas.

Section 4 of the DMS EES provides a detailed description of this proposed mineral sands mining project.

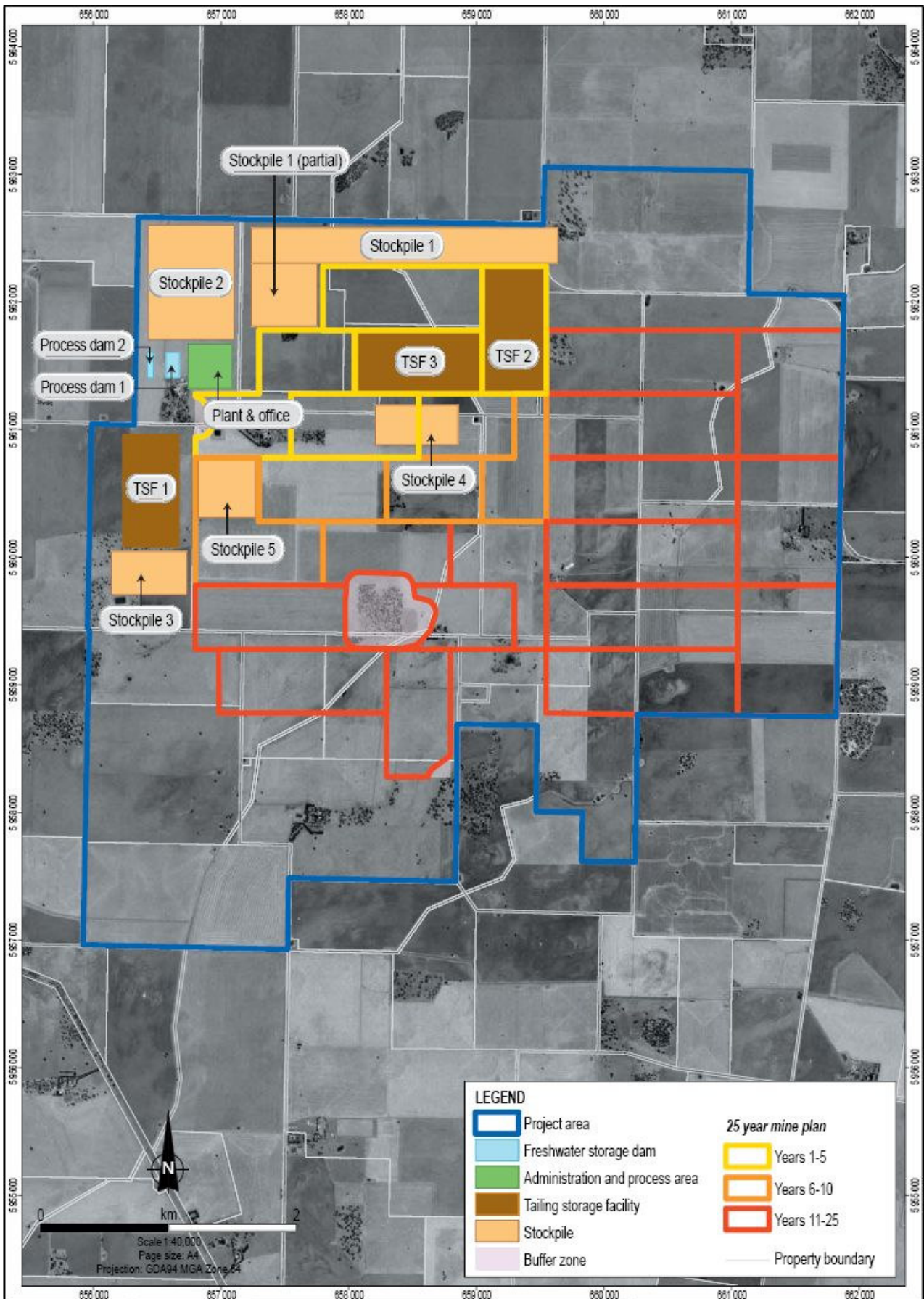
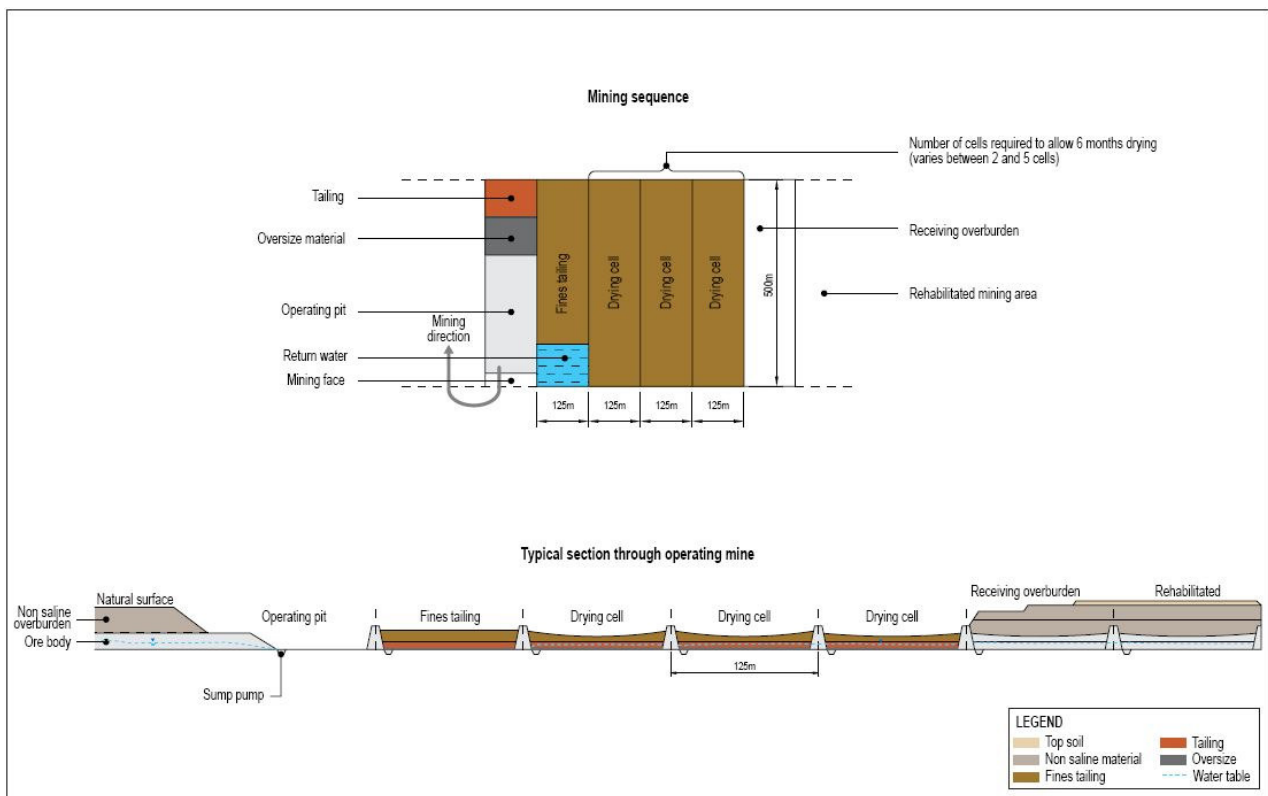


Figure 1. Proposed conceptual layout for the DMS mine (Source: DMS EES, page 4-6)



**Figure 2.** Proposed progressive concept for mining & tailings sequence (Source: DMS EES, page 4-9)

## 1.4 Site and Environmental Setting

The project area is approximately 17 km southeast of Minyip, located on an extensive plain (average elevation of 130 m AHD) with some sandy rises (refer to Figure 3). It has a slight fall to the east and a slightly steeper fall to the north. It is mainly freehold agricultural land (cereal cropping) with remnant patches of native vegetation. Cropping is the dominant activity with some sheep and cattle grazing.

The area has been mostly cleared and now contains isolated patches of remnant native vegetation, largely in road reserves and isolated fragments on the freehold land. The scattered pockets include some remnant Buloke woodland. The five Ecological Vegetation Classes (EVCs) located within the area are: Plains Woodland, Plains Savannah, Low Rises Woodland, Black Box Lignum Woodland, Ridged Plains Mallee. These EVCs are listed as endangered in the Wimmera Bioregion.

DMS' original (or superseded) project site was 5 km by 10 km (refer to the red box in Figure 3). It was the subject of both referrals (under the EE Act and EPBC Act), as well as the EES investigations. However, in December 2006 following the first phase of environmental studies and initial mine planning, DMS decided to confine the project site to the northern half of area (shown as a blue box in Figure 3). This is the final proposed DMS project area or mine footprint. It is approximately half of the original (superseded) project area.

The area is within the semi-arid climatic zone of southern Australia and has a Mediterranean to continental climate (i.e. cool wet winters and warm to hot dry summers). The average annual rainfall is approximately 400 millimetres (mm), with rain falling on an average of 98 days per year. The average summer and winter temperatures are 13°C to 30°C and 4°C to 13°C respectively.

Although the project area is within the Avon–Richardson catchment, it does not contain any defined watercourses or water bodies, apart from two domestic and stock supply channels (Taylors Lake Extension Channel and the East Lane Channel). The closest rivers are the Richardson River (4 km to the east) and Dunmunkle Creek (4 km to the west). The closest major water body is Lake Buloke (25 km northeast). Sheet floodwater flows can occur following major rainfall events.

The regional hydrogeology is generally understood, but on a wider scale only. The main aquifer is the Parilla Sands, an unconfined aquifer with high salinity and low yield. The mineral sand deposits are generally 3 to 12 m below the watertable within the Parilla Sands. The regional groundwater salinity varies between 14,000 and 35,000 mg/L TDS and the average local salinity is 16,930 mg/L TDS. In the vicinity of the project area, the groundwater elevation is generally between 110 and 120 m AHD and the regional groundwater flow is north-westerly towards the deeper section of the Murray Basin.

The typical stratigraphic sequence within the project area is: Woorinen Formation (0-6 m), Shepparton Formation ( 5-20 m thick), Parilla Sands (10-15 m thick), Geera Clay (10-30 m thick), Renmark Group (Olney Formation, 10-30 m thick).

In terms of Aboriginal occupation, the project area lies within the tribal boundary of the Jardwadjali, who occupied the Wimmera Plains and western Gariwerd region. The Jardwadjali were bordered to the east by the Djadja Wurrung, whose western boundary was formed by the Richardson River and Wallabo Creek. To date no Registered Aboriginal Party (RAP) has been appointed for the area under the *Aboriginal Heritage Act 2006*, but the following three groups have identified themselves as project stakeholders: Goolum Goolum Aboriginal Co-operative; Jupagalk Peoples; Barengi Gadjin Land Council Aboriginal Corporation.

## **1.5 Structure of this Assessment**

Section 2 of this Assessment outlines both the EES process and statutory approvals required for the DMS proposal.

The core part of this Assessment is found in Section 3, which assesses the environmental effects of the proposal within the context of the applicable environmental legislative and policy framework. This section also outlines the environmental evaluation objectives for this Project, which reflect the key aspects of relevant environmental legislation and policy. Further detail on the range of legislation and policy that provides the context and considerations bearing on the assessment can be found in the Appendix.

Section 4 provides a response to the key recommendations of the Inquiry.



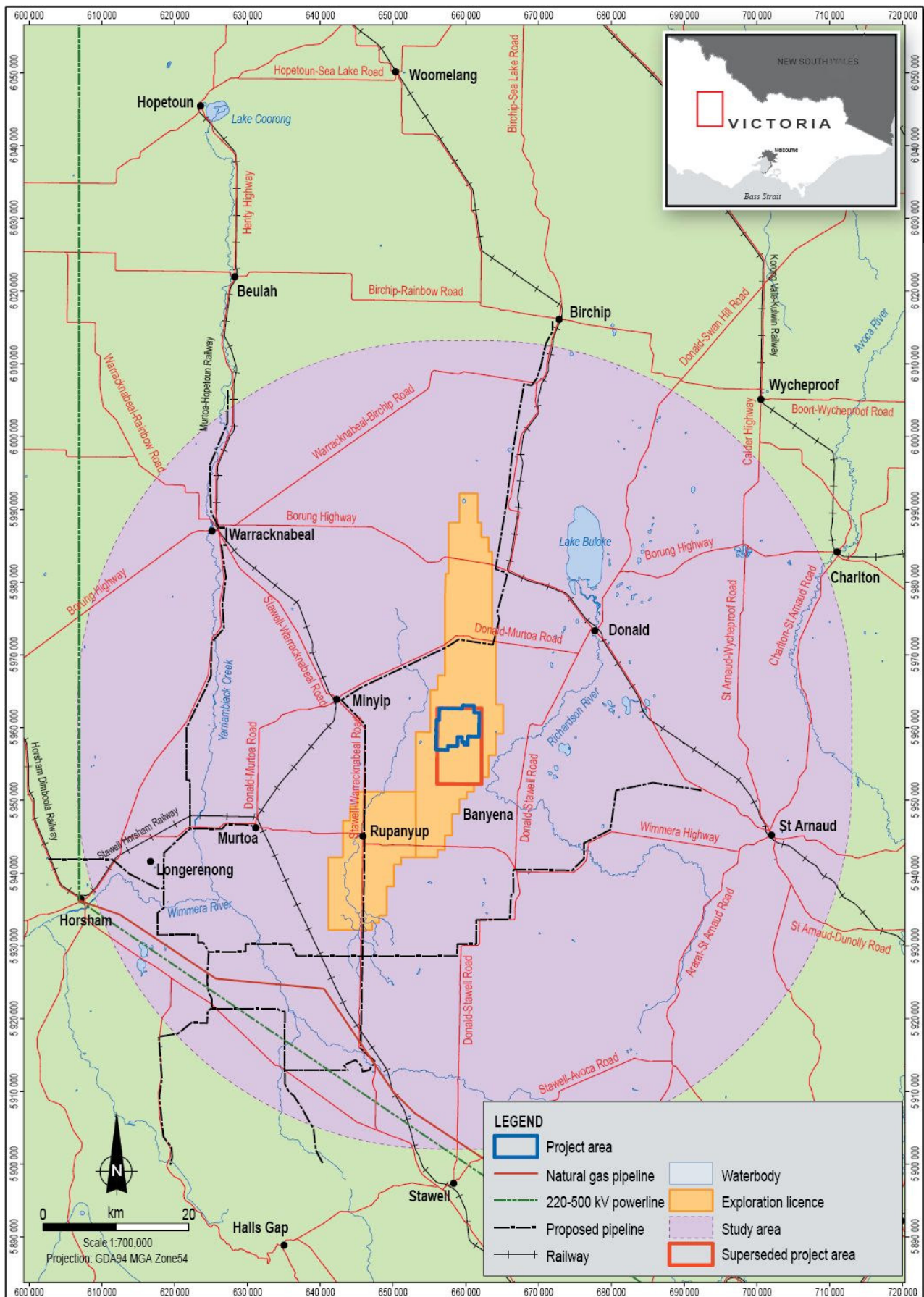


Figure 3. DMS Project and Study Area (Source: EES Supporting Study 9, page 1-2)

## 2 EES and Statutory Processes

### 2.1 The EES Process

On 8 September 2005, the then Minister for Energy Industries and Resources wrote to the then Minister for Planning requesting a decision on whether an EES was required for DMS Project. On 2 December 2005, the then Acting Minister for Planning determined that an EES was required to assess the potentially significant environmental effects of the Project.

As the proponent, DMS was responsible for preparing the EES, while the Department of Planning and Community Development (DPCD) administered the formal EES process. Draft Assessment Guidelines setting out the matters to be addressed in the EES were advertised for public comment in March 2006, prior to the Final Assessment Guidelines being issued to the proponent in May 2006.

An agency-based Technical Reference Group (TRG) was established and chaired by DPCD. The TRG included representatives of relevant government departments, agencies, and local government (e.g. Department of Sustainability and Environment (DSE)). The TRG's role was to advise DMS, as well as DPCD, in relation to the preparation of the EES, including with regard to technical, statutory and policy aspects.

In December 2007, DPCD provided advice to the proponent on final drafts of the EES documents. DMS then revised the EES and sought permission to exhibit it. In January 2008 the Minister for Planning authorised public exhibition of EES for public comment.

### 2.2 Public Review Process

The EES was exhibited for six weeks, from 4 February to 14 March 2008. A total of 34 submissions were received. Seven submissions were received from government departments/agencies, three from local government, two from interest groups and 22 from individuals. Details of submitters are included in Appendix B of the Inquiry Report.

An Inquiry was appointed by the Minister for Planning on 16 June 2008 under section 9(1) of the EE Act to consider the proposed DMS Project, in relation to both the EES and public submissions. The Inquiry comprised Mr Mark Marsden (Chair), Mr Geoff Angus (Member) and Colin Burns (Member).

Following a Directions Hearing in Wycheproof on 14 May 2008, the public hearing of the Inquiry was held for 5 days between 7 and 11 July 2008, in Minyip. The Inquiry's Report was provided to the Minister for Planning on 15 September 2008.

### 2.3 Required Statutory Approvals

The primary purpose of the assessment of environmental effects under the EE Act is to inform approval decisions under the relevant legislation. After receiving this Assessment, statutory decision-makers will decide whether or not to grant approvals, potentially subject to specific conditions to prevent, minimise or mitigate environmental effects.

In order to proceed, the DMS proposal requires the following key statutory approvals:

- Granting of a Mining Licence, Work Plan and Work Authority under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act), prior to any work commencing;
- Approval of a Cultural Heritage Management Plan (CHMP), as required under section 49 of the *Aboriginal Heritage Act 2006*, prior to the approval and commencement of any works; and
- Approval under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In addition the Project would require:

- Granting of any licence to extract groundwater under the *Water Act 1989*, both for dewatering the mine and for water supply from the Avon Deep Lead if the selection and feasibility of this resource is confirmed; and
- Planning permits under the relevant Planning Scheme(s) for the water pipeline and other associated infrastructure/works required for the water supply.

### **2.3.1 Mineral Resources (Sustainable Development) Act 1990**

The primary Victorian approvals required for this project are a Mining Licence and Work Authority under the MRSD Act; the former provides exclusive access to the mineral resources, while the latter is the formal permission to commence works. Hence, mining can only occur after the Minister for Energy and Resources first issues a Mining Licence, and subsequently the Department of Primary Industries (DPI) approves a Work Plan and then grants a Work Authority.

A Work Authority can only be granted after a planning permit is issued under the relevant planning scheme or the mining proposal is assessed under the EE Act. Therefore approval of the Work Plan and granting of the Work Authority can not occur until the Minister for Energy and Resources and DPI have received and considered the Assessment under the EE Act (this document).

The Work Plan is a key regulatory instrument for giving effect to recommendations from the Minister for Planning's Assessment. Recommendations can be addressed either in the body of the Work Plan or DPI can include project specific conditions in the Work Plan approval.

Applications for approval of a Work Plan and a Work Authority under the MRSD Act are to be submitted to DPI by the proponent following the EES process.

### **2.3.2 Water Act 1989**

Groundwater will need to be pumped out of the surface aquifer (dewatering), in order to enable mining to occur below the current level of the watertable. A Groundwater Extraction Licence is therefore required to remove groundwater from near the ore body, which needs to be applied for under section 51 of the *Water Act 1989*.

The Project also requires a water supply of up to 4 gigalitres (GL) per year for processing the ore, either from groundwater or surface water supplies. The preferred but unproven supply for the mine is saline groundwater from a local Deep Lead, which would require also Groundwater Extraction Licence under the *Water Act 1989*. The assessment of an application for this licence would require consideration of a range of factors set out under section 53 of the Act, including the specific environmental matters identified under section 40.

An entitlement to surface water supplies would also require an application under the *Water Act 1989*, which would be assessed by Grampians Wimmera Mallee Water (GWMW) in consultation with DSE.

### **2.3.3 Flora and Fauna Guarantee Act 1988**

A permit under the *Flora and Fauna Guarantee Act 1988* (FFG Act) is not required to remove declared flora, but this exemption does not apply to fauna species that are protected under the FFG Act.

The Governor in Council made a *Flora and Fauna Guarantee (Mineral Resources Development) Order* ('Order') on 20 September 1994, which is still current. In general, this Order authorises any person who undertakes authorised mining works, which have been the subject of an EES, to take protected flora, if the taking is as a result of or incidental to the carrying out of those works. The Order applies to restricted Crown land, unrestricted Crown land, freehold land owned by a public authority, or private land.

### **2.3.4 Planning and Environment Act 1987**

The Project is located on land zoned Rural (RUZ) under the Yarriambiack Planning Scheme, and land zoned Farming (FZ) under the Northern Grampians Planning Scheme. However, a planning permit under the local planning schemes is not required to use or develop land for mining if an EES and Assessment have been prepared under the EE Act (see 42 of the MRSD Act); hence this Project is exempt from a planning permit under Clause 52.08-2 of the planning scheme.

However, a planning permit will be required for the pipeline and works associated with water supply, particularly under the scenario that the Avon Deep Lead is to be the source of process water required for the Project.

The *Planning and Environment Act 1987* (P&E Act) is also the primary legislation under which the policy 'Victoria's Native Vegetation Management Framework - A Framework for Action' (NVMF) is implemented. However, in the circumstance that approval under this Act is not required, the NVMF may be applied under other applicable statutes, including the MRSD Act. The NVMF provides a framework for reversing the loss of native vegetation in Victoria and adopts a three step approach to achieving this: avoid, minimise, offset. Further, in the event that any remnant of an EVC of 'very high conservation significance' needs to be cleared, a specific exemption or approval is required from the Minister for Environment and Climate Change under the NVMF, as this policy does not permit its clearance.

### **2.3.5 Aboriginal Heritage Act 2006**

Approval of a CHMP is required for this Project before statutory authorisation of the mining works can proceed. Under section 49 of the *Aboriginal Heritage Act 2006*, a CHMP must be prepared for any project for which an EES has been required. The Act requires relevant decision-makers to only grant a statutory authorisation for the activity if it is consistent with the approved CHMP.

### **2.3.6 Radiation Act 2005**

The Proponent is likely to require a Management Licence under the *Radiation Act 2005* (although there is a possibility of an exemption under Section 16). Further, a Radiation Management Plan (RMP) and a Radioactive Waste Management Plan (RWMP) are therefore expected to be required, in accordance with the relevant code of practice.

A Management Licence is required under the *Radiation Act 2005* to conduct a "radiation practice" (Section 12), as defined in the Act, which includes transporting, mining and processing radioactive material. Radioactive material is defined as "material that spontaneously emits ionising radiation... at levels equal to or greater than the amount prescribed by the regulations". Under these definitions the HMC is "radioactive material" and therefore a Management Licence is likely to be required to process, mine and transport these materials.

### **2.3.7 Commonwealth EPBC Act 1999**

Approval under the EPBC Act is required for this Project (EPBC 2005/2372), as a delegate of the Australian Government Minister considered there to be potential for significant impacts on matters of national environmental significance protected under that Act. The controlling provisions that apply are Sections 18 and 18A (Listed threatened species and communities). A key matter in this case is the endangered Buloke Woodlands that could be impacted upon by the project.

As the Victorian EES process has been accredited under the EPBC Act, at the conclusion of the EES process, the Victorian Minister for Planning's Assessment will be provided to the Australian Government Minister to inform a decision on whether or not to approve the Project under the EPBC Act, and if so under what conditions.

## 3 Environmental Assessment

### 3.1 Approach to this Assessment

In assessing the environmental effects of the DMS Project, this Assessment under the EE Act takes into account relevant legislation and policy – refer to the Appendix for further details of this context. In combination, applicable provisions, objectives and standards from this legislative and policy framework form the matters that need to be considered in evaluating environmental effects, in order to inform statutory approval decisions.

In line with applicable legislation, including the P&E Act, *Environment Protection Act 1970* (EP Act) and EPBC Act, as well as the EE Act, the Assessment has regard to the consistency of the Project with ecologically sustainable development (ESD). The first three of these Acts incorporate objectives and/or principles of “ESD” or “sustainable development” - refer to the Appendix. Further, the Ministerial Guidelines made under section 10 of the EE Act specifically require the assessment of the proposal and its effects to be in the context of the principles and objectives of ESD.

To provide a coherent and integrated structure for this Assessment of environmental effects, relevant aspects of legislative and policy considerations have been synthesized into a set of evaluation objectives. A draft set of objectives were included within the Assessment Guidelines for this EES. These have now been refined in light of the further investigations of project issues in both the EES and the Inquiry’s report. Table 1 lists these evaluation objectives, together with the set of core legislation that underpins them. Specific aspects of applicable legislation and related policy will be highlighted in the discussion under individual evaluation objectives.

These evaluation objectives provide a set of benchmarks for assessing likely environmental outcomes of the Project. In so far as particular objectives would only be partly or weakly satisfied, the specific statutory context needs to be further considered.

**Table 1. Evaluation Objectives**

Evaluation Objectives	Key Statutes
1. To enable an efficient mining project that contributes to the economic development of the State's mineral resources while protecting the environment.	- <i>MRSD Act</i>
2. To provide clear overall social and economic benefits for the region as well as the State.	- <i>P&amp;E Act</i> - <i>MRSD Act</i>
3. To minimise to the extent practicable, including through avoidance, adverse effects on native vegetation and biological diversity, including effects on floral and faunal species and communities protected under either the <i>FFG Act 1988</i> or the <i>EPBC Act 1999</i> .	- <i>P&amp;E Act</i> - <i>FFG Act</i> - <i>EPBC Act</i>
4. To minimise to the extent practicable, including through avoidance, adverse effects on the values and resources of both surface water and groundwater environments, including on protected beneficial uses.	- <i>EP Act</i> - <i>Water Act</i> - <i>P&amp;E Act</i> - <i>C&amp;LP Act</i>
5. To minimise to the extent practicable, including through avoidance, adverse effects on both Aboriginal and non- Aboriginal cultural heritage values.	- <i>Aboriginal Heritage Act 2006</i> - <i>Heritage Act 1995</i> - <i>P&amp;E Act</i>
6. To minimise to the extent practicable, including through avoidance, adverse effects on surrounding land uses during mining, and provide for effective rehabilitation of affected land so as to enable productive use in the long-term.	- <i>MRSD Act</i> - <i>P&amp;E Act</i> - <i>C&amp;LP Act</i>
7. To minimise to the extent practicable, including through avoidance, adverse effects on residential amenity as well as risks to public safety and health during mine development and operation.	- <i>EP Act</i> - <i>P&amp;E Act</i> - <i>MRSD Act</i> - <i>Radiation Act 2005</i>
8. To minimise to the extent practicable, including through avoidance, the generation of greenhouse gases.	- <i>EP Act</i>
9. To ensure that mining can be implemented in accordance with a robust and transparent framework for environmental management.	- <i>MRSD Act</i> - <i>P&amp;E Act</i> - <i>EP Act</i> - <i>Aboriginal Heritage Act 2006</i> - <i>EPBC Act</i>
10. To enable ecologically sustainable development over the short- and longer-term, having regard to the likely overall economic, social and environmental implications of the proposal.	- <i>EE Act</i> - <i>MRSD Act</i> - <i>P&amp;E Act</i> - <i>EP Act</i> - <i>Water Act 1989</i> - <i>C&amp;LP Act</i> - <i>Aboriginal Heritage Act 2006</i> - <i>EPBC Act</i>

## 3.2 Efficient Mining of Mineral Resources

**Objective 1.** *To enable an efficient mining project that contributes to the economic development of the State's mineral resources while protecting the environment.*

### Statutory Context

The MRSD Act provides the primary statutory context for mineral exploration and development in Victoria. The purpose of this Act "is to encourage an economically viable mining industry which makes the best use of mineral resources in a way that is compatible with the economic, social and environmental objectives of the State".

Both the Yarriambiack and Northern Grampians Planning Schemes contain objectives and provisions that support the development of mineral resources, as important contributors to the region's employment and economic base. For example, the Yarriambiack Planning Scheme includes clause 22.06, which "encourages the exploitation of mineral sand deposits to enhance the economy of the municipality and region", "allows mining, processing and associated research in an environmentally sensitive manner and with regard to the amenity of adjacent land".

The key issue to be considered in this context is whether the proposal is an economically sound development of the State's mineral resources, which enables efficient supply of minerals to markets.

### Discussion

Prior to the current DMS proposal, the broad mineral sands deposits south-east of Donald were not considered economically feasible to extract and process because of the dispersed, fine-grained, low-grade nature of the ore, originally deposited around the edges of a shallow sea. As mentioned previously, Astron Ltd acquired the exploration rights on the basis of improved zircon prices and advances in processing methods.

Since it is now considered to be economically feasible to both mine the deposit and then backfilling and restoration of the soil profile using conventional earthmoving machinery, it is reasonable to conclude that the Project can offer a best use of the area's mineral sands deposits, subject to: the avoidance of key ecological and cultural heritage assets, the sourcing of a suitable water supply, as well as the effective mitigation and management of groundwater, noise and dust issues.

### Conclusion

Having considered the EES, public submissions and the Inquiry Report, it is my assessment that:

- The Project would enable the efficient extraction and processing, and hence economic use of the Donald mineral sand resources.

## 3.3 Economic and Social Effects

**Objective 2.** *To provide clear overall social and economic benefits for the region as well as the State.*

### Statutory and Policy Context

In addition to the purpose of the MRSD Act, relevant objectives of planning in Victoria under section 4(1) of the P&E Act include:

- (a) to provide for the fair, orderly, economic and sustainable use, and development of land;
- (c) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria;
- (e) to protect public utilities and other assets and enable the orderly provision and coordination of public utilities and other facilities for the benefit of the community; and
- (g) to balance the present and future interests of all Victorians.

*Growing Victoria Together, 2005* is the State Government's 10 year vision for building a better society. Relevant goals include more quality jobs and thriving, innovative industries across Victoria and protecting the environment for future generations and efficient use of natural resources.

## **Key Issues**

The key issues to be considered in this context are whether:

- The Project will have overall economic benefits for the region and State (including employment, income, local/regional investment, royalties etc.).
- The social benefits for the region outweigh the adverse effects on the local and regional communities.

## **Economic Effects**

Supporting Study 9 of the proponent's EES presents details of the predicted likely social and economic effects of the Project. It predicts both a capital investment of \$93 million and \$1,635 million of revenue to be generated over the 25 year life of the Project. The operating expenditure is estimated to be greater than \$750 million over 25 years and \$1.8 million per annum is likely to be paid in government royalties. These key economic benefits derived from export earnings and royalties would primarily be felt at the State level.

At the regional and local level, direct economic benefits are more likely to be derived from employment (i.e. DMS workforce of 75 and 238 indirect jobs), local investment and the provision of required goods and services. This would be in addition to the local and possibly regional indirect economic benefits resulting from the additional wages (approx. \$6.5 million per annum) and some increased business (direct and indirect) for local industries.

Based on this EES study the total loss in agricultural production per year (i.e. the opportunity cost in the event mining proceeds) is estimated to be \$156,380. Therefore, over the 25 year life of the Project, the total losses in agricultural productivity from cropping and grazing are predicted to be \$3.25 million and \$660,500 respectively. However, should mining proceed, the gross operating margin from mining would be between \$635 and \$885 million over the 25 years of Project. It is also predicted to generate wealth from sales far in excess of that currently available through farming, which at current prices would take approximately 187 years to achieve the same revenues as the mine over 25 years. The Project also represents a diversification in the regional economy which should help sustain it during downturns in agricultural output (e.g. due to the persistent drought conditions currently being experienced in the region).

The Inquiry considered there to be little doubt of the significant net economic benefits of the Project proceeding, including at the State, regional and local scales. There were no substantive submissions that contested these broad economic benefits.

## **Social Effects**

The EES predicts the Project will have some adverse social effects, although the specific nature and extent of these is somewhat uncertain. For example, a small number of families could be lost from the local area, possibly due to the proposed mine acting as a trigger to leave the area. A worst-case scenario is that all directly affected landholders do permanently leave, which would reduce the population of the local area by approximately 0.2%. However, the mine is predicted to produce a net population increase in this area (i.e. the local towns excluding Horsham) of approximately 1%. Such changes to the local population could affect local schools, businesses and other commercial and community services, although the severity of these effects is largely unknown and may be a net positive in the long term.

The EES notes that some members of the community have significant concerns regarding the Project, in relation to aspects such as reduced community cohesion, loss of amenity and/or farm income including following rehabilitation of the land. Other members of the community interviewed for the EES expect the mine to be beneficial, creating jobs (direct and indirect), business and social participation. Competition for labour (between the mine and current employers) is likely to occur, with competition for skilled workers in particular. This competition has the potential to cause some localised and short-term labour shortages.



The Inquiry considered DMS's commitments to support a local workforce and provide a flexible work arrangements (allowing workers to job share and continue farming), to be sufficient to suggest impacts on social cohesiveness could be mitigated or even be positive. However, the Inquiry also notes the potential for an influx of some workers which may provide some disruption to the local community, and possibly result in labour and accommodation shortages. In doing so, the Inquiry emphasises that the Project is within the broader Horsham area which should alleviate potential impacts on the supply of local labour and accommodation.

The six families that operate, own and/or live on farms within the Project area will be directly affected, and are likely to need compensation, and either temporary relocation and/or to leave the area permanently (as noted above). There are also a further 13 landholders located with 2 km of the Project area that may be affected, as the Project will bring about changes to the area, including on the area's amenity and access as mining progresses across the landscape. Changes are also likely to emerge from the increase in demand for services such as housing, retail, health and education, due to the operational DMS workforce (approximately 75).

Under the MRSD Act, DMS needs to agree on compensation arrangements before work can commence on individual properties. DMS is also proposing to mitigate disruption to the local community by providing appropriate temporary accommodation and supporting measures to strengthen the community structure where possible.

As highlighted by the Inquiry, the assessment of some social effects is much more subjective (and less quantifiable) than economic effects. This is apparent in the disparity of views expressed by community members about the potential for the mine to impact on sustainable social cohesion. Whilst both the local Councils suggest the Project will have net social benefits, it is difficult to be certain about how specific effects (adverse and beneficial) would transpire, particularly with respect to social cohesiveness.

In the view of the Inquiry, social outcomes should be able to be managed in conjunction with the overall management of environmental impacts. The Project is predicted to have some adverse environmental effects and cause community concern and potentially distress and therefore needs a mechanism to both manage and monitor an array of impacts, including the potential (and less certain) social effects. The Inquiry suggests that an Environmental Review Committee (ERC), which is usually required for mining projects, will provide a sound basis for monitoring potential social effects. Given the anticipated involvement of the local councils and community representatives in an ERC, this may possibly be an appropriate mechanism for both monitoring and managing potential social effects. However, since potential social effects are only indirectly related to the mine's actual operations, the ERC may not provide an adequate mechanism.

## **Conclusions**

Having regard to both the EES and Inquiry's analysis, it is my assessment that:

- The DMS Project will have overall economic benefits for the region and State, as well as regional and local direct and indirect economic benefits, including those likely to be derived from employment and local investment.
- The Project is unlikely to have significant adverse social effects and should produce a net social benefit to the local and regional communities, provided that potential adverse social effects are effectively monitored and managed.

Further, it is also my assessment that:

- DMS develop a program, in consultation with Northern Grampians and Yarriambiack Shire Councils, DPI, the Department of Human Services, DPCD and the ERC, to monitor community well-being and service capacity issues related to the presence of the mine and its workforce, and to guide action to be undertaken as appropriate by DMS, relevant agencies or through partnership arrangements.

## 3.4 Terrestrial Ecology, Flora and Fauna

**Objective 3.** *To minimise to the extent practicable, including through avoidance, adverse effects on native vegetation and biological diversity, including effects on floral and faunal species and communities protected under either the FFG Act 1988 or the EPBC Act 1999.*

### Statutory Context

Key statutes, policies and strategies related to the protection of native vegetation and biodiversity in Victoria are the:

- *Flora and Fauna Guarantee Act 1988* (FFG Act) and Victoria's Biodiversity Strategy.
- *Planning and Environment Act 1987* (P&E Act), including the Victorian NVMF.
- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of the FFG Act is to enable and promote the conservation of Victoria's native flora and fauna. Its objectives include: "(c) to manage potentially threatening processes; and (e) to ensure that the genetic diversity of flora and fauna is maintained". Further to this, Victoria's Biodiversity Strategy made under the FFG Act includes two related goals, i.e.:

- "the present diversity of species and ecological communities and their viability is maintained or improved across each bioregion", and
- "there is no further preventable decline in the viability of any rare species or of any rare ecological community".

One of the objectives for planning in Victoria under Section 4(1) of the P&E Act is: "to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity". SPPF clause 15.09, "Conservation of native flora and fauna", complements this.

The Victorian NVMF is the principal document that sets out Victorian Government policy for the protection of native vegetation. Whilst a permit is not required for this Project under the local planning schemes, the principles and requirements of the NVMF still apply and are implemented primarily through the EES and MRSD Act processes.

The "net gain" approach set out in the NVMF adopts a hierarchy of avoidance, minimisation and offset principles. The first priority is the avoidance of clearing and therefore losses of existing native vegetation. The NVMF also includes specific guidance on when clearance should not be permitted for different classifications of EVCs - e.g. very high conservation significance EVCs are not to be cleared unless exceptional circumstances exist and the Minister for Environment and Climate Change gives approval to do so.

One relevant objective of the EPBC Act is "to promote the conservation of biodiversity", which closely aligns with an objective of sustainable development under the MRSD Act: "biological diversity should be protected and ecological integrity maintained" (s.2A(2)(c)).

### Key Issues

Given this context, the evaluation of potential effects on biodiversity and native vegetation needs to address the following issues:

- The potential loss of and effects on native vegetation and associated ecological impacts.
- The potential loss and impacts (direct and indirect) on protected species and communities of flora and fauna (e.g. Buloke Woodlands, Turnip Copperburr, Growling Grass Frog, Plains Wanderer, Victorian Temperate Woodland Bird Community).
- The appropriate approach and options to meet legislative and policy requirements, including the avoidance, minimisation and off-setting of native vegetation clearance in accordance with the NVMF.

## Native Vegetation

The DMS Project area is generally highly modified and has a long history of agriculture. However, some remnant native vegetation occurs in patches, including roadside reserves. The first phase of ecological surveys done for the EES identified six EVCs within the area. These and all other EVCs detected within adjacent roadside reserves and the water supply pipeline zones are classified as endangered in the Wimmera Bioregion.

The EVCs where Buloke *Allocasuarina leuhmanii* is likely to be present are considered to be examples of the EPBC Act-listed endangered community 'Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions'. All of the EVCs in the project area (except the Black Box Lignum Woodland) are communities that could include Buloke trees and could therefore be part of this EPBC Act-listed community. Further to this, Buloke and several Buloke Woodland communities are also listed as threatened under the FFG Act (e.g. Grey Box-Buloke Grassy Woodland Community), which correspond with some of the EVCs to be cleared: Plains Woodland and Plains Savannah.

The original project area assessed during the EES surveys (red box in Figures 4 and 5) included an estimated 41.55 habitat hectares<sup>1</sup> (hha) of EVCs (24.66 hha of Plains Woodland, 15.19 hha of Plains Savannah, 1.10 hha of Black Box Lignum Woodland, and 0.60 hha of Ridged Plains Mallee), 2062 Large Old Trees, and 38 Medium Old Trees. The EES also identifies the remnants of Low Rise Woodland, Black Box Lignum Woodland and the Ridged Plains Mallee as being of 'very high conservation significance', whereas the Plains Woodland and Plains Savannah were identified as having 'high conservation significance'. DSE's submission provided one correction: 0.81 hha of Plains Savannah is also of 'very high conservation significance' (Refer to Table 2), which is consistent with the proponent's evidence to the Inquiry.

Whilst significant remnants are present across the original project area, the final project area or mine footprint was subsequently selected to avoid and minimise the clearance of significant native vegetation. This involved reducing the footprint of the mine and locating it in the northern half of the original project area (blue box in Figures 4 and 5), which avoids most of the significant areas of native vegetation (i.e. sites 2, 3, 4, 5, 11, and 16), some of which are now being considered as offset sites - refer to Figure 4. Site 21 will also be avoided although it is within the proposed mine footprint.

The proposed mine footprint includes an estimated 14.82 hha of EVCs to be cleared, which includes 9.38hha of Plains Woodland EVC, 4.34 hha of Plains Savannah EVC, and 1.10 hha of Black Box Lignum Woodland EVC, as well as 657 Large Old Trees and 38 Medium Old Trees. As indicated in Table 2, impacts on all EVCs except Black Box Lignum Woodland have been significantly reduced through the refinement of the mining footprint.

EVC	Conservation Status	Conservation Significance	To be cleared (hha)	To be retained (hha)	% of EVC Lost
Plains Woodland	Endangered	High	<b>9.38</b>	15.28	38
Plains Savannah	Endangered	High	<b>3.53</b>	10.85	29
Plains Savannah	Endangered	Very High	<b>0.81</b>		
Black Box Lignum Woodland	Endangered	Very High	<b>1.10</b>	0	100
Ridged Plains Mallee	Endangered	Very High	<b>0</b>	0.6	0
<b>Total</b>			<b>14.82</b>	<b>26.73</b>	

**Table 2.** EVCs to be cleared and retained (sources: DMS EES pg 6-48 & DSE Inquiry Submission).

<sup>1</sup> Habitat hectares is "a site-based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type" (VNMF).

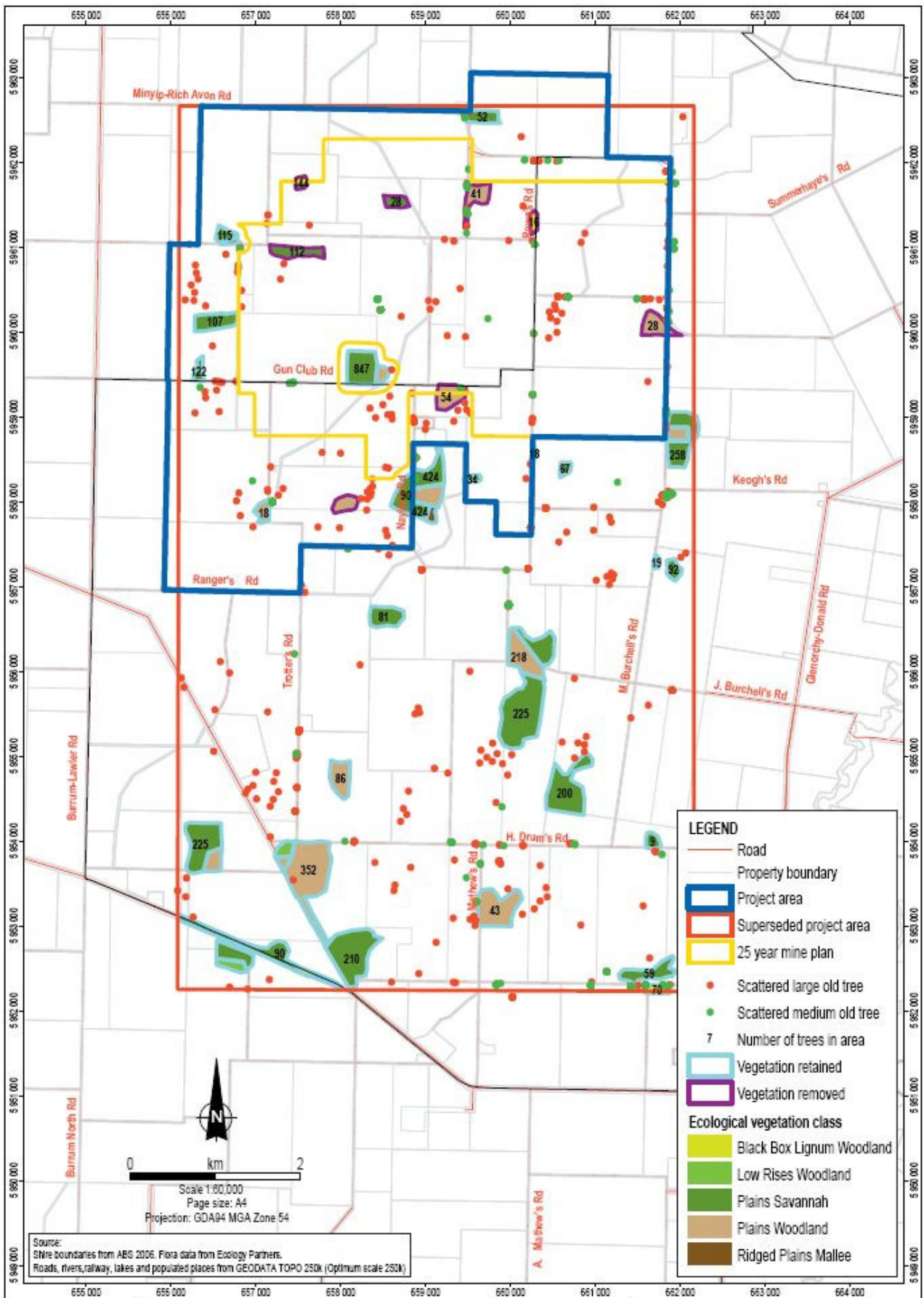


Figure 4. Native Vegetation to be Cleared and Retained (Source: DMS EES, page 6-49)

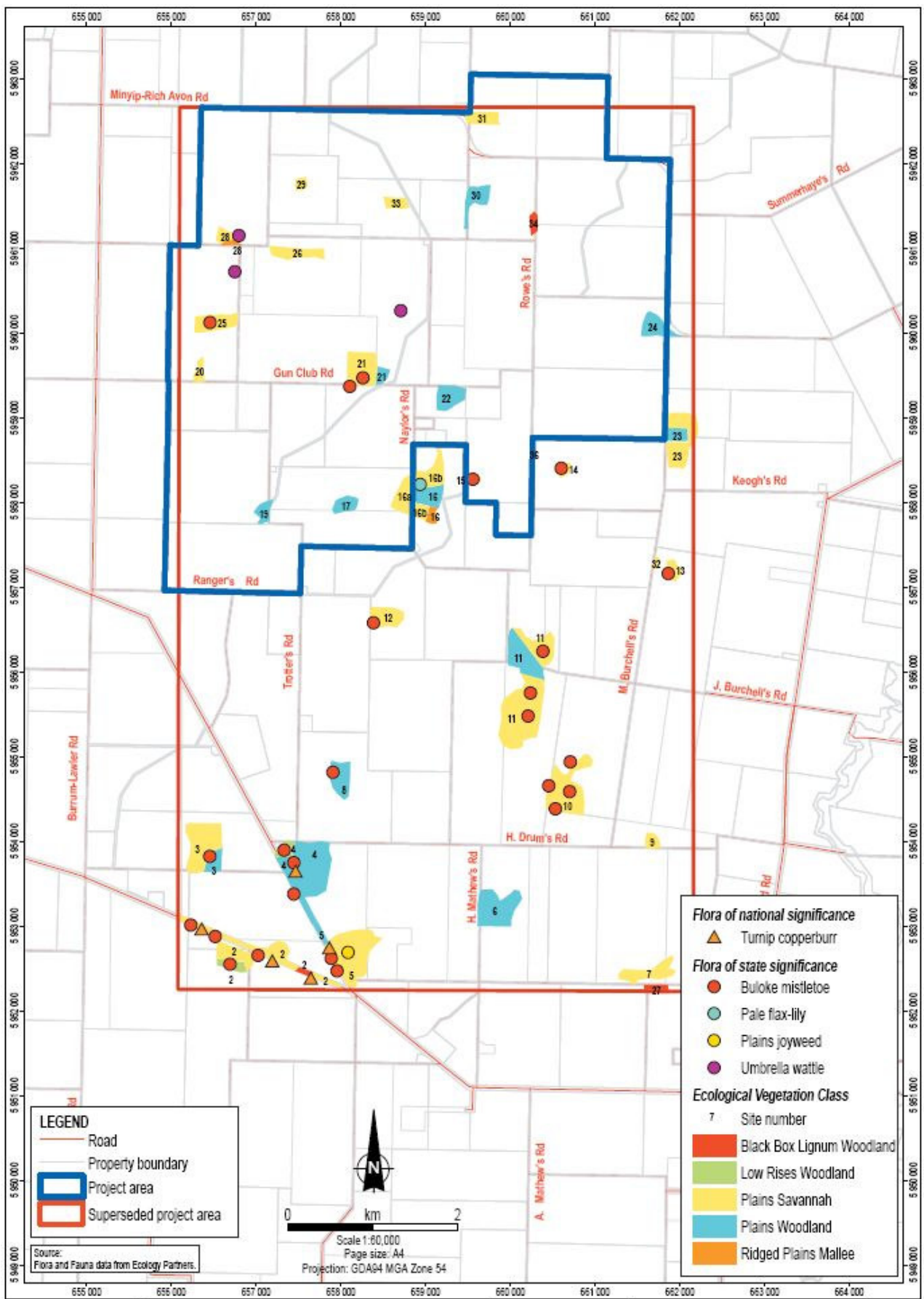


Figure 5. Recorded Flora & Native Vegetation in the Project Area (Source: DMS EES, page 6-35)



The proponent's evidence to the Inquiry highlighted the reduction in the proposed mining footprint, in order to avoid clearing a large majority of the significant native vegetation in the south. It suggested that this should meet the avoid requirement under the NVMF three step approach. Further to this, the proponent is recommending additional strategies be investigated to further reduce direct impacts on native remnants, including micro-siting of mining equipment to avoid remnants within the proposed footprint, as well as retaining vegetation just within the edge of the mine footprint (e.g. site 20 in Figure 5).

The evidence also concluded that the residual impacts require a net gain of 20.32 hha to be generated, the protection of 3268 Large Old Trees and 76 Medium Old Trees, and recruitment of 17,320 new trees within the Wimmera bioregion (using Plains Woodland and/or Plains Savannah). The net gain requirements under the NVMF were broken down into 3.33 hha of gains via revegetation works, 5.28 hha from rehabilitation works and 11.4 hha from management of retained remnants, so 20.01 hha are able to be provided on-site. The residual requirement is 0.31 hha, which needs to be provided off-site. DSE's submission accepted the proponent's application of the temporary loss provisions of the NVMF, which allows less demanding offsets for projects such as mining where vegetation loss can be considered temporary if the rehabilitation occurs within a reasonable timeframe.

Whilst DSE's submission largely accepted the proponent's net gain assessment, it also identified some concerns with the proposed native vegetation off-setting, as well as some inconsistencies associated with requirements for clearing higher conservation significance EVCs. DMS responded to the majority of these issues at the hearing, including by confirming that further detailed vegetation mapping will occur as part of the final mine plan, and that it will collaborate with DSE to identify more effective offsets (e.g. habitat linkages) as well as legally enforceable offset arrangements.

The proponent has not yet provided a detailed response to NVMF requirements regarding the clearance of very high conservation significance EVCs, for which Ministerial exemption/approval will be required. However, the Inquiry did make some judgements regarding this, taking into account matters identified in NVMF Guidelines: i.e. the scale/proportion of the vegetation to be removed on the property, the economic significance of the Project for the state, and whether or not remnants to be cleared are small and have low prospects of surviving. This Assessment will inform the decision of the Minister for Environment and Climate Change under the NVMF, to permit the clearing of very high conservation significance EVCs.

Having regard to these matters, the Inquiry concluded that the removal of both the very high and high conservation significance EVCs was justified, due to:

- The economic significance of the Project for the region and state.
- The reduction of the proposed mine footprint and significant extent of the native vegetation to be retained.
- The possibility of retaining further remnants within and along the perimeters of the mine.
- The provision of suitable offsets (although yet to be finalised) can be achieved.

The Inquiry was also satisfied that the overall 'avoid, minimise and off-set' requirements of the NVMF have been adhered to by the proponent, primarily for the reasons set out above. Given the proponent is yet to prepare their detailed offset strategy or overarching Environmental Management Plan (EMP), the Inquiry acknowledged the additional opportunities they have to avoid and minimise native vegetation clearance. A detailed Vegetation Management Plan that explores these further opportunities should be prepared and negotiated between the proponent, DSE, DPI and the Catchment Management Authority (CMA).

The potential impacts on native vegetation have been minimised and are acceptable in the context of the policy framework. In particular the avoidance of significant EVCs and ability to suitably provide for required off-sets (mostly on-site) enables the Project to meet the requirements of the NVMF. In addition, the economic significance of the Project together with the small extent of very high conservation significance EVCs to be impacted should provide a sufficient basis for their clearance to be permitted under the NVMF.

## **Flora**

The EES ecological investigations (Supporting Study 3) included flora surveys of the overall project area (six days between 30 November and 12 December 2005) in addition to a preliminary ecological survey (18 to 19 September 2005). A total of 145 taxa of plants were recorded (97 indigenous and 48 introduced) in the study area.

The DSE and Commonwealth databases were also examined for floral species of conservation significance that have been recorded or may potentially occur within 10 km of the project area. This search identified eight species of National and State conservation significance. However, only one floral species of National significance was recorded in the study area: Turnip Copperbur (*Sclerolaena napiformis*), which is listed as endangered under the EPBC Act. Four species listed on DSE's *Advisory List of Rare or Threatened Plants in Victoria* were recorded: Umbrella Mulga, Plains Joyweed, Buloke Mistletoe, Pale Flax-lily. Twenty three flora species of regional conservation significance were also identified. Buloke is also listed under the FFG Act and was scattered throughout most remnants of native vegetation in the project area.

Whilst the endangered Turnip Copperbur was located in large numbers in southern section of the study area (one of the largest known populations), it was not recorded in the area now proposed to be the mine footprint. The two other EPBC Act listed species identified in the database search were not detected in the project area – i.e. Greencomb Spider-orchid (*Caladenia tensa*) and Slender Darling-pea (*Swainsona murrayana*). These were considered unlikely to be present in the project area. However, Supporting Study 3 does recommend that some additional surveys in native remnants within the final mine footprint may be prudent as part of the final detailed design and work planning.

DSE's submission considers there is no significant risk to threatened floral taxa from the construction and operation of the mine, consistent with the findings of the EES investigations. The Inquiry also accords with this view and believes that relevant monitoring and mitigation measures identified by the proponent's expert are suitable to ensure that no significant effects on protected flora should occur.

From the EES survey results it is clear that the majority of the significant species of flora were recorded in Sites 2, 4 and 5 in the south-west corner of the original project area as well as Site 16b. These sites are generally considered to be of National conservation significance, but are now outside of the proposed mine footprint. However, monitoring of significant flora species (prior to, during, and after mining) is still recommended to ensure these species are not significantly impacted.

## Fauna

The overall habitat value of the vegetation within the study area range from low (cropped and pasture areas) to high (remnant woodlands, irrigation channels), supporting a range of native fauna including several woodland dependent birds, and ground dwelling species. These habitats included modified woodland remnants, tree hollows, waterbodies/channels and exotic grasses/crops.

The EES investigations (Supporting Study 3) included fauna surveys between 6 and 9 December 2005 of the entire project area, as well as the preliminary ecological survey in mid September 2005. A total of 94 species of terrestrial fauna were detected in the study area, including 13 mammals (9 indigenous and 4 introduced) 69 avifauna (63 indigenous and 6 introduced), 6 reptiles (native), 5 frogs (native), and one fish.

One EPBC Act listed faunal species, Growling Grass Frog (*Litoria raniformis*), was recorded in the study area during ecological investigations, and a further three (Plains-wanderer - *Pedionomus torquatus*; Swift Parrot - *Lathamus discolor*; and Lewin's Rail - *Rallus pectoralis clelandi*) have previously been recorded in the local area, according to the Atlas of Victorian Wildlife (AVW). There is also the possibility that a small number of other Nationally significant species not recorded may occur within the area on very rare occasions. No suitable core habitat for any significant faunal species was identified within the reduced project area through the EES investigations, although there is the possibility of occasional use of this area by Swift Parrot, Plains-wanderer and Painted Snipe (i.e. only likely during dispersal between optimal habitats).

Three FFG listed State significant fauna (Bush Stone-curlew - *Burhinus magnirostris*; Diamond Firetail - *Stagonopleura guttata*; Hooded Robin - *Melanodryas cucullata*) were recorded during the EES investigations. Bush Stone-curlew was also previously recorded adjacent to the site. Twelve other State significant species were identified as potentially relevant in the AVW, although the habitats for the majority of these species are not present within the project area. Eleven regionally significant fauna (one mammal, one reptile, nine birds) were recorded during the survey.

The project area is also within the geographic area of the threatened Victorian Temperate Woodland Bird Community (listed under the FFG Act) and supports suitable habitat and an assemblage of birds that defines this community. Four

woodland dependent birds listed in this threatened community were recorded during the surveys of the project area: Hooded Robin, Brown Treecreeper, Bush Stone-curlew and Diamond Firetail.

The EES ecological investigations recorded a number of Hooded Robins in remnant woodland habitat (i.e. sites 4, 5, 10, 16b and 21) across the study area and it has been previously recorded 38 times in the local area. Indeed this species is expected to be resident and/or utilise the larger patches of remnant woodland in the project area, although these sites are mostly in the southern half and none are proposed to be cleared for the proposed mine footprint - refer to Figures 4 and 5. Therefore the EES predicts very little impact on this species.

The proponent's ecological surveys recorded the majority of the other State significant faunal species in Sites 2, 4 and 5 in the south-west corner of the original project area. These significant areas are now outside of the proposed mine footprint that was reduced to avoid the key ecologically sensitive areas. Further to this, monitoring for these significant fauna (pre, post and during mining) is still advised in order to avoid or minimise impact on these significant species. Both the proponent's evidence and the Inquiry concluded that there are not any significant risks to protected threatened fauna species due to the Project. DSE also supported this conclusion.

## **EPBC Act Matters**

The relevant controlling provisions under the EPBC Act are Sections 18 and 18A (Listed threatened species and communities). The Project is a 'controlled action' (EPBC 2005/2372) under this Act because it has the potential to cause significant impact on listed species and communities, particularly the:

- 'Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions' (endangered community);
- Turnip Copperbur (endangered flora); and
- Growling Grass Frog (vulnerable fauna).

The EES notes other relevant listed threatened fauna were previously recorded in the region or for which habitat is predicted to occur within 10 km of the site: Plains-wanderer, Swift Parrot and Lewin's Rail. Supporting Study 3 also notes the possibility of the Swift Parrot occasionally flying over the area, as well as it, Lewin's Rail and the Painted Snipe possibly residing very occasionally in the project area. There are local records of the occurrence of the Plains-wanderer within a few kilometres of the project area in its preferred native grasslands or woodlands with open understorey. The EES therefore included comparisons between these recorded habitats and similar patches of remnant woodland in the project area, which indicated that the species may very occasionally utilise this vegetation. However, there is no core habitat within the reduced mine footprint for this or any of the other above mentioned species and therefore the EES predicts no likely impacts for them.

### *Turnip Copperburr*

A very significant population of the Turnip Copperburr was located during the EES surveys, in the very southern section of the superseded project area (refer to Figure 5). The proposed mine footprint now avoids any potential impacts on this species (i.e. given the mine is only in the northern section of the original project area). The EES identified two other potentially relevant nationally listed flora species based on the database searches: Greencomb Spider-orchid (*Caladenia tensa*) and Slender Darling-pea (*Swainsona murrayana*). However, these species were not recorded in the ecological surveys and given the vegetation in the project area it was concluded that their occurrence within the footprint is very unlikely. Although, Supporting Study 3 does recommend that some additional surveys in native remnants within the final mine footprint may be prudent as part of the final detailed design and work planning.

### *Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions*

The EPBC Act listed endangered community "Buloke Woodlands" includes all sites that could have Buloke present, including the Plains Savannah, Plains Woodland and Low Rises Woodland EVCs in the proposed mine footprint. The EES predicts that approximately 13.72 hha (41.93 ha) of a total of 39.85 hha (98.05 ha) of these EVCs in the original project area will be impacted by the project. Therefore, it will cause a reduction in the extent of this endangered community of approximately 41.93 ha, at the very least for the duration of the Project. In order to reduce the impact on this endangered community 26.73 hha of these EVCs will be retained from the original project area, as offsets protected in perpetuity - i.e. more than the 18.37 hha of offsets required for these EVCs under the NVMF.



The predicted impacts are not likely to reduce the overall extent of this ecological community, cause a loss that is critical to its survival or cause a substantial reduction in the quality and integrity of an occurrence of this community.

### *Growling Grass Frog*

The EES suggests the area may support a population of the Growling Grass Frog, as they have been recorded in local irrigation channels and farm dams. These habitats are likely to support a source population for breeding and dispersal of this species. However, within the proposed mine footprint the species was only recorded in a farm dam at site 19.

Where channels and farm dams are directly or indirectly impacted by the proposed mine footprint, there is potential for impacts on this species. However, the EES highlights the context of the future decommissioning of water supply channels in the project area as part of the Wimmera Mallee Pipeline Project. It also proposes three options for minimising impact on this species in the event that these channels are not decommissioned prior to the mining proceeding:

- A detailed species conservation management plan - i.e. covering the salvage, translocation and monitoring of the species.
- Conservation of other local sites that support Growling Grass Frog populations.
- Contribution to the conservation actions outlined in the Draft FFG Action Statement for this species.

It is predicted that residual cumulative impacts on the local population of this species will result from the Wimmera Mallee Pipeline Project (WMPP) and/or the mine, although the proponent considers this should be minimal if successful implementation of management options occurs via a species conservation management plan.

### *Conclusion on EPBC Act Matters*

Both the EES and the Inquiry conclude that there would be no significant impact on any listed nationally significant threatened species or communities, provided that the relevant offsets and mitigation measures identified in the EES ecological reports and expert witness statement are implemented.

While the Project should not affect the conservation status or have an effect of significance on any EPBC Act listed species or communities, the potential impact on Growling Grass Frog will need further attention through both this Project and any related decommissioning of channels in the mine footprint during the Wimmera Mallee Pipeline Project. The preparation of a detailed conservation management plan for this species should provide a sufficient means for minimising and addressing residual impacts.

## **Water Supply Pipeline and Road Transport Routes**

As noted by the Inquiry, a system of ponds, pumps and pipelines is likely to be required to deliver water to the mine site. The establishment and operation of such infrastructure does have the potential to impact on native vegetation and species of flora and fauna. However, in the absence of details of the final water supply option and the associated infrastructure design and pipeline routes, it is not possible to quantify the extent of any impacts at this stage. The Inquiry highlights that the development and use of such infrastructure will require planning permits and as such applications and supporting information will be needed to clarify any residual impacts and mitigation required, such as under the NVMF.

The Inquiry considered that strict application of the principles of NVMF, including the avoid, minimise and offset requirements, will need to be demonstrated to the satisfaction of DSE and local planning authority before any permit for works can be obtained.

## **Conclusions**

Having regard to the EES and Inquiry's analysis and submissions, it is my assessment that:

- The proposed mine footprint has been reduced and configured to both significantly avoid clearing some significant native vegetation (e.g. sites 2, 4, 5, 11, 16 and 21) and minimise potential effects on other EVCs: only 14.82 hha of a possible 41.55 hha of EVCs would be cleared as a result of the proposed mine footprint.

- The loss of small areas of very high conservation significance EVCs should be acceptable, having regard to the economic importance of the proposal, the extent of the native vegetation to be retained, the difficulty of further avoidance, and the opportunities to provide suitable offsets.
- The Project would not affect the conservation status of floral and faunal species or communities that are listed under either the FFG Act or EPBC Act, and is unlikely to have any effect of significance on relevant listed flora and fauna protected under these Acts, particularly with the identified mitigation measures being adopted.
- There may be some residual effects for the local population of Growling Grass Frog, although this could result from both the mine and the WMPP. However, these effects should be minimal if successful implementation of management options occurs.

Further, it is my assessment that:

- Any residual clearing of native vegetation be further minimised and managed in accordance with the NVMF to the satisfaction of DSE, particularly through the implementation of a detailed Native Vegetation Management Plan that is prepared in consultation with DSE. This plan should be included as a condition of the Work Plan.
- Further monitoring for significant listed fauna and flora species (as identified in Specialist Study 3) before, during and after the mining project be conducted in order to avoid or minimise impacts on any listed species.
- A detailed conservation management plan for the local Growling Grass Frog population be prepared, to address and minimise combined residual effects for this species from the Project and the WMPP.

### 3.5 Water Resources and Aquatic Environments

**Objective 4.** *To minimise to the extent practicable, including through avoidance, adverse effects on the values and resources of both surface water and groundwater environments, including on protected beneficial uses.*

#### Statutory Context

The primary statutory and policy context for the protection and management of water resources and associated aquatic environments is set out in the following legislation and statutory policy:

- *Water Act 1989.*
- *Environment Protection Act 1970.*
- State Environment Protection Policies (SEPP) (Waters of Victoria) and (Groundwaters of Victoria).

The relevant factors under the *Water Act 1989* that establish the acceptable allocation and use of water resources include: existing water availability, the requirements of existing and competing users, government policies, and the protection of the environment. Indeed the Act's primary purposes include ensuring that water resources are conserved and sustainably used and that values of waterway environments are protected and enhanced.

SEPPs made under the *Environment Protection Act 1970* provide for the maintenance of environmental quality in water environments (surface and groundwater), sufficient to protect existing and anticipated beneficial uses. Both the SEPP (Groundwaters of Victoria) and the SEPP (Waters of Victoria) are relevant to the assessment of impacts for this Project. Beneficial uses of groundwater include the maintenance of ecosystems, as well as water supply and industrial water use depending on the segment, which is defined by the salinity of groundwater (i.e. the total dissolved solids (TDS)).

The EES identified the local and regional groundwater to be within segment D of the SEPP (Groundwaters of Victoria), as the TDS ranges from 14,000 mg/L to 35,000 mg/L. Therefore the protected beneficial uses of groundwater at the site are: maintenance of ecosystems; industrial water use; and buildings and structures.

## Key Issues

The key issues for the Project that need to be considered in the context of applicable policy and legislation are:

- Impacts on surface waters at or near the proposed mine that could result from contamination of water (e.g. sediment, chemicals and salt) leaving the mine site and causing impacts to the local groundwater table, surface drainage, and overland flow regime, including on adjacent land.
- The potential impacts of groundwater extraction for mine dewatering on the environmental quality of surface water environments and the quality and quantity of groundwaters, both near the site and regionally.
- The potential reduction or interruption of water supply to other current water users.
- Whether or not the long-term extraction and use of water resources (i.e. from the Avon Deep Lead) for mining is environmentally sustainable.

## Groundwater

The proposed mineral sands mining has the potential to cause groundwater related impacts at and near the site, including on soil and groundwater quality, altered watertable levels, and the creation of a perched watertable. These impacts could be due to dewatering at the mine, importing saline processing water onto the site and/or the proposed placement of slimes or saline overburden back into the pit. The EES included hydrogeological investigations and modelling (Supporting Study 10) to predict potential impacts and propose appropriate mitigation measures.

The depth of mining excavation is expected to average 20.6 m, due to the average thicknesses of the ore-body (9.8 m) and overburden (10.8 m). Local groundwater data suggests the top of the ore will be approximately 3.0 m above the watertable and the base around 6.8 m below, since the groundwater table was encountered at depths ranging from 7m to 18m below the ground's surface. The proposed dry mining method is to use trucks and excavators and consequently mine dewatering would be required. It is proposed to dewater only two operating cells at any one time.

Numerical modelling in Supporting Study 10 predicts the dewatering would drawdown the local groundwater-table aquifer, although this is likely to be restricted to within 2.5 km of the mining area due to low permeability of this aquifer. The cone of depression is not predicted to impact on any surface water environments, with the closest being the lower Richardson River four km to the southeast and Dunmunkle Creek three km to the northwest. No existing groundwater users are predicted to be impacted by the aquifer drawdown, as it will not reach any existing bores. Twenty-four stock and/or domestic bores exist in the wider region, with the closest being approximately 20 km away. Two irrigation bores are located approximately 40 km from the project area.

The mining by-products would be deposited back into each mining cell (125m x 500m) in the order of oversized sands, tailings, fine tailing (i.e. slimes), saline overburden and non-saline overburden (refer to Figure 2). The slimes will be allowed to dry for 6 months prior to replacement of the overburden. The EES describes the low potential for both seepage of water from the slimes layer to the watertable during this consolidation, as well as development of a perched watertable (possibly into the root zone) resulting from reduced vertical movement of groundwater at the slimes layer.

Any excess water to be introduced to the soil via the replaced mining by-products is predicted to be bound within the slimes layer (i.e. post-drying and consolidation). The EES includes calculations of the average depth to the top of the slimes layer, which should be marginally deeper than the top of the original pre-mining ore. Further, any additional groundwater recharge that may occur from the slimes is also not expected to cause any elevation in groundwater levels; the slimes layer will be relatively impermeable and dewatering should mitigate any unpredicted potential increases to local recharge within the medium-term. The slimes will also be placed above the watertable wherever possible, to prevent regional groundwater flows from being affected by their low permeability.

The predicted increased salt load introduced at the site through process water would be diluted but only marginally lower than the local groundwater salinity. The EES predicts that this additional salt load is likely to be permanently bound in the slimes layer, which is to be mostly above the watertable and well below the ground surface and root-zone. Numerical modelling of the water balance predicted that seepage from the drying slimes layers to the groundwater will occur at a maximum rate of 0.6ML/day, throughout the life of the mine. It is therefore predicted that this salinity poses little risk to the soil or groundwater resources of the area.

The EES predicts that it is very unlikely a perched watertable will be created, as the rehabilitated overburden is expected to have similar (i.e. low) permeability to the original material, which will then overlie the slimes layer (also low permeability). The groundwater recharge in the area is also very low, due to the high evaporation to rainfall ratio. However, a worst-case scenario was also investigated; where the slimes layer would restrict all vertical groundwater movement. If this occurred, a perched watertable could form but it is unlikely to be more than 1 m high. Given the slimes layer would be at a minimum depth of 7.6 m from the ground surface, a perched water table of 1 m would not have any detrimental impacts.

As the Inquiry noted, only one submitter actually questioned the extent of impact on groundwater levels during the mining, although another submitter did consider that further investigations were necessary. However, the Inquiry found no basis to question the EES modelling methodology or the predictions and essentially accepted the predicted impacts on watertable levels during mining, as well as the negligible adverse impacts on the local surface and groundwater resources and users.

The Inquiry did highlight concerns expressed by numerous submitters regarding the proposed use and fate of large volumes of imported water and salt to the site, including the associated uncertainties. The response of the proponent to these issues is that the majority of water and salt imported to the site will be bound in the backfilled slimes layer, which is located so as to have little or no direct impact on the root zone or ground surface. They also cite the predicted negligible vertical migration of water from slimes layer to the groundwater.

The Inquiry largely accepted the proponent's reasoning, especially in the context of the proposed criteria and methods to ensure the slimes layer remains well below the root zone and at least 7 m below the ground surface. The Inquiry also considered there to be no likely potential adverse impacts from any perched watertable (which is not predicted to occur anyway), particularly in light of the bottom of the root zone being approximately 3 to 4m above the slimes layer. This does however rely on the effective reproduction of existing conditions, which while considered feasible is still uncertain. The Inquiry did not consider these uncertainties sufficient to conclude that the risk is too high, but at the same time they are sufficient to elevate the importance of effective monitoring and contingency plans.

Specific measures to avoid and mitigate any potential groundwater impacts are proposed in the EES, including:

- Conducting trials during the pre-production phase to confirm the predicted fate of saline water within the slimes.
- Monitoring of levels and quality of groundwater before, during and after mining, both within and outside the site.
- Maintaining the top of the backfilled slimes layer at a minimum depth of 7m below ground.
- Compacting overburden in the pit to re-establish the low vertical-permeability of the pre-mining soil profile.
- Installing observation bores to enable detection of the accumulation of perched groundwater above the slimes layer.

The Inquiry was not certain about the potential for adverse impact on the watertable aquifer that may result from any chemical reactions between the constituents of the water migrating from the slimes to the groundwater and acknowledges that further data is needed on the quality of the water to be used at the mine in particular. The Inquiry also considered that the addition of a flocculant (at the predicted concentration) will have no impact on the groundwater.

## **Surface Water**

While there are no defined permanent or ephemeral water bodies in the site, there are two main domestic and stock supply channels. As noted previously, the closest waterways are the Richardson River (around 4 km to the east) and Dunmunkle Creek (around 3 km to the west) and the closest major water body is Lake Buloke approximately 25 km north-east, which the Richardson River drains into.

The EES describes the proposed approach to surface water management as being focused on sediment control, flood protection of the mine and maintaining and finally reinstating the original surface drainage characteristics of the site. All rainfall runoff from the pit or constructed surfaces (roads, stockpiles, tailing storage and plant area) is to be treated as contaminated water; this water would be added to the process water system or treated to achieve a standard suitable

for dust suppression on the project site. Uncontaminated runoff is to be diverted around the mine by both the existing drainage and or purpose-built diversions, designed to cater for a 1-in-100-year ARI event.

The proposed surface water management plan is to be based on a detailed survey of the project area, such that it can be designed to maintain existing natural drainage characteristics and therefore minimise any flood effects at the site and downstream. A pertinent aspect of DMS's rehabilitation plans for the site includes the main drainage line being rehabilitated to the Black Box Swamp EVC, both to reinstate this endangered EVC and acting as a flood retention area.

The Inquiry noted the broad agreement regarding the acceptability of the proposed surface water management measures, which will significantly limit impacts on runoff and any potential receiving surface water environments. The Inquiry also agrees with the view of the EPA: that sediment management should be refined to be in accordance with the EPA Publication 480 *Environmental Guidelines for Major Construction Sites*.

## **Water Supply**

The EES predicts that the mine would require in the order of 87 litres of water per second, which equates to 2.75 GL/year over the life of the mine, with a maximum annual requirement of approximately 4 GL/year. The EES and Supporting Study 11 (Water Supply Options) provide a preliminary assessment of two options for the supply of water to the mine for processing the ore:

- The Avon Deep Lead, a saline confined aquifer 25 km east of the proposed mine site.
- A GMMW supply of 'growth water' that may become available for industrial and economic uses due to the predicted water savings from the Wimmera Mallee Pipeline.

Both sources of water would require delivery through a pipeline and associated infrastructure, which would need to be implemented as part of this Project. The proponent acknowledges that both options would be subject to an application and approval under the *Water Act 1989*, as well as planning permits for the development and use of associated infrastructure to deliver the water.

As the EES predicts, both options have the potential to impact on surface water environments. The potential GMMW supply could affect the availability of non-saline water for other legitimate uses and/or the maintenance of environmental flows for river and lake environments. Whereas prolonged groundwater extraction from the Avon Deep Lead has the potential to impact on surface waters by reducing groundwater discharges to existing surface water environments, as well as possibly reducing the availability of groundwater to others.

### **Avon Deep Lead**

The proposed extraction of large volumes of water from the Avon Deep Lead would reduce the water level in this confined aquifer, such that the cone of depression or drawdown would extend many kilometres south of Cope Cope. Given hydrologic linkages with surface water environments such as Lake Buloke, it is also likely that the volume of water flowing northwards into Lake Buloke may be significantly reduced. The EES investigations also indicate that a reduction in groundwater aquifer pressure will be observed regionally, in the Renmark Group and possibly become apparent in the Parilla Sand aquifer. As noted in Supporting Study 11, pump testing together with a number of monitoring bores will be essential to gaining a better understanding of how the receiving and interconnected water environments (ground and surface) would be affected by a prolonged extraction of up to 4 GL/year.

The EES, submitters and the Inquiry all note the significant uncertainties regarding the nature and extent of environmental risks for this option, which can only be resolved by pump testing of the aquifer. Indeed confirmation of the likely sustainable yield and feasibility of this water source will require pump testing to occur. This option would also require an assessment process for a Groundwater Extraction Licence under the *Water Act 1989*, which would ultimately determine whether the potential environmental impacts and use of the water are acceptable or not. The assessment of an application under the *Water Act 1989* would include consideration of a number of matters, including the potential for any adverse impacts on the groundwater resources, and/or receiving/dependent surface water environments.

One submitter suggests that prolonged extraction of groundwater from the Avon Deep Lead would result in a significant reduction in Avon River and Sandy Creek streamflows, which the Inquiry found to be implausible. However the Inquiry

did consider there to be likely changes to the flow into and possibly impacts on Lake Buloke, and potentially other lakes as well. The extent and potential significance of any such impacts have not been quantified by proponent. Indeed the Inquiry determined that the absence of this information prevented it from making final recommendations on the overall acceptability, or otherwise, of the impacts of the Avon Deep Lead option. Sufficiently precise predictions and quantification of these potential will first require the establishment of the sustainable yield and the quantity of water that can be applied for, as well as a detailed understanding of the local hydrogeology and interconnectivity with other water resources and receiving environments.

GMMW provided the Inquiry with some Ministerial Guidelines for assessing applications to extract groundwater, which indicate that an application from DMS for the Avon Deep Lead extraction licence would need to be supported by a 'Groundwater Assessment Report', which requires sufficiently detailed assessments of potential impacts on both existing and future groundwater users and the environment. Further to this, any licence that may be granted could include conditions requiring adequate monitoring of impacts and predicted sustainability of the extraction, to ultimately protect both groundwater and surface water environments and uses that may be adversely affected.

In light of the information provided by the proponent and GMMW at the hearing, the Inquiry was satisfied that a Groundwater Extraction Licence would not be granted without adequate assessment and acceptability of potential environmental impacts. The Inquiry found "no fundamental barriers" to the development of an application for and possible approval of a water supply from the Avon Deep Lead.

A number of submitters as well as the proponent's expert witness on water supply expressed the view that saline water from the Avon Deep Lead is likely to be the most environmentally sustainable option for water supply, a view the Inquiry did not disagree with. The Inquiry however highlighted that a water supply from the Avon Deep Lead is yet to be proven as a viable alternative and as such, further testing is required to establish the sustainable quantity of water that be supplied from the lead. Therefore the Inquiry was essentially presented with two alternatives yet to be proven as viable and consequently was not in a position to conclude which of the water supply options should be adopted or possibly to ruled out.

### **GMMW Water Supply**

The proponent and GMMW confirmed that 20 GL/year is likely to be available to potential users due to the predicted water savings from the Wimmera Mallee Pipeline. This predicted water saving is to be made available for consumption by new enterprises that will directly contribute to the region's economic growth. The proponent could be considered to satisfy this criterion and thus could be a potential user of this 'growth water'. This water will be allocated to consumptive uses regardless of whether any amount would be made available (upon application) to the proponent.

Some submissions challenged both the estimated water savings from the Wimmera Mallee Pipeline and previous decisions regarding the nominal allocation of those savings. No contrary evidence was provided to or requested by the Inquiry, particularly as this matter was largely outside its Terms of Reference. The Inquiry did not then agree or disagree with either the estimated savings or the allocation of those savings. Instead, for the purposes of assessing the DMS Project, it relied on the views of relevant authorities.

According to GMMW 80 GL/year of these savings have been allocated to the environment and therefore even if hypothetically this was increased to 84 GL/year, the Inquiry considered it highly unlikely that it would result in a meaningful difference to the environment.

The Inquiry's conclusions on the delivery of water from GMMW supply system are very similar to those for the Avon Deep Lead option, in that there seem to be no 'fundamental barriers' to the development and possible approval of an appropriate proposal if this water was to become available.

The infrastructure required for both supply options is similar in concept and character. The Inquiry concluded that well proven methodologies and technologies exist to reduce the environmental risks to acceptable levels, and that the planning permit application and assessment process is more than adequate to address these residual risks of the infrastructure required for both water supply options.

## Conclusions

Having regard to the EES and Inquiry's analysis, it is my assessment that:

- The proposed dewatering and mining methods will have low impacts on the local groundwater and negligible impacts on surface waters, such that protected beneficial uses are maintained in the long-term.
- Contaminants and water from slimes are unlikely to impact on the local groundwater or the reinstated root zone, and in the event that contaminants do escape from the slimes, they would move slowly through the soil and attenuate to minimal levels, and should therefore not impact on groundwater quality.
- There is low potential for a perched watertable and in the event it occurs it is not likely to have any impact.
- The potential impacts on the quality and quantity of runoff from the site and any receiving water environments are likely to be negligible and therefore not compromise any protected beneficial uses.
- The Avon Deep Lead water supply option is yet to be established as feasible or environmentally sustainable.
- The Avon Deep Lead water supply option has significant uncertainties regarding the nature and extent of any environmental risks. Therefore, the acceptability of potential environmental effects of prolonged extraction from this aquifer on surface water environments (e.g. Lake Buloke) and other regional groundwater resources (e.g. the Renmark Group and Parilla Sand aquifer) are unable to be determined at this stage.
- I note that this latter water supply option does require detailed assessment under the *Water Act 1989* before a Groundwater Extraction Licence can be issued - i.e. to determine whether the potential environmental impacts and use of the water are acceptable or not.

Further to this, it is my assessment that:

- Sufficient uncertainties necessitate effective monitoring and contingency planning (as proposed by the Inquiry), regarding both the fate of water and contaminants within the slimes and the potential for a perched watertable above the slimes. The specific measures to avoid and mitigate any potential groundwater impacts proposed in the EES and Inquiry Report are therefore considered appropriate.
- Best practice surface water management (guided by EPA advice) needs to be implemented to ensure that potential impacts on the quality and drainage of runoff to receiving water environments are negligible.
- Prior to any licence being granted under the *Water Act 1989* for prolonged extraction of groundwater from the Avon Deep Lead:
  - A detailed 'Groundwater Assessment Report' be prepared, including assessments of potential environmental impacts, including on surface water environments and values, groundwater aquifers and existing and future users of water resources; and
  - Any licence that may be granted include conditions that require monitoring of both predicted impacts and the sustainability of groundwater extraction.

## 3.6 Cultural Heritage

**Objective 5.** *To minimise to the extent practicable, including through avoidance, adverse effects on both Aboriginal and non-Aboriginal cultural heritage values.*

### Statutory Context

The legislation that applies to the assessment of impacts on cultural heritage includes the following statutes:

- *Heritage Act 1995*
- *Aboriginal Heritage Act 2006*

The objectives of the *Aboriginal Heritage Act 2006* include: "(a) to recognise, protect and conserve Aboriginal cultural heritage in Victoria... ; and (d) to promote the management of Aboriginal cultural heritage as an integral part of land and natural resource management".

New procedures for protecting and managing Aboriginal cultural heritage in Victoria commenced under the latter Act in mid 2007. These procedures require cultural heritage issues to be considered early in the development planning process, before the approval of a use or development, through the preparation of CHMP. The new Act recognises Aboriginal people as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage. Aboriginal cultural heritage can include the places, objects, artefacts, beliefs and behaviours that are valued by indigenous Victorians.

Under the transitional provisions of the Act, a proponent must prepare a CHMP where an EES is or has been required and works have not commenced. A CHMP is based on an assessment of a Project's impacts on Aboriginal cultural heritage values and outlines management recommendations, including contingency plans.

The main purpose of the *Heritage Act* 1995 is "to provide for the protection and conservation of places and objects of cultural heritage significance...". This Act provides the statutory context for the assessment of impacts on non-Aboriginal post settlement heritage.

The most pertinent objective of planning in Victoria, under Section 4(1) of the P&E Act, is: "to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest or otherwise of special cultural value". Clause 15.11 'Heritage' of the SPPF addresses both Aboriginal and non- Aboriginal cultural heritage, directing that planning authorities consult with local Aboriginal communities.

## Key Issues

The two key issues to be considered in this context are:

- Whether there is significant loss of or impacts on Aboriginal cultural heritage sites and values.
- Whether there is significant loss of or impacts on significant non-Aboriginal cultural heritage sites and values.

## Aboriginal Cultural Heritage

The EES Supporting Study 2 (Cultural Heritage Assessment) detailed the predictions and conclusions for impacts on cultural heritage (both Aboriginal and non-Aboriginal). The Aboriginal cultural heritage investigations included field surveys, undertaken across the original project area between 3 and 7 October 2006, covering approximately 21 percent of the total area. Ten percent ground coverage is generally considered to be an acceptable level.

A total of 52 Aboriginal cultural heritage sites were recorded in the original project area, comprising 37 artefact scatters and 15 scar trees. Refer to **Figure 6**. Consultation with the Baringi Gadjin Land Council established that all of these sites are of high significance to the Aboriginal community. However, the vast majority of the sites have low to moderate scientific significance.

Due to the reduced project area, there are some sites that will not be disturbed (refer to **Figure 6**). The mine footprint has also been tailored to avoid certain patches of remnant vegetation that include Aboriginal cultural heritage sites. As the mine activity area is directly associated with the location and extent of the orebody, further opportunities to avoid impacts are limited.

The proponent has indicated that further fieldwork will be undertaken and a CHMP will be prepared in accordance with the *Aboriginal Heritage Act 2006*, which will involve consultation with the relevant Registered Aboriginal Parties (RAP) or relevant Aboriginal stakeholders if no RAP has been appointed for the area. This further fieldwork will include areas not previously covered in the baseline surveys and include a range of subsurface testing where sites have been previously identified.



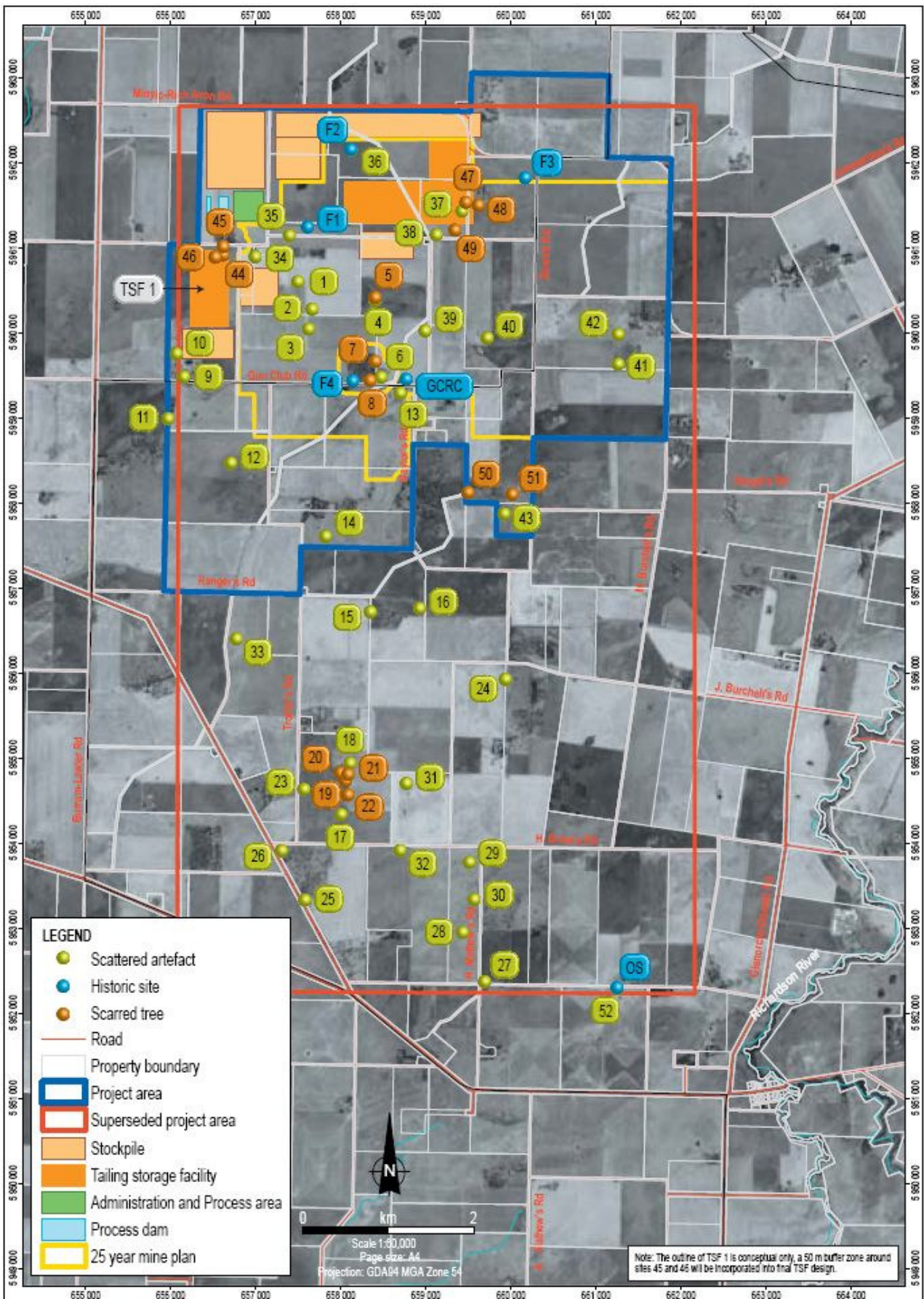


Figure 6. Recorded Heritage Sites in the Project Area (Source: DMS EES, page 6-119)

The EES predicts the Project will result in the disturbance of 18 Aboriginal cultural heritage sites. Whilst there is always the potential for unidentified sites of cultural heritage to be encountered during earthworks, all Aboriginal cultural heritage sites and artefacts (known and unknown) will be addressed in accordance with an approved CHMP, including the appropriate stakeholder consultation.

### **Non-Aboriginal Cultural Heritage**

EES field surveys were between 3 and 7 October 2006. Five non-Aboriginal cultural heritage sites were recorded. One of these sites, only F4 (rural shed) is of moderate historical and high scientific significance. The remaining sites are of low historical and moderate scientific significance.

As with Aboriginal cultural heritage, opportunities to avoid impacts on non-Aboriginal cultural heritage are limited. Two sites will not be disturbed (F4 and F3 – refer to Figure 6) due to reduced mine footprint. As all archaeological sites older than 50 years are protected under the *Heritage Act 1995*, any disturbance requires an application for 'consent to disturb' to be submitted to Heritage Victoria.

The Project will result in the disturbance of the three other non-Aboriginal cultural heritage sites. Heritage Victoria will need to be notified of any new non-Aboriginal cultural heritage sites encountered during the Project's earthmoving and advice will need to be sought on appropriate action.

### **Conclusions**

Having regard to the EES and Inquiry's analysis, it is my assessment that:

- Impacts on identified Aboriginal cultural heritage sites have been minimised and are acceptable, in the context of the requirement under the *Aboriginal Heritage Act 2006* for further investigation and mitigation in accordance with an approved CHMP.
- There will be no impacts on non-Aboriginal sites of cultural heritage significance.

## **3.7 Surrounding Land-uses and Site Rehabilitation**

*Objective 6. To minimise to the extent practicable, including through avoidance, adverse effects on surrounding land-uses during mining, and provide for effective rehabilitation of affected land so as to enable productive use in the long-term.*

### **Statutory Context**

This section focuses on the potential effects on the surrounding land-uses and activities, including the future use of the project area. These are broadly covered by an objective of the MRSD Act: "ensuring that mineral resources are developed in ways that minimise impacts on the environment... land which has been mined is rehabilitated, and just compensation is paid for the use of private land" (refer to sections 2(b)(i), (iii) and (iv) of the MRSD Act).

The MRSD Act specifically requires that a rehabilitation plan be prepared as part of the Work Plan and then be approved by DPI.

### **Key Issues**

The key issues to be considered in this context are:

- Whether surrounding land-uses and activities may be affected by some direct or indirect effects of the Project, such as a decrease in available agricultural land.
- The feasibility of rehabilitation of the land to the previous land-use (agriculture) or an acceptable variation from that, including managing risks such as soil cross-contamination.
- The opportunities to improve environmental conditions and values of the land through rehabilitation.

## Land-use

Currently the project site and immediately adjacent land is used for dryland agriculture. According to the EES cropping is the dominant use, with some sheep and cattle grazing. The crops include a broad range (e.g. wheat, barley, oats, rye, canola, field pea, chickpea and lentils), with cereal cropping being the major choice.

Six families operate farms, own or live on land within the 25 km<sup>2</sup> project area. Of the six residences within the project area, one is leased. There are also at least 13 additional residences within 2 km of the project area. The surrounding area also supports some light industry associated with the production and processing of crops and other farm products.

The temporary loss of the project area for agricultural uses will disrupt the local agricultural productivity and remove the resident farmers from this land, requiring some compensation to be paid under section 85 of the MRSD Act. As noted in the EES, compensation must be paid for any loss or damage associated with approved mining works on a mining licence. The EES also highlights that the proposed progressive rehabilitation of the mine will enable the area removed from agricultural production to be at a practicable minimum at any given time.

DMS proposes to minimise disruption to the local community by negotiating with the individual owners and occupiers of the local land, in order to determine the best outcomes for each of them. The proponent's strategy also includes relocating residents locally, only for the period that their property is occupied or affected by the mining purposes. The intention is to have land occupiers and owners impacted for as a limited a time as possible.

## Rehabilitation

EES Supporting Study 5 provides details of the proposed rehabilitation of the site, a primary objective of which is to restore soils to at least their current condition in terms of providing for viable agriculture or revegetation. The proposed rehabilitation also seeks to restore an 'approximation of the current landscape', with some consolidation of dunes and lunettes into fewer larger areas. The specific objectives of the proponent's rehabilitation strategy include:

- To re-establish some larger dunes and burying small sand dunes below subsoil, leaving a clay plain which is preferred by local farmers.
- To establishing several wetland areas for the Black Box Lignum Woodland EVC.
- To progressively decommission and rehabilitate the dedicated tailings storage facilities (TSFs), which will become a permanent features of the landscape (approximately 5 m above ground level), with native grass species on the steep outer banks.
- To sow crop or pasture as soon as possible to reactivate the biological processes in the soil.
- To source all seeds and cuttings from the project area or the immediate surroundings (i.e. within 10 km)

The EES highlights the importance of maintaining careful management of the topsoils and other layers in the soil profile if rehabilitation of agricultural land and native vegetation is to be successful, including that soil be removed when moist, that topsoil be stored on topsoil, subsoil on subsoil and overburden on overburden, with all stockpiles being surrounded by cut-off drains.

Some submitters, including local farmers, raised concerns regarding the difficulty of reinstating soils removed from the site, as well as the potential for soil higher in soluble salts, boron and sodicity to become mixed with good soil. The Inquiry did agree that the ability to effectively segregate these layers of soil is probably the most critical aspect of rehabilitation raised by submitters. However, the proponent's consultants did provide advice that such a system - based on soil sampling to avoid undesirable soil layers contaminating good soil layers - was very feasible.

DPI also raised several matters in relation to rehabilitation, including the rehabilitation of the TSFs which it believes DMS needs to further demonstrate for the Work Plan (i.e. that 1.2 m of capping is sufficient to avoid soil salinisation). DPI also identified the need for the required Work Plan to incorporate both a monitoring program with the purpose of confirming that soil salinisation is being prevented, as well as completion criteria that are developed to determine when rehabilitation has been achieved to a suitable standard. The inquiry concurred with the conclusions of DPI.

The EES does note that there will be an unavoidable increase in elevation of the area following rehabilitation. Provided there is effective compaction of the redeposited materials in the mine void, it is estimated that this will increase the elevation of site by 1 to 2 m. Given this increased elevation, the reshaping of the site's landform needs to be designed and executed to ensure that drainage characteristics are restored appropriately.

Though the EES included relatively detailed procedures for post-mining rehabilitation, the Inquiry was surprised that more specific evidence was not presented on the success (or otherwise) of recent rehabilitations carried out in the Wimmera and elsewhere. The Inquiry did however accept that the detailed evidence provided by the proponent forms a sound basis for successful rehabilitation. Further to this, the Inquiry noted that DPI will require the development of completion criteria to guide successful achievement of rehabilitation (for both agricultural land and native vegetation). The Inquiry also highlighted the importance of further work to expand the generalised rehabilitation criteria contained in proponent EES, including in relation to general native vegetation and specific EVCs.

## **Conclusions**

Having regard to the Inquiry's conclusions, it is my assessment that:

- Disruption to local agriculture, land-holders and residents will be minimised through the mitigation and negotiation proposed by the proponent (meeting requirements of the MRSD Act), including relocation of residents for necessary periods when their property's are due to be affected by the mining project.
- The approach to rehabilitation of the site proposed by DMS is generally sound and suitable for re-establishing productive agricultural land with some native vegetation and ecological values. However, refinement of the aspects identified by the Inquiry will need to occur in consultation with DPI, in particular:
  - the rehabilitation of the TSFs requires further assessment to determine the most appropriate depth of the cap; and
  - more specific rehabilitation or completion criteria need to be developed for both agricultural land and native vegetation land, in consultation with DPI and DSE respectively.

## **3.8 Public Health, Amenity and Safety**

*Objective 7. To minimise to the extent practicable, including through avoidance, adverse effects on residential amenity as well as risks to public safety and health during mine development and operation.*

### **Statutory Context**

Potential health, safety and amenity effects are inherent aspects of environmental effects to be considered as part of the assessment process under the *Environment Effects Act 1978*. One specific legislative basis for considering these type of effects of development is an the objective of the *Planning and Environment Act 1987*: "to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria"<sup>2</sup>.

The *Environment Protection Act 1970* provides a framework for the protection and maintenance of environmental quality sufficient to protect existing and anticipated beneficial uses of the environment, including ambient air. SEPP (Ambient Air Quality) and SEPP (Air Quality Management) provide for the protection of beneficial uses dependent on air quality, in particular public health.

The EPA also prepares policy guidance to aid the implementation of the Act and minimise impacts from noise:

- Interim Guidelines for Control of Noise from Industry in Country Victoria, EPA Publication N3/89 (1989).
- Noise Control Guidelines, EPA Publication TG302/92 (1992).

There is no subordinate legislation or SEPP for industrial noise in regional Victoria that specifies maximum allowable noise levels for new development, such as SEPP N-1 for metropolitan Melbourne. However, in 1989 the EPA published the Interim Guidelines for Control of Noise from Industry in Country Victoria N3/89 (N3/89), which provides

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<sup>2</sup> Under s.4(1)(c) of the P&E Act.



the guidance on what noise levels are acceptable for industry at sensitive receptors in regional Victoria. However, where background noise levels are comparable to those in metropolitan Melbourne, noise limits should be determined using SEPP N1.

The *Radiation Act 2005* provides a framework for the transporting, mining and processing of radioactive material. Under the Act's definition, the proposed HMC is "radioactive material" and therefore a Management Licence is likely to be required to process, mine and transport these materials to minimise risks to public safety.

## Key Issues

The key issues to be considered in this statutory context are:

- Impacts on the local community could arise from a reduction in air quality as well as noise generated from the construction and operation of the mine.
- Radiation hazards could be generated through mining and processing of the mineral sands and consequently pose safety risks.
- There could be landscape and visual impacts in the short and long term.
- The transport of the HMC and use of local roads by DMS could impact on the traffic and safety of local commuters.

## Air Quality

The mining project has the potential to effect air quality and its beneficial uses, including the most sensitive beneficial uses of: i) human health and well-being; and ii) life, health and well-being of other forms of life including animals and vegetation. This was assessed within EES Supporting Study 1 (Air Quality and Greenhouse Gases Assessment).

As described in the EES, the proposed mining involves moving large volumes of earth materials - e.g. topsoil, subsoil, overburden and ore - and the repeated movement of mining equipment and trucks at and adjacent to the mine pit. These activities generate dust particles, including very fine particles that can be harmful to human health (i.e. PM<sub>10</sub> and PM<sub>2.5</sub>). Dust also has the potential to impact on local crops (i.e. reduce photosynthesis), reduce local visibility and amenity, as well as potentially affect the quality of drinking water in local water-tanks.

Supporting Study 1 included Gaussian plume dispersion modelling (an EPA preferred method) to predict the changes in air quality, specifically PM<sub>10</sub> and PM<sub>2.5</sub>, nitrogen dioxide, carbon monoxide, PAHs and respirable crystalline silica. The modelling used the maximum envisaged rates of extraction to provide a degree of conservatism. The mining operations are predicted to generate significant dust if large trucks are used to transport ore at the mine. However, the modelling results show that dust and associated impacts on air quality are significantly reduced if the mined ore is processed and pumped as a slurry instead. The proponent's evidence to the Inquiry confirmed its commitment to using the slurry method to transport mined ore instead of haul trucks, thus significantly reducing the environmental risks associated with dust generation at the mine.

Due to varying location of ore extraction over the 25 year life of the mine and the large project area, the EES investigation was based on the locations of potential "worst-case" residential receptors, given their distance to the nearest point of extraction at any point during the Project. Consequently, two modelling scenarios were modelled:

- Scenario 1 (Year 2): ore extraction within the northern region, located closest to receptor R2 (0.4 km south of the nearest mining), and processing located to the west of the extraction area.
- Scenario 2 (Year 24): ore extraction within the eastern region of, located closest to receptor R5 (0.2 km west of the nearest mining), and processing located to the west of the extraction area.

The modelling results show that for the respective scenarios neither residence R2 nor R5 are likely to experience unacceptable levels of dust - i.e. the mining together with background levels are still below the criteria for PM<sub>10</sub>, PM<sub>2.5</sub> and respirable crystalline silica. The Inquiry also noted that the highest PM<sub>10</sub> and PM<sub>2.5</sub> levels occurred when the background levels were extremely high. Two other residences (D7 and D11) are located within the proposed mine, but

as acknowledged by the proponent's evidence to the Inquiry, the residents need to be removed ahead of the mining as they would be subjected to excessive levels of dust.

The modelling of dust from the two potential purpose-built rail sidings for the bulk handling of the HMC, showed that for either rail siding location the criteria for both PM<sub>10</sub> and PM<sub>2.5</sub> would easily be met at the nearest residence (estimated to be 0.8 km and 1.2 km from the northern and southern rail siding locations respectively).

The Inquiry accepts the EES prediction of very low or negligible impacts of mining generated dust on water-tanks or on nearby agricultural crops, again citing the modelling results that indicate surrounding areas are more likely to be impacted by background dust than mining dust.

The site establishment or construction phase of the Project is anticipated to occur during the first two years, and will include the removal of vegetation, fencing, initial stripping and stockpiling of topsoil, subsoil and overburden from the mine pit. This phase of the Project is predicted to generate much less dust and emissions than during the planned mining operations and consequently was not addressed any further in air quality assessment.

EPA's submission recommended additional modelling of heavy metals in dust from the mining, which was undertaken prior to the Inquiry. The proponent's evidence on this modelling shows predicted concentrations of heavy metals at the sensitive receptors are well below the relevant assessment criteria.

The Inquiry ultimately concluded that provided that recommended design and operational safeguards are implemented (e.g. option of direct piping of ore slurry, dust suppression sprays), particulate matter, dust deposition and combustion emissions attributable to the Project would be within the established air quality criteria that protect beneficial uses of the local air-shed, including at all surrounding residences outside of the mine.

## **Radiation**

The only component of mineral sands that is significantly radioactive is the mineral monazite. The DMS ore-body comprises less than 1 percent monazite. However, the monazite will be part of the heavy minerals extracted during the mining and treatment process. The radiation risks associated with the mineral sands mine are only related to the handling of materials that have monazite. EES Supporting Study 7 (Radiation Assessment) SS7 included an assessment of the radiation doses that may be received by both workers and the public.

The most at risk are those working at the mine, (i.e. those handling HMC during processing), which were conservatively estimated to receive a maximum external dose (1.6 mSv/year) well below the recommended upper dose limits adopted in Australia<sup>3</sup> (20 mSv/year). The estimated annual dose from inhalation was considerably lower than the occupational exposure limit.

Submissions raised the matter of contamination of crops by radioactive dust, which was not addressed quantitatively in Supporting Study 7. The Inquiry accepted the view contained with the proponent's evidence that the quantity of radioactivity that will be deposited on crops is more than likely to be trivial. This is reinforced by the fact that the ore will be transported and processed when it is wet, the radioactive component is very small and usually associated with the larger particles that are not within dust generated at a mine, and monazite will not be separated from the ore during the mining itself.

The Inquiry did acknowledge the understandable public concerns regarding the potential of impacts from radiation. However, the proponent's evidence and Supporting Study 7 provide both sound and conservative predictions that extremely low doses are likely for workers and the risk to the public is considered to be negligible.

## **Noise**

Both the establishment of the mine and ongoing mining activities, which will occur 24 hours per day, 7 days per week, will generate significant noise. An assessment was conducted in EES Supporting Study 6 (Noise Assessment), which included modelling of the noise under neutral and worst case climatic scenarios (i.e. a temperature inversion or enhanced wind conditions).

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<sup>3</sup> National Health and Medical Research Council

The EES background noise monitoring highlights that the area is very quiet and that machinery noise would be noticeable over long distances. As noted by the EPA and the Inquiry, these low background levels require application of the following limits from N3/89: Day-time 45 dB(A); Evening 37 dB(A); and Night-time 32 dB(A). N3/89 also allows additional noise for construction periods, with an increase of 10dB(A) allowed during the day, up to a maximum of 68 dB(A).

The EES noise modelling results were presented in terms of the buffer distances (i.e. required to achieve a noise level at or below the maximum allowable under N3/89). The results show that a number of residences will be well inside the buffer distances at some time during the life of the mine given their respective locations, and are therefore more than likely to be subjected to noise levels in excess of the N3/89 limits. In addition, the modelling showed one residence would be subjected to noise levels above the N3/89 limits at all times during the life of the Project.

Specifically, seven residences within the core project area and two residences on the edge of the project area, are predicted to experience some degree of noise impact from the Project for most (if not all) of its 25-year life, and ten residents will experience noise in excess of N3/89 limits when the mine is in their vicinity. Under this worst-case scenario the night-time limit will be exceeded at an additional seven residences when the mine is in their vicinity. In addition, six of the residences are also expected to hear night-time construction noise. Five residences are located either on the ore-body or adjacent to the ore processing plant, so the proponent is likely to purchase these properties and thus eliminate noise issues at these locations.

Modelling of the impact of reversing beeper noise showed that the impact would be less than that of the noise of the machinery however it was noted that the character of the noise may cause disturbance.

The noise from the rail-siding options were also modelled in the EES. N3/89 Day and Evening limits are predicted to be exceeded for the northern rail siding location, irrespective of the handling method. Noise levels resulting from emissions from the southern site are predicted to exceed the N3/89 Night limit if the bulk handling method is utilised. Supporting Study 6 also suggests that noise reduction barriers would enable the rail option to comply.

Whilst not incorporated into the modelling, the proponent has examined some options for avoiding or mitigating noise levels near the mine. This was considered to only be partially successful by the proponent, so it is proposing to negotiate with each potentially affected resident to arrive at a mutually agreeable outcome, such as compensation, purchase of the property, temporary relocation, changes to operating practices or modifications to the residence.

The EPA was not in agreement with the proponent's desire for flexibility to negotiate when and how different residence's amenity may be protected or compensated for, such that mutually acceptable arrangements might be established without necessarily satisfying the N3/89 amenity requirements. EPA's submission to the hearing did agree that acoustic treatment of residences could produce a satisfactory result, but emphasised that these measures at the receptor should be considered only as a last resort. It is the view of EPA that all practical means of noise reduction (i.e. at or near the source/mine) need to be considered first wherever feasible. The EPA also criticised the lack any definitive description or commitment on what mitigation measures are likely to be applied at the mine.

The Inquiry also had concerns regarding the proposed flexible approach to the application of the N3/89 guidelines. It was of the view that exceeding N3/89 limits on a regular basis (i.e. in the day or evening) would largely be unacceptable, irrespective of any 'consents' that are established with the owners/occupiers. It agreed with the EPA about the need to ensure N3/89 limits are met, by first attempting to address noise reduction or mitigation at the source.

However, for the night-time the Inquiry determined that a limit on the maximum noise level in habitable rooms of 47dB(A)<sup>4</sup> could be a satisfactory substitute for the N3/89 night time limits, with the proviso that this only be used when there is both agreement with the owners/occupiers of the residence and independent assessment and monitoring to establish that internal noise does not exceed this limit. Based on the EPA's advice (regarding external noise levels with windows open), the Inquiry recommended that a maximum external night-time noise level of 57dB(A) could be applied for residences where the 47 dB(A) night-time internal limit is agreed to. The consideration of residences with windows

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<sup>4</sup> The work of Professor Griefahn shows that, providing the *noise level from a single event* in a bedroom does not exceed 47dB(A), sleep disturbance is unlikely. These limits are 'single event maximums', which differ from the averaged limits under N3/89.

open was deemed to be important due to the impact that closed windows may have on internal amenity, particularly in the warmer months.

The Inquiry highlighted that any flexibility that may be afforded by way of an agreement does not “simply compensate for the ‘pain’ residents agree to suffer” and it is still paramount that protection from sleep disturbance occurs. Rather, the consent of the owner/occupier to both the internal and external noise levels must be obtained, such that agreement on the limits and their deviation from the N3/89 limit is clear.

With respect to construction noise, the Inquiry considered that the criteria from both EPA guidelines apply (N3/89 and TG 302/92<sup>5</sup>), as the requirements of these guidelines differ in that they seek to control different types of noise. The Inquiry considered that both types of noise should be controlled and therefore that both sets of limits apply to the construction phase noise. However, the Inquiry was unable to determine a definition of construction, instead suggesting that DPI should establish this in consultation with the EPA and the proponent.

It is clear from the Inquiry’s analysis that there will be significant noise impacts for some residences, which will vary depending on their proximity to the mine. However, some residences will be impacted for most or the entire life of the Project. Whilst adherence to daytime and evening limits from N3/89 should enable residential amenity in the area to be protected, the night-time limit is likely to be exceeded for some residences, which requires a flexible approach to be adopted to ensure the most sensitive beneficial use of sleep is protected at all residences that are not purchased/removed by the proponent.

## **Visual and Landscape Character**

Project staging is likely to cause the Project to have smaller discrete sections with high visual impacts (i.e. confined to the local setting), likely to last for three to five years, particularly in the first 5 years and last 15 years of the Project. EES Supporting Study 13 acknowledges that the Project will result in a significant modification to the existing landscape, with high visual impacts likely to last for three to five years in the local area, particularly for eight residences at various times in the Project’s 25 year life.

Notwithstanding the potentially high visual impact of the Project, no significant concerns were raised by submitters, which may indicate it is considered tolerable to the community. This could be due to both the transitory nature of the proposed mining and that the area is not particularly known for its landscape value. Further to this, early progress on the establishment of perimeter and foreground screening is likely to significantly reduce the visual impact of the Project at sensitive viewing locations that will be affected. The EES highlights that effects on individual residences will also occur over relatively short periods (three to five years) and be limited to a few highly impacted viewing locations. This should enable impacts to be effectively addressed during mining operations, such that the site blends in with surrounding landscape and foreground.

Progressive landscape remediation and rehabilitation should reduce the duration of visual impacts, such that the effects are limited to discrete cells or sections being mined or backfilled. The establishment of rehabilitated surfaces and crops will minimise the medium to long term visual impacts, reducing impacts to very low levels at all viewing locations in the long-term.

The EES anticipates lighting pollution to originate from two sources during operations, but that it will mostly be visible as a soft glow during darkness. The main sources of light will be the WCP and Vehicle lighting. The residences along primary road routes, such as Minyip–Rich Avon Road will be particularly susceptible to the impact of vehicle lighting, which is considered to be potentially greater than the impact of night lighting of the WCP.

The Inquiry concluded that the Project would result in significant visual impacts in some specific viewing locations, but that the transitory nature of the mine will minimise and confine these impacts.

## **Roads, Traffic and Transport**

EES Supporting Study 8b (Roads Traffic and Transport Assessment) predicted that the mine will generate between 215 and 272 vehicle movements per day. The estimated average truck traffic includes round trips between the mine

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<sup>5</sup> In October 2008, EPA Victoria replaced EPA Publication TG 302/92 with EPA Publication 1254 ‘Noise Control Guidelines’.



and port facilities (and/or the railway siding), trucks bringing materials or equipment to the site, and a tanker of diesel every week. There will also be other contractors regularly visiting the project area.

The EES details the road network adjacent to and within the project area. It includes one Class B Declared Main Road under the control of VicRoads, local roads under the control of Yarriambiack and Northern Grampians Shire Councils, and private roads. The condition of roads within the project area varies from poor to average. There are no roads within the project area in good condition. The main access road to the mine will be unsealed, but the HMC haul road to Minyip will be upgraded (widened and sealed) to cope with increased traffic.

DMS proposes to monitor the local road conditions and usage patterns over the first 18 months (after construction) to establish what upgrades or additional roads may be necessary, which would then be confirmed in consultation with the Northern Grampians, Yarriambiack and Buloke Shire Councils.

While the EES predicts localised road closures in the project area may be required, they are likely to be temporary and affect only local traffic with alternative travel routes easily provided.

A Traffic Management Plan (Supporting Study 8) outlines the commitments DMS is proposing to adopt to ensure minimal impacts on the local traffic and road network. The plan specifies hours of operation, speed limits for sealed and unsealed roads, road upgrades and fire access. The detailed framework set out in this Traffic Management Plan addresses any residual issues adequately and as such it should provide the substantive basis for addressing all traffic and transport aspects of the mine.

The Inquiry also concluded that the increase to local traffic volumes from the Project are not likely to be significant. However, the Inquiry did highlight the importance of upgrading local roads to cope with the nature of the traffic the mine will generate, and noted the commitment of DMS to upgrade local roads (including intersections) as a result of the mine's operations, as determined necessary through consultation with the councils and VicRoads.

## **Conclusions**

Having regard to the Inquiry's analysis and in light of the above considerations, it is my assessment that:

- The Project's impacts on air quality and its beneficial uses from dust would be negligible providing the slurry pumping scenario (i.e. DMS' preferred option) is implemented.
- Risks associated with radiation are negligible and should be readily addressed through management plans developed and implemented in accordance with the Code of Practice on Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005) and the Code of Practice for Safe Transport of Radioactive Material (2008).
- As it is currently proposed, the DMS Project has the potential to exceed the noise limits specified in N3/89 at a number of residences within the vicinity of the mine operations during day, evening and night, as well as during construction.
- However, the predicted noise impacts on amenity will vary for different residences over the life of the Project - the majority will only experience noise exceeding N3/89 limits when the mine is in their vicinity. Whereas nine residences - seven of which are in the project area - will be impacted for most or all of the 25 year Project.
- Adoption of practicable best practice noise source reduction together with appropriate mitigation should enable the Project to meet N3/89 daytime and evening period criteria such that amenity at affected residences is largely protected during those periods. However, N3/89 night time criteria are not likely to be complied with for some residences under these circumstances and alternative night-time criteria may be warranted to specifically address the protection of sleep within affected residences.
- The Project would result in significant visual impacts at a limited number of specific viewing locations, but these impacts are transitory and will be progressively reduced and mitigated through the management and rehabilitation of the site.
- Impacts on local roads, traffic conditions and users are likely to be low and easily managed through the measures proposed by DMS and detailed in the draft Traffic Management Plan.

Further to this, it is my assessment that:

- Air quality monitoring be conducted by DMS in accordance with advice from EPA and DPI, to confirm EES modelling predictions.
- In order to minimise adverse impacts and provide adequate protection of the acoustic amenity at nearby residences, a Noise Management Plan be prepared (under the Work Plan) to establish the specific measures to be adopted to meet N3/89 limits over the life of the Project. This Plan is to incorporate noise source reduction and treatment wherever possible as well as identify the specific agreed mitigation to be adopted for each residence for relevant periods of the Project life.
- Following clear demonstration that practicable best practice source reduction and mitigation alone would not enable N3/89 night time limits to be met for certain residences for specific times during the Project, it may be feasible to adopt an alternative criterion of 'L<sub>max</sub> 47dB(A)<sup>6</sup> or less for all habitable rooms used for the purpose of sleep', which should protect the key night time use of a residence for sleep, although other amenity expectations such as relaxing and quietude may not be met. In addition, this departure from the N3/89 night time limit should only occur for specific residences for relevant times during the Project when:
  - There is evidence of the owner/occupier providing informed consent;
  - A proposed monitoring program has been prepared in consultation with the EPA; and
  - There is evidence, assessed in consultation with the EPA, that the 47dB(A) maximum noise level can be achieved in the habitable rooms.
- For specific residences where the L<sub>max</sub> 47dB(A) limit to protect sleep disturbance is to be adopted, a maximum external night time noise level of 57dB(A) should also be applied (which assumes an open bedroom window). However, in exceptional circumstances where 57dB(A) is unable to be met outside with practicable best practice source reduction and mitigation in place, a maximum external night time noise level of no more than 62dB(A) may be applied under the following conditions:
  - There is evidence of the owner/occupier providing informed consent, which clearly acknowledges that all windows and doors need to remain shut at night time to ensure that operational mining noise does not impact on sleep;
  - A proposed monitoring program has been prepared in consultation with the EPA; and
  - There is evidence, assessed in consultation with the EPA and DPI, that the 47dB(A) maximum noise level can be achieved in the habitable rooms and that appropriate mechanical ventilation can be put in place with closed windows and external doors.
- Appropriate management plans for radiation, radioactive materials and radioactive waste be prepared in consultation with DHS and DPI, such that they conform with the relevant Codes of Practice. This may be implemented through a condition of the Work Plan and/or a management licence under the *Radiation Act 2005* if this is required.
- DMS implement the suggested attenuation measures (identified in the EES and Inquiry report) and that this be monitored by DPI to ensure visual impacts are adequately minimised.
- DMS upgrade some local roads (including intersections), in order for local roads to cope with the nature of the traffic that results from the proposed mining operations, which should be determined through consultation with the councils and VicRoads.
- DMS finalise the Traffic Management Plan to enable operational and traffic management and mitigation options to be confirmed with DPI and the Councils, thus minimising impacts on the local traffic and road network.

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<sup>6</sup> This is a *maximum noise level (L<sub>max</sub> measured in dB(A) using the fast time weighting)* applicable to a single event in a bedroom, to protect against sleep disturbance.

## 3.9 Greenhouse Gas Emissions

**Objective 8.** *To minimise to the extent practicable, including through avoidance, the generation of greenhouse gases.*

### Statutory Context

The contribution of the Project to greenhouse gas (GHG) emissions needs to be considered in the context of the *Environment Protection Act 1970* and the PEM for GHG Emissions and Energy Efficiency in Industry, which is incorporated under SEPP (Air Quality Management)<sup>7</sup>. Further to this, under the *Environment Protection (Environment and Resource Efficiency Plans) Regulations 2007* (EREP), as from 1 January 2008 all commercial and industrial sites in Victoria that use more than 100 TJ of energy and/or 120 ML of water during a financial year need to prepare an action plan to reduce energy and water use as well as waste.

### Key Issues

As a consequence of the applicable PEM and EREP Regulations, the Project will need to minimise its contribution to GHG emissions, adopt energy efficiency measures and reduce the power required for mining operations where practicable.

### Discussion

GHG emissions were considered in EES Supporting Study 1 (Air Quality and Greenhouse Gases Assessment). The mining proposal will be a significant source of GHGs primarily due to emissions of carbon dioxide (CO<sub>2</sub>), with the two dominant sources being the direct combustion of hydrocarbon fuels (i.e. using diesel in mobile mining equipment, transport and on-site electricity generation), and, indirectly, the use of coal in the Latrobe Valley as the major source of electricity supplying the Victorian grid and hence the mine.

However, the incremental contribution to Australia's net GHG emissions as a result of the Project will be low in absolute terms – the EES indicates that the Project will represent a maximum annual increase of approximately 0.016% relative to the 1990 estimate of aggregate Australian GHG emissions. Whereas the GHG emissions calculated for each transportation method of HMC (i.e. road and rail) would produce annual increases of up to 0.00084% (rail) and 0.002% (road), relative to Australian 1990 emissions. The EES indicates that GHG emissions from the mining are much greater than from the transportation, which would suggest there are more opportunities for GHG reductions at the mine.

While the EPA considered the measures to reduce GHG emissions listed in the EES were appropriate, its written submission noted that the PEM requirements include the identification and incorporation of “best practice measures” in relation to the energy efficiency of plant and equipment. The EPA did not consider that such measures were addressed in detail or that the energy efficiency of the processing plant as a whole was assessed. The EPA also assessed the EES against the new EREP requirements - i.e. for all large energy and water users who trigger one of the resource use thresholds - and concluded that the Project will need to address them.

The Inquiry concurred that further work was still required to address energy efficiency, particularly with respect to the provision of “best practice” or similar standards to enable the plant and mining equipment to satisfy the requirements of the PEM. The Inquiry also noted that the EES did not include any analysis of the potential consumption of energy to supply water to the mining site, either from the Avon Deep Lead (located 25 km to the east) or the GMMW system, although other further work is needed to finalise the water supply option to be adopted. In addition, the Inquiry noted that the EES failed to give any in-depth consideration of alternative or renewable power options.

### Conclusions

Having regard to the EES and Inquiry's analysis, it is my assessment that:

- The Project will produce a significant amount of greenhouse gas emissions.

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<sup>7</sup> EPA Publication 824 (2002)

- However, the GHG emissions due to the Project will not be significant in an Australian-wide context. Further, it is my assessment that DMS further address 'best practice' opportunities to maximise energy efficiency and minimise GHG emissions, especially at the mine site, in order to meet obligations under the *Environment Protection Act 1970*.

### 3.10 Environmental Management Framework

**Objective 9.** *To ensure that mining can be implemented in accordance with a robust and transparent framework for environmental management.*

#### Statutory Context

Under the MRSD Act, DMS will be required to submit an Environmental Management Plan (EMP) to DPI for approval, as a condition of the Work Plan.

#### Key Issues

The Project will need to be implemented with a robust and transparent framework for managing the residual environmental impacts and risks, in conjunction with monitoring of the Project's environmental performance.

#### Discussion

DMS has proposed a comprehensive EMP, including the following elements:

- Construction Environmental Management Plan;
- Vegetation Management Plan;
- Native Vegetation Offset Management Plan;
- Weed and Wildlife Management Plans;
- Radiation Management Plan;
- Traffic and Transport Management Plans.

It was suggested by DSE that a Pest Management Plan also be included in the EMP.

While DPI is the relevant authority for approval of the EMP, DPI advised the Inquiry that relevant government agencies will also be consulted during the review of the proposed final EMP and that DSE in particular would be closely involved in the assessment of the EMP in relation to biodiversity matters.

DMS is also proposing to develop an overarching Environmental Management System (EMS) consistent with ISO 14000 standards. The comprehensive EMP, including its associated conditions, measures, mitigation and monitoring components, would be incorporated into the EMS, such that there is regular internal and external review of environmental performance.

The Inquiry process highlighted a key mechanism for monitoring and managing environmental impacts: Environmental Review Committees (ERC). An ERC is used for each mining project – they have a well established role in environmental management under the MRSD Act. DPI recently released a discussion paper on ERCs, which provides recommendations on appropriate use of ERCs in terms of their function, structure and operation. The Inquiry strongly supported the establishment of an ERC for the DMS Project and considered it would appropriate key parties (e.g. DPI, DMS, EPA and local councils) to be involved in both shaping the ERC's role, focus and composition for this Project.

#### Conclusions

Having regard to the EES and Inquiry's review, it is my assessment that:

- The EMP to be included as part of the Work Plan incorporate appropriate performance objectives to provide a clear framework for implementation and evaluation of outcomes;

- DPI establish and convene an ERC with broad terms of reference inter alia (i) to monitor the implementation of the EMP and the environmental performance of the Project during its construction, operational and decommissioning phases, and (ii) to provide a channel for communication between the mine operator and key stakeholder interests, including in relation to issues of concern and community engagement by the mine operator;
- To provide transparency, a report on the environmental performance of the Project be prepared annually by the mine operator and made publicly available on a suitable internet site following its review by the ERC.

### 3.11 Ecologically Sustainable Development

**Objective 10.** *To enable ecologically sustainable development over the short- and longer-term, having regard to the likely overall economic, social and environmental implications of the proposal.*

#### Statutory Context

A 2006 amendment to the MRSD Act inserted the principles of ESD, derived from the 1992 National Strategy for Ecologically Sustainable Development, as similarly incorporated into the *Environment Protection Act 1970* and the EPBC Act 1999. Section 2A(1) of the MRSD Act states that: "It is the intention of Parliament that in the administration of this Act regard should be given to the principles of sustainable development".

This section focuses on the acceptability of the environmental effects of the DMS Project, in the context of ESD and relevant legislation and policy. The Ministerial Guidelines made under section 10 of the EE Act specifically require the assessment of a proposal and its effects to be in the context of the principles and objectives of ESD.

#### Key Issues

- The overall environmental effects of the proposal need to be acceptable in terms of their consistency with applicable environmental policy and legislation.
- Need to consider the Project (and its environmental and related economic and social effects) in terms of its consistency with ESD.

#### Overview of Environmental Effects

In summary, this Assessment accepts that the Project's direct and indirect economic benefits for the local region and State are likely to be significant. The preceding sections of this Assessment also recognise that the Project would give rise to broad-scale though largely limited off-site effects and environmental risks, although there could be some moderate and significant environmental effects:

- Residual effects on the local population of Growling Grass Frog could be significant, although these effects should be minimal if effective implementation of management measures occurs.
- Small areas of very high conservation significance EVCs would be lost, but this would be acceptable in the context of their small extent, the provision of suitable offsets and the economic benefits of the Project.
- The acceptability of potential environmental effects of prolonged groundwater extraction from the Avon Deep Lead aquifer is unable to be determined at this stage and may have the potential to be significant.
- Disruption to local agriculture, current land-holders and residents would occur, although this should be minimised through the mitigation proposed by the proponent and required compensation (under the MRSD Act).
- Impacts on some identified Aboriginal cultural heritage sites will occur, although these have been minimised and would be acceptable if undertaken in accordance with an approved CHMP.
- Noise currently predicted to be generated by the Project would impact on the amenity of a number of residences within the vicinity of the mine during day, evening and night operations, as well as during construction.

However, additional options for addressing noise source reduction together with appropriate mitigation at residences should enable the Project to achieve an acceptable level of amenity protection at residences.

- The Project would result in significant visual impacts in a limited number of viewing locations, although these impacts would be largely transitory and progressively reduced over time.

In addition to this, some effects of the Project are unable to be confirmed at this stage due to certain uncertainties that need to be resolved, in particular:

- The environmental impacts and sustainability of prolonged extraction of groundwater from the Avon Deep Lead have not been determined or quantified, and detailed assessment of this would be required through an application for the extraction under the *Water Act 1989*.
- Predictions of the following need to be confirmed through further monitoring and assessment:
  - Impacts on groundwater levels around the mine (during and post mine dewatering);
  - The unlikelihood of a perched watertable developing above the slimes layer;
  - The distance between the slimes layer and the ground surface; and
  - The ultimate fate of water and salt to be added during backfilling of mine by-products.

Effective resolution of the residual uncertainties together with implementation of identified management and mitigation measures, should enable the Project to be implemented in an overall environmentally acceptable manner.

### **Consistency with ESD**

The Project's overall consistency with ESD needs to be considered in the context of the relevant ESD objectives and principles, in particular the following:

- To protect biological diversity and maintain essential ecological processes and life-support systems.
- The need to consider the global dimension of environmental impacts of actions and policies.
- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equity considerations.
- The need to facilitate community involvement in decisions and actions on issues that affect the community.

The proposed mine footprint has been developed to conserve some areas of ecological conservation significance in the south, such that the biodiversity and ecology of the area is essentially maintained, particularly in relation to species and communities protected under the State and Commonwealth legislation.

Potential effects of the Project have been considered in relation to global aspects, particularly in relation to the associated GHG emissions, which would be insignificant in the Australia-wide and global contexts.

The assessment of the proposed mining Project has incorporated community input and submissions during key phases, including the public Inquiry hearing. The ERC process and ongoing regulation of the mine's environmental performance will involve the local community.

This Assessment further integrates the consideration of relevant economic, social and environmental factors that were investigated and assessed through the EES and Inquiry Report. These factors include both short and long term considerations, for example the potential impacts on the survival of threatened species and the Project's contribution to the diversification and development of the region's economy.

### **Conclusions**

Having regard to the EES and Inquiry's analysis, it is my assessment that:

- Having regard to the likely beneficial and adverse social, economic and environmental effects of the Project, it should be able to be implemented in a manner that is consistent with ESD.

In conclusion, it is my assessment that:

- The potential environmental effects of the DMS Project would be acceptable addressed, subject to implementation of specified management and mitigation measures.
- The Project would provide a net societal benefit to the State of Victoria, having regard to both long-term and short-term economic, environmental and social considerations.
- The Project should proceed in a manner consistent with this Assessment, including the following responses to the recommendations of the Inquiry.

## 4 Response to Inquiry Recommendations

The Inquiry's recommendations are reproduced in italics with the response by the Minister for Planning in normal type font below.

### Overall Recommendation

1. *That the Minister for Planning should approve the proposed DMS sand mine project subject to the additional mitigation and managements measures recommended below.*

#### Minister's Response:

Accepted in principle. It is my assessment that the DMS Project be approved under the relevant legislation, subject to the measures and further processes recommended in this Assessment. I note that this Assessment does not constitute an 'approval' as such.

### Environment Review Committee

2. *DPI establish an Environmental Review Committee (ERC) to monitor the environmental impacts, and should be set up, function and operate having regard to the recommendations of the DPI discussion paper on ERC's.*

#### Minister's Response:

Accepted. It is my assessment that an ERC be established in accordance with DPI requirements.

### Water

3. *That the Work Plan not be approved unless it contains:*
  - *Predictions of the following that are in general accordance with predictions provided in the EES.*
  - *The maximum extent of the area over which groundwater levels will be reduced during excavation of material from the mine pit;*
  - *The maximum level of the watertable in the area of the pit at anytime up to 5 years after pit backfilling is completed;*
  - *The minimum separation of the top of slimes layer in the backfilled pit and the surface level; and*
  - *The minimum separation of upper surface on any perched watertable that may form above the slimes layer in the backfilled pit and the surface level.*
4. *A monitoring program that will enable testing of each of the above predictions.*
5. *A prediction of the results of any reactions between the constituents of the groundwater and that of water that may be added to the groundwater and the impacts of any products of such reactions.*
6. *The following be included in the conditions attached to the approval of any Work Plan:*
  - *Sediment management will be conducted in conformance with EPA Publication 480 Environmental Guidelines for Major Construction Sites; and*
  - *The licensee shall cause an audit to be conducted of the implementation of all aspects of the groundwater monitoring program described in the Work Plan and the results of that program with reference to predictions of impacts included in the Work Plan, with one year from the date of approval and then within one year of the date of the previous audit. The audit will be conducted by an Appointed Environmental Auditor under section 53S of the Environment Protection Act 1970 and will provide an audit report to the all members of the Environmental Review Committee and other parties as is directed by the District Manager.*

#### Minister's Response:

Accepted. It is my assessment that the aforementioned predictions do need to be confirmed through further monitoring and assessment, which need to be incorporated into the DPI approved Work Plan and EMP.



## Biodiversity and Habitat

7. That the Work Plan not be approved unless the EMP contains:

- Construction Environmental Management Plan
- Vegetation Management Plan
- Native Vegetation Offset Management Plan
- Native Vegetation Management Plan
- Weed Management Plan
- Wildlife Management Plan
- Pest Management Plan

8. That the Victorian Minister for Planning advise the Commonwealth Minister for Environment, Water, Heritage and the Arts that the Donald Mineral Sands project will not have a significant impact on any listed threatened species or communities under the EPBC Act provided the relevant mitigation measures identified by the proponent's flora and fauna experts are implemented.

### Minister's Response:

Accepted. It is my assessment that the above plans be incorporated into the Work Plan to be approved by DPI. It is also my assessment that the Work Plan to be approved incorporates all the relevant aspects of this Assessment's recommendations (refer to above sections).

## Air Quality

9. That the Work Plan not be approved unless it contains:

- Adequate information in the EMP to satisfy the requirements of the Protocol for Environmental Management – Mining and Extractive Industries to identify and evaluate “best practice” controls for all relevant indicators specified in the State Environment Protection Policy (Air Quality Management) and “maximum extent achievable” controls indicators specified as Class 3 indicators;
- A dust emission management strategy that includes actions that are considered “best practice” for the control of all relevant indicators specified in the State Environment Protection Policy (Air Quality Management) and “maximum extent achievable” control for indicators specified in Class 3 indicators;
- A procedure for determining the timing of the vacation of residences to avoid the exposure of residents of air of unacceptable quality, as specified in the Protocol for Environmental Management – Mining and Extractive Industries; and
- A compliance monitoring program in the EMP that satisfies the requirements of the Protocol for Environmental Management – Mining and Extractive Industries, including a reactive control strategy using real-time monitoring to prevent exceedances of air quality criteria at the nearest residences.

### Minister's Response:

Accepted. It is my assessment that these be incorporated into the Work Plan to be approved by DPI.

## Greenhouse Gas Emissions

10. That the Work Plan not be approved unless it contains:

- Adequate information in the EMP to satisfy the EPA's requirements for demonstrating that “best practice” methods have been used for energy efficiency, especially for the on-site processing plants;
- A requirement in the EMP for plans to meet the requirements of both the Victorian Environment and Resources Efficiency Plans (EREP) and the Commonwealth Energy Efficiency Opportunities (EEO) programs when the relevant thresholds of energy use are reached;
- A requirement in the Transport Management Plan that identifies a course of action to investigate the option of transporting HMC to port to reduce greenhouse gas emissions; and
- A requirement in the EMP for consideration of the use of renewable and alternative energy supplies.

### Minister's Response:

Accepted in principle. It is my assessment that these aspects be incorporated into the approved Work Plan, with the exception of the EMP requirement regarding renewable and alternative energy supplies.

## Noise

11. *The following be included in the conditions attached to the approval of any Work Plan:*
  - *The licensee must ensure that noise levels at any sensitive receptor not exceed the noise limits specified in the Interim Guidelines for Control of Noise from Industry in Country Victoria N3/89 except if the licensee provides the District Manager with a proposal for the substitution of a limit on the maximum noise level for the Night limit at a particular residence, or residences.*
  - *Any such proposal will, before a limit on the maximum noise level outside the residence of no more than 62 dB(A):*
    - *Include evidence of the consent of the owner and/or occupier of the residence to the application of the proposed noise limit;*
    - *If the proposed noise limit is greater than 57 dB(A), include evidence that noise at the proposed limit will not result in a noise level in a habitable room of greater than 47 dB(A); and*
    - *Include details of a monitoring program that will enable demonstration of compliance, or otherwise.*
12. *If the proposal is for a limit on the maximum noise level of 57dB(A) or less the District Manager will approve the proposal providing the he/she is satisfied with both:*
  - *The evidence of the consent of the owner and/or occupier; and*
  - *The adequacy of the proposed monitoring program, assessed in consultation with the EPA.*
13. *If the proposal is for a limit on the maximum noise level of greater than 57dB(A) the District Manager will approve the proposal providing that he/she is satisfied with each of:*
  - *The evidence of the consent of the owner and/or occupier;*
  - *The adequacy, assessed in consultation with the EPA, of the proposed monitoring program; and*
  - *The evidence, assessed in consultation with the EPA, that noise at the proposed limit will not result in a noise level in a habitable room of greater than 47 dB(A).*
14. *Once the proposal is approved the licensee must:*
  - *Ensure maximum noise levels at the residence during the Night do not exceed the approved limit; and*
  - *Implement the proposed monitoring program to the satisfaction of the District Manager.*
15. *Management of noise emissions during construction activities, with such activities being defined by the District Manager in consultation with the EPA, will be in accordance with the guidance provided in Section 12 of Noise Control Guidelines TG302/92 and resultant noise levels at sensitive receptors must comply with the limits described in the Schedule in that Section of the guidelines.*

### Minister's Response:

Accepted in principle. It is my assessment that this general approach be adopted in the approved Work Plan, such that it is consistent with my earlier findings on noise (section 3.8).

In addition, a Noise Management Plan should be prepared (i.e. as a condition of the Work Plan). It should incorporate the specific measures that will be adopted to meet the N3/89 noise limits (or better), including noise reduction and treatment at the source(s) wherever possible, as well as the specific agreed mitigation to be adopted for each residence. Management of noise emissions during construction activities will now need to be in accordance with the new guidelines, EPA Publication 1254 'Noise Control Guidelines', which replaced TG302/92 in October 2008.

## Radiation

16. *The Department of Human Services either determine that a management licence under the Radiation Act 2005 is required or agree to act as the regulatory authority on matters relating assessment and compliance testing of management plans relating to radiation and radioactive materials.*
17. *The following be included in the conditions attached to the approval of any Work Plan:*
  - *Prior to commencement of the production of heavy mineral concentrate the licensee will provide the District Manager with either:*
  - *A copy of a management licence issued by the Department of Human Service under the Radiation Act 2005 for the conduct of radiation practices associated with the mining, processing and transport of radioactive materials; or*

- A copy of a Radiation Management Plan, Radioactive Waste Management Plan certified by the Department of Human Services as being in conformance with:
- The Code of Practice on Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005); and
- The Code of Practice for Safe Transport of Radioactive Material (2008).

18. *If the operations are not subject to a management licence issued by the Department of Human Service under the Radiation Act 2005, then the Department of Human Services will act as the regulatory authority on matters relating to the assessment and compliance testing of management plans relating to radiation and radioactive materials.*

**Minister's Response:**

Accepted. It is my assessment that these aspects be incorporated in the approved Work Plan.

## **Roads, Traffic and Transport**

19. *That the EMP not be approved unless it contains a Transport Management Plan.*

20. *The Transport Management Plan include the range of matters in the Northern Grampians Shire Council submission tabled at the Inquiry hearing. These are:*

- *An existing conditions survey of public roads in the vicinity of the mine facility that may be used for access, including details of the suitability, design and construction standard of such roads;*
- *The designation of appropriate construction and transport vehicle routes to the mine facility;*
- *The designation of vehicle access points to the mine from surrounding roads, including main roads access points to local access roads;*
- *The designation of operating hours and speed limits of trucks on relevant routes accessing the site so as to avoid the time and routes of passage of school buses, and to provide for resident safety;*
- *Any necessary pruning of street planting or roadside vegetation to provide for transport of materials to the site, and pruning practices to be followed;*
- *The designation of vehicle access-ways and car parking areas;*
- *The requirements of Over Dimensional Load permits and escorting of long large loads along roads in the area;*
- *The need for road intersection upgrades to accommodate an additional traffic or site access requirements, whether temporary or ongoing;*
- *A timetable for implementation of any pre-construction works identified to be undertaken;*
- *A timetable for regular inspections to be carried out during the construction period to identify maintenance works necessary as a result of construction traffic; and*
- *The use and development must be carried out in accordance with the endorsed Traffic Management Plan and the cost of any works including upgrades and maintenance are to be at the expense of the work authority holder.*

21. *The Transport Management Plan be developed by a working group comprising DMS, Yarriambiack, Buloke and Northern Grampians Shire Councils, VicRoads and relevant emergency service organisations.*

22. *That the Work Plan not be approved unless it contains a Transport Management Plan that identifies a course of action to investigate the option of transporting HMC to port by rail.*

**Minister's Response:**

Accepted. It is my assessment that these aspects be incorporated within the approved Work Plan, although further investigation of the transport options (e.g. to port by rail) should be undertaken such that the Transport Management Plan is prepared cognisant of the chosen option.

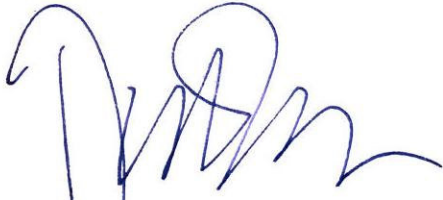
## **Rehabilitation**

23. *That the Work Plan not be approved unless it contains an adequate rehabilitation plan for agricultural land and native vegetation land based on the information and guidance provided in the report Rehabilitation of Donald Mineral Sands Project.*

24. *That the DPI recommend to the Environmental Review Committee (ERC) when established, that the ERC consider the establishment of a sub-group of local farmers or landowners to participate in the evaluation of the assessment of the productivity of rehabilitated agricultural land.*

Minister's Response:

Accepted in principle. It is my assessment that these aspects be incorporated into the Work Plan and ERC process required under the MRSD Act, which should also respond to the relevant aspects of this Assessment's findings (section 3.7).



**JUSTIN MADDEN MLC**  
**Minister for Planning**

## Appendix - Assessment's Legislative and Policy Context

### ***Environment Effects Act 1978***

Under the Act, the Minister for Planning requires a proponent to prepare an EES when there is the potential for significant environmental effect, such as regionally or State significant adverse effects. It is also considered when there is a need for highly integrated assessment of potential environmental effects (including economic and social effects).

The *Ministerial Guidelines for Assessing Environmental Effects under the Environment Effects Act 1978 (June 2006)* (EES Ministerial Guidelines), state that the primary objective of an assessment process under the Act is to “provide for the transparent, integrated and timely assessment of the environmental effects of projects capable of having a significant effect on the environment”. The final assessment of the effects of a proposal then enables decision-makers to consider whether the proposal has acceptable environmental effects and risks.

Consistent with the 1992 Inter-Governmental Agreement on the Environment (IGAE), the ‘environment’ is interpreted broadly for the purposes of environmental impact assessment under the *Environment Effects Act 1978*. The EES Ministerial Guidelines (June 2006) defines the environment to include “the physical, biological, heritage, cultural, social, health, safety and economic aspects of human surroundings, including the wider ecological and physical systems within which humans live.”

### ***Mineral Resources (Sustainable Development) Act 1990***

The purpose and objectives of the MRSD Act are set out below (from Sections 1 and 2 of the Act):

*Purpose:*

- To encourage an economically viable mining industry which makes the best use of mineral resources in a way that is compatible with the economic, social and environmental objectives of the State.

*Objectives:*

- To encourage and facilitate exploration for minerals and foster the establishment and continuation of mining operations...;
- To establish a legal framework aimed at ensuring that mineral resources are developed in ways that minimise impacts on the environment... land which has been mined is rehabilitated, and just compensation is paid for the use of private land; and
- To recognise that the exploration for, and mining of, mineral resources must be carried out in a way that is not inconsistent with the *Native Title Act 1993* of the Commonwealth and the *Land Titles Validation Act 1994*.

### ***Planning and Environment Act 1987***

The **objectives for planning** in Victoria are set under Section 4(1) of the *P&E Act*. Some relevant objectives include:

- (a) to provide for the fair, orderly, economic and sustainable use and development of land;
- (b) to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity;
- (c) to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest or otherwise of special cultural value;
- (d) to facilitate development in accordance with the objectives set out in paragraphs (a), (b), (c), (d) and (e);
- (e) to balance the present and future interests of all Victorians.

The Act's objectives establish a broad framework for considering the implications of land use and development, and from a more contemporary perspective may be seen to encompass environmental, economic and social aspects of sustainable development.

The **State Planning Policy Framework (SPPF)**, which is part of the Yarrambiack and Northern Grampians Planning Schemes, sets State-level policy for land-use planning and for considering development proposals. The SPPF highlights the need for planning and development to balance key principles relating to settlement, environment, resource management, infrastructure, economic well-being and social needs. Moreover, clause 11.02 of the SPPF sets a goal of ‘integrating environmental, social and economic factors in the interests of net community benefit and sustainable development’.

Specific clauses in the SPPF that are relevant to the assessment of the environmental and related effects of the proposal include:

- Protection of catchments, waterways and groundwater (clause 15.01)
- Air quality (clause 15.04)
- Noise abatement (clause 15.05)
- Soil Contamination (clause 15.06)
- Conservation of native flora and fauna (clause 15.09)
- Heritage (clause 15.11)
- Industry (clause 17.03)
- Agriculture (clause 17.05)

The **Local Planning Policy Framework (LPPF)** identifies the long terms directions for land-use and development within a municipality and provides the framework and basis for zones, overlays and specific provisions of a Planning Scheme. Relevant aspects of the LPPF for the Yarrambiack and Northern Grampians Planning Schemes (including the SPPF) need to be considered in the context of broader land-use development decisions.

Victoria’s **Native Vegetation Management Framework – A Framework for Action (NVMF)** implements the principles of the Victorian Biodiversity Strategy (1997). The NVMF is implemented largely through the *Planning and Environment Act 1987*, in the Victorian Planning Provisions that apply to all Planning Schemes, in particular through clauses 15.09 and 52.17. The goal of the NVMF is to achieve a ‘net gain’ in the area and quality of native vegetation, in part by applying a three step approach when development proposals are considered:

- a) *Avoid* adverse impacts, particularly through vegetation clearance;
- b) *Minimise* impacts if they cannot be avoided;
- c) *Offset* impacts that cannot be avoided or minimised.

Whilst a permit is not required for this project under the local planning schemes, due to the exemption under the MRSD Act, the principles and requirements of the framework are still relevant and in effect are implemented through the EES and Work Plan processes.

### ***Water Act 1989***

The purpose of the *Water Act 1989* is to conserve, allocate and manage terrestrial surface and ground waters, including the following specific purposes set out in the Act:

- (c) To promote the orderly, equitable and efficient use of water resources.
- (d) To make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians.
- (j) To provide a formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses.

The Minister for Environment and Water may allocate water resources through bulk water entitlements and issue licences to take and use water from waterways and groundwater. Sections 53 and 40 of the *Water Act 1989* specify the range of matters that must be taken into account in considering an application for a license to take and use water. These matters include existing and project water availability, water quality, the requirements of existing and competing users, any adverse effects that the allocation may have on waterways, aquifers, the drainage regime and government conservation policies and legislation.

The SEPP (Groundwaters of Victoria) provides the framework for protection of groundwater resources in the state and has the aims of maintaining and, where possible, improving groundwater quality and the protection of beneficial uses, including receiving surface water environments.

### **Environment Protection Act 1970**

The **principles of environment protection**<sup>8</sup> are set out in sections 1B to 1L of this Act. Those potentially relevant to this proposal and Assessment are:

- 1B. Principle of integration of economic, social and environmental considerations
- 1C. Precautionary principle
- 1D. Principle of intergenerational equity
- 1E. Principle of conservation of biological diversity and ecological integrity

In addition, the *Environment Protection Act 1970* provides for the making of subordinate legislation including Regulations, Waste Management Policies and SEPPs. SEPPs provide the policy basis for maintaining environmental quality sufficient to protect existing and anticipated beneficial uses of the environment. The following are particularly relevant to the present proposal:

- *SEPP (Groundwaters of Victoria)* provides for the protection of beneficial uses of groundwater, including the maintenance of ecosystems, water supply and industrial water use.
- *SEPP (Air Quality Management)* provides for the protection of beneficial uses dependent on clean air quality.
- *SEPP (Prevention and Management of Contamination of Land)* provides for the protection of beneficial uses of land and the preventing the contamination of land.
- *Environment Protection (Environment and Resource Efficiency Plans) Regulations 2007*.

The EPA also prepares policy guidance to aid the implementation of the Act and subordinate legislation. The following are relevant to this Assessment:

- Interim Guidelines for Control of Noise from Industry in Country Victoria, EPA Publication N3/89 (1989).
- Noise Control Guidelines, EPA pub 1254 (October 2008), which replaces EPA Publication TG302/92 (1992).
- Protocol for Environmental Management (PEM) for Mining and Extractive Industries, EPA Publication 1191 (2007).
- PEM for Greenhouse Gas (GHG) Emissions and Energy Efficiency in Industry, incorporated under *SEPP (Air Quality Management)*, EPA Publication 824 (2002).

### **Commonwealth EPBC Act 1999**

The DMS Project has been declared to be a 'controlled action' requiring assessment and approval under the EPBC Act. The EES process was accredited as the required assessment process for this project, and as such this Assessment needs to assess the potential for significant impacts on the controlling provisions (see section 2.3.7). In this context, it will be appropriate to have regard to the guidance provided in *Matters of National Environmental Significance: Significant Impact Guidelines 1.1*<sup>9</sup>.

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<sup>8</sup> These principles are derived in part from the Principles of Environmental Decision-Making adopted by all jurisdictions in Australia as part of the 1992 Inter-Governmental Agreement on the Environment (i.e. IGAE).

<sup>9</sup> Australian Government (Department of the Environment and Heritage), May 2006.

## ***National Strategy for Ecologically Sustainable Development***

In 1992 all jurisdictions in Australia agreed to the National Strategy for Ecologically Sustainable Development, which defined and articulated objectives and guiding principles of ecologically sustainable development (ESD). This framework has informed subsequent government reforms and programs. In Victoria, the definition and objectives of ESD have recently been incorporated in the MRSD Act (through amendments in 2006). They were previously given formal recognition in Section 4 of the ***Commissioner for Environmental Sustainability Act 2003***, viz.:

- (1) Ecologically sustainable development is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.
- (2) The objectives of ecologically sustainable development are:
  - (a) to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
  - (b) to provide for equity within and between generations;
  - (c) to protect biological diversity and maintain essential ecological processes and life-support systems.
- (3) The following are to be considered as guiding principles of ecologically sustainable development:
  - (a) that decision making processes should effectively integrate both long-term and short-term economic, environmental, social and equity considerations;
  - (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
  - (c) the need to consider the global dimension of environmental impacts of actions and policies;
  - (d) the need to develop a strong, growing and diversified economy which can enhance the capacity for environment protection;
  - (e) the need to maintain and enhance international competitiveness in an environmentally sound manner;
  - (f) the need to adopt cost effective and flexible policy instruments such as improved valuation, pricing and incentive mechanisms;
  - (g) the need to facilitate community involvement in decisions and actions on issues that affect the community.

This framework for ESD has been adopted in the EES Ministerial Guidelines (June 2006) as a framework of reference, in combination with the principles of environment protection under the *Environment Protection Act 1970* and other applicable legislation and policy to inform the assessment of environmental effects.