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PROPOSED GINKGO MINERAL SANDS PROJECT

REPORT ON THE ASSESSMENT OF A DEVELOPMENT APPLICATION
(DA 251-09-01) PURSUANT TO SECTION 79C OF THE
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

EXECUTIVE SUMMARY

On 17 September 2001, Bemax Resources NL (Bemax) lodged a Development Application (DA) and Environmental Impact Statement (EIS) with the Department of Planning to construct and operate a dredge mining operation for the extraction of mineral sands and the establishment of associated infrastructure at a site located approximately 85 km north of Mildura and some 40 km west of the township of Pooncarie, as shown in Figure 1. The associated infrastructure includes the establishment of a mineral concentrate transport route, electricity transmission line and a potable water pipeline. The relevant local government authority is Wentworth Shire Council.

The proposal is State Significant under the *Environmental Planning and Assessment Act, 1979* (the Act). The Minister for Planning is therefore the consent authority for the DA. The capital cost of the Project is expected to be approximately $85M. The proposal will employ a construction workforce of up -to 145 employees and an operational workforce of up to 100 employees. The proposal therefore meets the criteria for State Environmental Planning Policy 34 "Major Employment Generating Industrial Development".

The proposal is designated development and an EIS was prepared by the Applicant. The proposal is also integrated development as it requires the following approvals in addition to the development consent:

- A licence from the Environment Protection Authority under section 47 of *the Protection of the Environment Operations Act 1997*;
- An approval from the National Parks and Wildlife Service under section 90 of *the National Parks and Wildlife Act 1974*;
- A permit under from the Department of Land and Water Conservation under Part 3A of the *Rivers and Foreshores Improvement Act 1948* and a license under section 116 of the *Water Act 1912*; and
- An approval from Wentworth Shire Council under section 138 of the *Roads Act 1993.*

The DA and EIS were publicly exhibited from Wednesday 26 September 2001 until Monday 29 October 2001, in accordance with the *Environmental Planning and Assessment Act, 1979*. The Department received a total of 8 submissions in response to the exhibition of the proposal. This included 5 submissions from State Government agencies, 1 submission from Wentworth Shire Council and 2 submission from private landholders. No submissions objected to the proposal.

The mine will produce an average of 450,000 tonnes per annum (tpa) of heavy mineral concentrate for transportation to a mineral separation plant. To obtain this mineral concentrate, up to 12 Mtpa of ore will be mined and 22Mtpa of overburden will be removed. The Project is expected to have an 18-month construction phase and an operational life of around 11 years. It is proposed to commence construction in the second quarter of 2002 and commence operation in the third quarter of 2003.

The key issues in regard to the proposal included dust impact, impacts on roads and transportation, impacts on groundwater and surface water, rehabilitation of the site, waste management, impact on European and Aboriginal sites and relics, and impacts on flora and fauna.

The consent conditions recommended for the Ginkgo mineral sands mine proposal are principally related to:

- Requirements for environmental management plans for site activities;

- Noise and dust management and monitoring;
- Management of archaeological sites;
- Flora and Fauna management and monitoring;
- Surface and groundwater management and monitoring;
- Transport and road management;
- Requirement for an Annual Environmental Management Report;
- Independent Environmental Auditing.

The plans required by the consent conditions contain the detail of the management and mitigation measures for these issues to be undertaken by Bemax. The plans are to be approved by the Director-General of the Department of Planning in consultation with the relevant government authorities prior to either construction or operation of the mine depending on the timing of the issue.

The noise and dust plans require specifications of the procedures for dust and noise monitoring for the purpose of undertaking independent noise and dust investigations. An Environmental Management Strategy is also to be prepared by Bemax which is to give a broad overview of the management plans and their inter-relationship.

The Department of Planning considers that the proposal is consistent with State and regional planning objectives relating to resource development and employment generation. The Department's planning report concludes that there are no environmental impacts that could not be effectively mitigated and managed by way of conditions of consent.

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FILE: S00/01704

1. INTRODUCTION AND BACKGROUND

1.1 The Applicant

Bemax Resources NL on behalf of the BIP Joint Venture (a joint venture between Bemax Resources NL 75% and Probo Mining Pty Ltd 25%).

1.2 Overview of the proposal and its location

Bemax Resources NL ("Bemax") is seeking development consent to develop the Ginkgo mineral sands deposit ("the Project") located approximately 85 kilometres (km) north of Mildura and some 40km west of the township of Pooncarie in western New South Wales. Figure 1 shows the location of the proposed development.

The Project includes the construction, operation and rehabilitation of a mineral sands mine and ancillary infrastructure, including the construction of a highway access road, an electricity transmission line and a potable water pipeline.

The mine will produce an average of 450,000 tonnes per annum (tpa) of heavy mineral concentrate for transportation to a mineral separation plant. To obtain this mineral concentrate, up to 12 Mtpa of ore will be mined and 22Mtpa of overburden will be removed. The Project is expected to have an 18-month construction phase and an operational life of 11 years. The capital cost of the Project is expected to be approximately $85M. The proposal will employ a construction workforce of up to 145 employees and an operational workforce of up to 100 employees. It is proposed to commence construction in the second quarter of 2002 and commence operation in the third quarter of 2003.

The area covered by the development application in relation to the mining lease application area is illustrated in Figure 1. The Mining Lease Application area for the Project covers an approximate area of 3500ha. The proposed mining area is approximately 6km long and 400m wide. Overburden material overlying the mineral sands deposit is approximately 30m in depth and overlies approximately 30m of ore.

It is proposed to mine the mineral sands using a conventional floating bucket wheel/cutter suction dredge. Minerals will be separated and concentrated on a floating plant located behind the dredger. The mineral concentrate will then be transported to a mineral separation plant, located in Victoria, by one hundred tonne payload triple road trains. However, on Monday 17 September 2001, the Department received a Development Application (DA) from Bemax Resources to construct and operate a Minerals Separation Plant in Broken Hill. This application is currently being assessed.

The major mine site components of the Project are proposed to include:

- A floating dredge and floating plant for mineral sands mining and primary minerals separation;
- A borefield for supplying make-up water to the dredging pond and floating plant;
- An overburden stripping and overland conveying system;
- Administration and accommodation camp buildings;
- Potable water reticulation and treatment and a sewage treatment plant;
- Initial sand residue and water supply dams;

- An initial overburden emplacement;
- Project roads;
- Overburden, soil and mineral concentrate stockpiles; and
- Fuel and consumables storage facilities.

The major ancillary infrastructure for the Project comprises:
- A 35km long 66 kV electricity transmission line from the Pooncarie-Wentworth Road to the mine site;
- A potable water pipeline extended some 20 km from an extraction point adjacent to an existing pump station on the Darling River to the mine site; and
- A 58 km highway access road from the mine site to the Silver City Highway.

1.3 State Significant, Integrated, and Designated Development

The proposal is defined as State Significant Development under the *Environmental Planning and Assessment Act 1979* ("the Act"). As such, the Minister for Urban Affairs and Planning is the consent authority for this DA. Under Section 91 of the Act, the development proposal is also an 'integrated development', as, in addition to requiring development consent, the application requires other approvals or licences from other government agencies. These agencies (referred to as integrated approval bodies under the Regulation) include:

- A licence from the Environment Protection Authority under section 47 of *the Protection of the Environment Operations Act 1997*;
- An approval from the National Parks and Wildlife Service under section 90 of *the National Parks and Wildlife Act 1974*;
- A permit under from the Department of Land and Water Conservation under Part 3A of the *Rivers and Foreshores Improvement Act 1948* and a license under section 116 of the *Water Act 1912*; and
- An approval from Wentworth Shire Council under section 138 of the *Roads Act 1993.*

The approval bodies have submitted their general terms of approval, which have generally been adopted as conditions in the recommended instrument of consent.

The proposal is also Designated Development under Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* ("the Regulation") and an EIS has therefore been prepared.

1.4 Lodgement of DA and exhibition

On 17 September 2001, Bemax lodged the DA and EIS with the (then) Department of Urban Affairs and Planning. The DA and EIS were publicly exhibited from Wednesday 26 September 2001 to Monday 29 October 2001, in accordance with the *Environmental Planning and Assessment Act, 1979*. The DA and EIS were exhibited at the following locations:
- The Department of Urban Affairs and Planning Information Centre ,Sydney;
- Nature Conservation Council, Sydney;
- Wentworth Shire Council, Wentworth;
- Telegraph Hotel, Pooncarrie.

Submissions were received until close of the exhibition period. A detailed summary of submissions resulting from the public exhibition of the proposal is given at Appendix 1.

Public notification of the DA involved the placement of notices in the Broken Hill Truth and Sunraysia Daily, and the placement of site signs at various locations on and around the DA area.

The Department is satisfied that the requirements for public exhibition of the DA and EIS and public participation have been fully met.

1.5 Local Council position

Wentworth Shire Council made a submission in response to the project and did not raise any objections. Council submitted that the major issues of concern relate to movement of raw material and the impact of transport of the material on Council roads.

1.6 Government agencies' position

A total of 5 submissions were received from government agencies. The government agencies who made submissions were the Department of Mineral Resources (DMR), the Roads and Traffic Authority (RTA), NSW Agriculture, the NSW Heritage Office and National Parks and Wildlife Service (NPWS). The agencies raised a number of issues in relation to the project which are discussed in detail in Section 4 of the Report and throughout Section 5 of the report. The Department is satisfied that these issues were either clarified or resolved by the Applicant in response to submissions or are addressed by the Conditions of Consent.

1.7 Local community position

A total of two submissions were received from the public. The main issues raised were the impacts of the Project on domestic livestock and pastures, predominantly as a result of increased traffic and related dust generation.

1.8 Request for Commission of Inquiry

No submissions were received that requested a Commission of Inquiry (COI) into the proposed Project.

2.0 THE PROPOSAL

2.1 Site details

The proposed Ginkgo development application area is illustrated by Figure 1. The proposed area subject to mining activities is contained within the area outlined as the MLA area as illustrated by Figure 2. The proposed electricity transmission line easement, potable water pipeline easement and the highway access road also form part of the development application area, and collectively with the MLA area are referred to as the Project area.

The mine lease application (MLA) area comprises flat to gently undulating sandplains covered by a combination of grasslands, low woodlands and shrublands. The land is currently used for pastoral/grazing purposes.

The mine site would be located on two pastoral leases that are administered under jurisdiction of the Westerns Land Commissioner. The MLA area is also bounded on all sides by pastoral leases. The northern boundary of the MLA area runs parallel to Nob Road. Travellers Lake is located approximately 10km to the west and the Darling River is located approximately 20km to the east of the MLA area.

The project also involves the construction of an electricity transmission line, a potable water pipeline and a highway access road. The electricity transmission line would be 35 km in length and would link the mine site with the existing transmission line easement located adjacent to the Pooncarie-Wentworth Road approximately 25 km south of Pooncarie. From the Pooncarie-Wentworth Road the transmission line would cross the Darling River and transverse through a number of leaseholds to the mine site. The transmission line traverses woodlands near the Darling River and mallee and sand dune systems near the mine site. These aspects of the project are also outlined by Figure 2.

The potable water pipeline would be 20 km in length and be constructed from the Darling River to the mine site along the southern side of Nob Road. A pump station would be constructed at the Darling River adjacent to an existing pump station (Greenvale pump station). The vegetation community along Nob Road is woodland and some small patches of dunefield mallee.

The highway access road linking the mine site with the Silver City Highway would comprise parts of Nob Road, Old Roo Roo Road and Old Broken Hill Road, and a new road from Old Roo Roo Road to the Silver City Highway. The access road crosses the Great Darling Anabranch. At this location the access road transverses woodland. Elsewhere the access road would be constructed through predominantly shrublands.

2.2 Land Ownership and Landuse

The mine site is proposed to be located with the Western Division of NSW in the far west of the state. The mine site would be located on two pastoral leases (Aston and Mallara). Land tenure of the Project area is shown in Figure 2. The land is generally only suitable for grazing, and climatic and physical limitations preclude the establishment of improved pastures in the MLA area soils. As such landuse within the MLA area comprises pastoral leasehold lands that are used for light intensity rangeland grazing.

2.3. Production process

The central high grade core of the Ginkgo deposit extends some 6km in length and is up to 400 metres wide. The standing water table lies at an average depth of 40 metres below the ground surface and provides sufficient freeboard for the proposed mining method of a conventional dredge with a floating plant. The dredge and floating plant have an effective operating width of less than 500 m and the mine path has been designed to recover the resource in a single pass.

Overburden material overlying the Ginkgo deposit averages approximately 30 m in depth and overlies approximately 30 m of ore. The mine path would be stripped ahead of the dredge. Stripped overburden would be transported via an overland conveyor system and replaced over sand residues that have been deposited behind the floating plant.

The production of mineral concentrate will involve mining heavy mineral sands (ilmenite, rutile, zircon) using a conventional floating dredge. Primary separation of the minerals from the sands will also occur on a floating plant located behind the dredger. The mineral concentrate will be pumped ashore and temporarily stockpiled prior to transportation by road to a mineral separation plant. As mining of the mineral sands advances along the mine path, replacement of sand residues, overburden and topsoil will progressively be placed behind the dredger. The general arrangements for this mining method and the types and location of the infrastructure are illustrated in Figure 2-5 and 2-6 of the EIS.

2.4 Project Development

The Project will develop in two phases, a construction phase and an operational phase.

The construction phase would involve the installation and commissioning of surface facilities to allow access to the orebody and the commencement of mining. The major construction activities at the mine site would be:

- Vegetation clearance and soil management;
- Excavation of the Construction Pit to allow the assembly of the dredge and planting plant;
- Assembling of the dredge and floating plant;
- Construction of the Initial Water and Sand Residue Dam to provide storage of water and sand residues during the beginning of the operational phase;
- Construction of the overburden emplacement while the overburden conveyor system is installed;
- Construction of the Accommodation Camp;
- Construction of required road works to link the mine site to the Silver City Highway;
- Construction of a 66kV electricity transmission line linking the mine site with an existing transmission line easement located 25km south of Pooncarie;
- Construction of a potable water pipeline and associated pump station, from the Darling River to the mine site.

The operational phase will involve:

- Progressive vegetation clearing, topsoil removal and overburden excavation from the mine path;
- Mining and processing of the mineral sands;
- Transportation of the mineral concentrate to the mineral separation plant;
- Progressive placement of sand residues and overburden behind the dredger;
- Progressive rehabilitation of the mine path.

2.5 Annual production, hours of operation and employment

The Applicant advises that following an initial extraction rate of 8Mtpa in Year 1, the dredging operation would maintain a steady ore mining rate of up to 12Mtpa for the remainder of the 11 year mine life. In total 128Mtpa of ore would be extracted from the deposit. Primary separation of the ore is proposed to occur through the floating plant to be located behind the dredge. This process will produce an average of 450,000tpa of heavy mineral concentrate for transport to a mineral separation plant.

The construction phase of the project would require a workforce averaging around 90 people with a maximum of approximately 145 employees required during a peak 2-3 month period. The construction workforce would work 12 hour day shifts and construction would be undertaken seven days per week.

An operational workforce of some 100 employees is expected. The employees would work on a shift basis with two 12 hour shifts worked in each 24-hour period.

2.6. Mineral Concentrate Transport Route

The EIS describes that mineral concentrate will be transported by road to a Mineral Processing Plant in Victoria and therefore assess the associated impacts with this transportation. However, since the DA and EIS were lodged, the Department has received a further application from the Applicant for a Minerals Processing Plant at Broken Hill.

This Application assesses the impact associated with the transport of mineral concentrate from the mine site along the mine access road, and Silver City Highway to Broken Hill. Should this most recent application be approved, the Applicant proposes to transport material to this site rather than as described in the EIS. However the Department has assessed the proposal as originally submitted.

The transport of the mineral concentrate from the mine site to the mineral separation plant would be undertaken using one hundred tonne payload triple road trains.

The mineral concentrate transport route from the mine site to the mineral separation plant in Victoria will follow:

- A newly constructed road between the mine site and Old Roo Roo Road;
- Old Roo Roo Road;
- A newly constructed road between Old Roo Roo Road and the Old Broken Hill Road;
- The Old Broken Hill Road;
- A newly constructed road between the Old Broken Hill Road and the Silver City Highway; and
- The Silver City Highway;

The route to the Silver City Highway will comprise an all weather road with gravel pavement. Roadworks along the route will include the construction of new roads and a new crossing (across the Great Darling Anabranch), and various intersection upgrades.

2.7. Justification

The Applicant provides various justification for the Project proceeding. Should the Project be approved, the Ginkgo mine would be one of the first mineral sand mines within the NSW Murray Basin. The Applicant assesses that the Project would have a significant effect upon employment and the economy of the Far West and Murray Darling. In doing so, towns in the vicinity of the Project would be able to provide the inputs of the products and services required for employees, and therefore would benefit from the proposal by way of an increase in economic activity.

The Project is estimated to contribute $48M in annual direct and indirect regional output or business turnover. Direct and indirect regional value adding is likely to contribute approximately $19 M including $9 M in household income. The operation of the Project is expected to create major flow on benefits in the electricity supply, mining and road transport sectors.

Were the project not to proceed their would be a loss of employment opportunities for 145 construction and 100 operation phase direct job opportunities, along with indirect opportunities. Also lost would be expenditure of some $85 million for the mine, process equipment and the mine site, and some $75 million in annual economic benefit to the regional economy. In addition, tax revenue and royalties would not be generated, and local infrastructure improvements would not occur.

3.0 STATUTORY PLANNING MATTERS

Various State, regional and local statutory planning provisions apply to the proposed mine. The proposal is a "designated development" under Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* and an EIS has been prepared in support of the application.

State Significant Development

By operation of State Environmental Planning Policy No. 34 (Major Employment Generating Industrial Development (SEPP 34) the Project is classified as State Significant Development. The application of SEPP 34 to this project was determined by the Minister on 13 August 2001.

Designated Development

The Project is designated development as it is a "mine" as described under Schedule 3 of the *Environmental Planning and Assessment Regulation 2000*. Subsequently, an EIS has been prepared in support of the DA. The Department is satisfied that procedures relating to the preparation and public notification of the EIS have been followed.

Integrated Development

The proposal is integrated development, under section 91 of the EP&A Act, as it requires approvals / permits from:

- the Environment Protection Authority (EPA), under sections 47 and 48 of the *Protection of the Environment Operations Act 1997*;
- the Department of Land and Water Conservation (DLWC), under Part 3A of the *Rivers and Foreshores Improvement Act 1948* and sections 10 and 116 of the Water Act 1912;
- the National Parks and Wildlife Service (NPWS) under section 90 of the *National parks and Wildlife Act, 1997;*
- Wentworth Shire Council under section 138 of the *Roads Act 1993.*

3.1 Local Planning Considerations (Wentworth LEP)

The Project is located within the Wentworth Shire. The planning provisions for the Shire are contained within the Wentworth Local Environmental Plan 1993 (Wentworth LEP). Under this plan, the proposed Project area is zoned 1(a) General Rural Zone. The Applicant advises that the proposal is consistent with the objectives of the zone and is permissible with development consent. The Department is satisfied that the project is permissible and consistent with the zone objectives.

3.2 Regional Environmental Plans

There are no Regional Environmental Plans that pertain to the proposed Project.

3.3 State Environmental Planning Policies (SEPP)

SEPP 11 (Traffic Generating Developments)

SEPP 11 requires the consent authority to refer a copy of the DA for the Project to the RTA. The RTA confirmed they had received the DA and EIS in a letter dated 9 October 2001. The Department is satisfied that the provisions of SEPP 11 have been complied with. RTA raised no objection to the proposal.

SEPP No. 33 (Hazardous and Offensive Development)

SEPP 33 was introduced in 1992 to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact. A preliminary hazard

analysis is provided in Appendix I of the EIS. The Department reviewed this preliminary hazard analysis and found it to be adequate. The Department is therefore satisfied that the provisions of SEPP 33 have been complied with.

SEPP No. 44 (Koala Habitat Protection)

SEPP 44 applies to Wentworth Shire (as listed in Schedule 1 of the SEPP) and requires the consent authority to consider whether the land that is the subject of the DA is "potential koala habitat" or "core koala habitat".

Studies conducted for the EIS concluded that no preferred koala forage trees in accordance with Schedule 2 of SEPP 44 were recorded in the MLA Area. However, potential koala habitat occurs at the Darling River and Great Darling Anabranch in areas where the electricity transmission line, potable water pipeline and highway access road would be constructed. The Department is satisfied that the provisions of SEPP 44 have been followed and that the area comprising the project area does not constitute potential 'core koala habitat'.

3.4 Schedule 3 of EP&A Regulation

The proposal is designated development under Schedule 3 of the EP&A Regulation 2000 and an EIS was prepared accordingly. Procedures relating to the preparation and public notification of the EIS have been followed.

3.5 Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act)

The Commonwealth EPBC Act commenced operation on 16 July 2000, with the primary objective of providing protection for the environment, particularly those aspects of the environment that are matters of "national environmental significance". The EPBC Act establishes a scheme requiring environmental assessment and approval of proposals likely to significantly impact on such matters and a determination by the Minister as to whether the proposal is a "controlled action" under the EPBC Act.

The Project was referred to the Environment Australia on 1 February 2001 for an assessment of whether it includes a controlled action under the EPBC Act. Environment Australia gave notice on 23 February 2001 that the development of the Project is not a controlled action under the EPBC Act.

3.6 Threatened Species Conservation Act, 1995

The EIS addresses each of the matters set out in section 5A of the EP&A Act, and concludes that there was unlikely to be a significant impact on threatened species and therefore a species impact statement was not required (SIS). The Department concurred with the original assessment for all threatened species as presented in the EIS with the exception of the impact on the Painted Burrowing Frog (*Neobatrachus pictus*). NPWS also raised significant concerns as to the assessment of the impacts on this species. In response to these concerns the Department requested further information in regard to the impact of the project on this species. The details of the further assessment is outlined in Section 5 of the Report. Following review of this additional information and in consultation with an amphibian expert, the Department concluded that the impact on this species was unlikely to be significant and an SIS was not required. However, the NPWS maintained that an SIS was considered necessary to assess the impact on this species.

3.7 Conclusion

The proposal is in accordance with the provisions of all the relevant environmental planning instruments. The Department is satisfied that statutory obligations as to the preparation of the EIS, notification and public participation have all been met.

4.0 SUBMISSIONS RECEIVED

In accordance with section 79 of the EP&A Act, the Department received a total of 8 submissions in response to the exhibition period. A detailed summary of submissions resulting from the public exhibition of the proposal is given at Appendix 1. Five submissions were received from government agencies, 1 submission from Wentworth Shire Council and two submissions were received from private residents. None of the submissions objected to the proposal. There were no requests for a Commission of Inquiry.

4.1 Government agencies

4.1.1. Submissions

A total of 5 submissions were received from government agencies, along with a submission from Wentworth Shire Council.. No agency objected to the proposal.

Submissions were received from:
- Department of Mineral Resources (DMR);
- NSW Agriculture;
- Roads and Traffic Authority (RTA);
- NSW Heritage Office;
- National Parks and Wildlife Service (NPWS); and
- Wentworth Shire Council.

DMR

DMR expressed support for the Project, provided that controls are in place that minimise the impacts on the environment, adjoining landholders and relevant stakeholders, and that the proposed operations are carried out in accordance with relevant statutory requirements.

DMR did however raise particular concern with issues involving:
- Deficiencies of the EIS in relation to reporting of mineral reserves and design of associated infrastructure;
- The intent of the Proponent to mine known lower grade mineral sands that exist within the orebody;
- Rehabilitation;
- Air Quality; and
- Environmental management and monitoring plans and safety management plans.

The Department forwarded these concerns to the Applicant, and an adequate response or further clarification of the issue was provided. These issues are addressed throughout Section 5 of the Report.

RTA

The RTA stated that all their requirements had been complied with. The RTA neither objected to nor raised concerns about the proposed Project.

NSW Agriculture

A submission from NSW Agriculture stated that they were unable to comment on the Project due to the lack of specific detail offered in the EIS. The specific details lacking in the EIS related to:
- The final use of the site;
- Specifics of the rehabilitation of the mine site and MLA area;
- Weed and pest management;
- Emergency incident management;
- The fencing to be used for securing the MLA area;
- The management of the non-mined area within the MLA area.

These outstanding issues were raised directly with the Applicant, and an appropriate response was provided as to how the Applicant would address these concerns. These area issues are discussed in more details in Section 5 of the Report.

The Heritage Office

The Heritage Office was concerned that the Project involved the removal of an historic survey mark (circa 1860's). In response to these concerns the Department has included a provision in the consent conditions in accordance with the recommendations from NSW Heritage.

National Parks and Wildlife Service

NPWS raised concern with the eight-part test for the Painted Burrowing Frog, and specifically with the conclusion that there will be no significant impact upon on this species. NPWS considered that given the species low numbers and the limited extent of the populations, the Project would have the potential to result in a significant impact on two populations of Painted Burrowing Frogs, and therefore an Species Impact Statement was considered to be required.

NPWS also raised a number of outstanding issues about the Aboriginal cultural heritage assessment. These concerns related to the lack of details provided for consultation with the Local Aboriginal Land Council, lack of details about specific mitigation measures and procedures for the dissemination of cultural heritage information

Wentworth Shire Council

The Council submitted that it supported the Project. The main concerns of the Council related to movement of raw material and the impact on roads. The Council required the company to enter into an appropriate agreement with Council regarding the construction and maintenance of the road from the mine entrance to the Silver City Highway. In addition Council requested the company be encouraged to improve mobile phone coverage in the area.

4.1.2. Requests for further information

Additionally, three integrated approval bodies requested further information after reviewing the EIS to enable them to assess whether general terms of approval could be issued for the proposal:

Environment Protection Authority (EPA)

In response to their review of the information provided in the EIS, EPA required further information in respect of the classification for waste generated off-site that is proposed to be disposed at the mine site, including details of testing methods and generation of this waste.

Department of Land and Water Conservation (DLWC)

DLWC requested further information in relation to the following issues:

- mitigation measures for potential impacts associated with extraction from groundwater;
- groundwater recovery post mining;
- sensitivity analysis of the hydrogeological model;
- proposed design of the structure that will cross the Great Darling Anabranch;
- rehabilitation.

The Applicant supplied the information requested by these government agencies and their general terms of approval are contained in the Conditions of Consent.

4.2 Public submissions

Two public submissions were received during the exhibition period. The submissions did not oppose the Project but raised the issues of possible stock losses due to increased traffic along unfenced roads and the impacts to pastures caused by dust generated from traffic movement. These issues were raised with the Applicant and an appropriate response provided or these issues are addressed by the conditions of consent.

5.0 DEPARTMENT OF URBAN AFFAIRS AND PLANNING'S CONSIDERATION

Key issues

The Department has identified the key issues for the Project as being:

- Groundwater and surface water
- Air Quality
- Noise
- Flora and Fauna
- Aboriginal Archaeology
- European Heritage
- Transport and roads
- Waste management
- Hazards and Risk
- Socio-economics
- Ecologically Sustainable Development

5.1. Surface and groundwater

5.1.1 Groundwater

Applicant's position

The Applicant engaged Golder & Associates to assess the existing groundwater environment and the potential impact on groundwater resources. The report is contained in full at Appendix J to the EIS, and summarised in section 4.5 of the EIS.

The EIS describes that the Ginkgo deposit lies within a large aquifer that extends west to the Great Darling Anabranch, east to the Darling River and south to the Murray River. The groundwater investigation program analysed groundwater samples collected from 4 wells. The groundwater quality recorded from the mine is reported in the EIS to be typical of the water quality from the aquifer that is unsuitable for human/stock consumption or agricultural use. The water quality recorded at Chalky Well, which was one of these fours bores and located 15 kilometres from the MLA area, represents an isolated lense of less saline water developed at shallow depth overlying the main aquifer.

In order to assess the potential impacts on local groundwater systems, a hydogeological investigation of the project was undertaken.

- Groundwater extraction

The EIS indicates that the Project will use 100 L/s of groundwater in the first year and 60 L/s of groundwater in the following years. This water would be provided by a groundwater borefield located within the MLA adjacent to the initial sand residue dam and approximately 1 km south-west from the centre of the mine. The borefield would comprise six production bores a minimum of 100 m apart, as illustrated in Figure 2.1 of the EIS.

The EIS details that on the basis of groundwater modelling the predicted groundwater extraction would result in a 14cm draw down at Chalky Well (the nearest operating landowner well) by the end of mining (Year 11). The EIS described this draw down as negligible. Chalky Well is the only well currently used within approximately 15 km of the proposed mine site and is utilised for stock watering. It is expected that recharge after the cessation of mining activities will enable the return of the water table to its pre-mining level.

The Applicant also advises that there would be a small net reduction in the water table over the a large area between the Darling River and the Great Darling Ananbranch as a result of the Project. The slight reduction in the water table in the vicinity of the site would ultimately have the effect of slightly reducing the flux of saline

groundwater to areas of discharge. However this small net reduction in the water table is expected to slowly recharge after mining ceases.

- Initial Sand Residue Dam and Initial Water Dam

The EIS described that in order to provide storage for water pumped from the process water borefields during the construction period, an initial water dam would be constructed with overburden materials from the construction pit. The storage would cover an approximate area of 10 ha with embankments an average of 10 m in height.

An initial sand residue dam would be constructed to store residues that initially cannot be returned to the dredge pond behind the floating plant. The dam would cover an approximate area of 40 ha with embankments averaging 15 m in height.

The EIS outlines that the initial sand residue and water dams have the potential to leak saline water to the groundwater.

Mitigation Measures proposed by the Applicant

The Applicant does not propose any mitigation measures to minimise the use of groundwater at the mine or to mitigate the potential impacts on the groundwater resource. However the EIS describes that a network of monitoring bores, comprising existing and proposed bores would be used to monitor groundwater quality and level. In addition, water levels would be monitored at production bores at the borefield and at monitoring bores within the MLA area. Groundwater levels will be monitored monthly at the production borefield and monitoring bores within the MLA area.

The EIS outlines that groundwater quality monitoring would be undertaken quarterly and the suite of parameters analysed would include electrical conductivity, sodium, potassium, calcium, magnesium, chloride, bicarbonate, sulphate, total iron, manganese, lead and phosphorous.

Mitigation measures proposed to minimise saline water held in the initial sand residue and water storage dams leaching into the groundwater, are design based. The design of the dams will incorporate clay liners, a cut-off trench, compaction of *in-situ* soils and a toe drain. Surface water runoff from the dam embankments will be directed to sumps.

Community/Agency Position

The private submissions received by the Department did not raise any concerns relating to groundwater use.

DLWC advised that the groundwater assessment detailed in the EIS is adequate however requested further information in respect of groundwater impacts regarding:

- Measures that would be undertaken to mitigate impacts to landholders if groundwater use at the mine lowers water levels in the shallow aquifers utilised by the landholders;
- Management of groundwater dependent ecosystems located at Salt Lakes that may be impacted from the lowering of the groundwater level;
- The additional inflow of water from the Darling River into the groundwater system;
- Expected leakage volumes from the initial water dam and sand residue dam;
- A sensitivity analysis of the hydrogeological assessment.

The Applicant subsequently provided further information to the DLWC in regard to the above issues. In their response the Applicant stated:

- A management plan detailing monitoring and contingency mitigation plans will be developed;
- Based on the modelling undertaken, groundwater drawdown at the Salt Lakes would be immeasurable and within the range of climatic variations, thus a study of the impacts on ecosystems is not required;
- As drawdown is negligible a study of the time expected for 100% recovery is not required;

- Modelling indicates that there will be no measurable additional inflow into the Darling River or Great Darling Anabranch;
- Conservation values for parameters were used in the modelling and thus the results are conservative which accounts for any sensitivity analysis.

DLWC were satisfied with the response provided by the Applicant and subsequently provided their GTAs for the project.

The DMR expressed concern in their submission about the source, location, quality and quantity of the clay overburden material proposed for use as a clay liner in the initial sand residue dam and the initial water dam. DMR also expressed concern with the lack of detailed information given in the EIS about the design of the dams. The Applicant provided response to these concerns drawing attention to the specific sections of the EIS and the design and modelling undertaken by Golder Associates. The Applicant also indicated that further detail would be provided in the Project Feasibility Study and included in the Mine Operations Plans for the project.

Department's Position

The Department is satisfied that the EIS and the additional information provided in response to DLWC's request for further information, adequately assesses the impacts on groundwater. The management of ground water quality is subject to strict controls under the recommended conditions of consent. The Department has incorporated in the conditions of consent a requirement that the Applicant prepare a Site Water Management Plan to the satisfaction of the Director-General and DLWC. This plan shall include measures for the management of the quality and quantity of groundwater, measures to prevent the quality of any ground waters being degraded and a projection of potential groundwater changes during mining and post-mining. The conditions of consent also require the Applicant to implement a groundwater monitoring program to the satisfaction of the Director- General and DLWC. The conditions also incorporate DLWC's other General Terms of Approval, including the requirement for the preparation of a Borefield Impact Mitigation Plan by the Applicant.

The Department is satisfied potential impacts on surface and groundwater quality and land resources will be adequately addressed by the mitigation and management measures outlined in the EIS and the recommended conditions of consent.

5.1.2. Surface water

Applicant's Position

The Applicant describes that the Project Area is located within the lower Darling River system, which is a component of the larger Barwon-Darling River System. However, the EIS describes that there are no well defined drainage channels within the MLA areas as a result of the limited and well dispersed annual rainfall, the sandy soils, limited topographic relief and high evaporation rates. Notwithstanding, overland flow does occur during prolonged rainfall events and surface waters accumulate in topographic depressions and then evaporate or seep into the groundwater table over time. The EIS indicates that due to the lack of surface water bodies in the MLA area, no details of the quality of existing surface water is available.

Potential impacts

The EIS states that the potential impacts to surface water systems are limited due to the location of the mine site away from any significant surface water systems and the absence of any well defined drainage channels within the MLA area and immediate surrounds.

Occasional prolonged rain can generate surface water and the EIS identified a number of scenarios that might cause this water to become contaminated. These are listed in Table 1 below.

Table 1. Potential water contamination scenarios.

Operational Area	Potential Impact Scenario	Type of Potential Contamination
Potable water pump station – diesel storage	Diesel spillage to downstream surface waters during operation	Diesel, oil
Potable water pump station	Drainage of sediment laden runoff to downstream surface waters during construction. Mobilisation of sediments resulting from a pipe failure during operation	Sediments
Electricity Line	Drainage of sediment laden runoff to downstream surface waters during construction	Sediments
Project Roads	Drainage of sediment laden runoff to downstream surface waters during construction. Potential erosion and sedimentation and salinity issues resulting from runoff from road surfaces and associated systems	Sediments, salt

The EIS states that the amount of water to be extracted for potable water use at the mine site (63ML) from the Darling River is not significant in terms
of the total volume of water in the river. This water would be allocated under normal Darling River allocation rules.

Mitigation Measures proposed by the Applicant

Despite the predicted low potential for surface water impacts, the Applicant does propose a number of mitigation measures to minimise surface water impacts. These measures include:

- Using bunds to segregate disturbed and undisturbed areas and to channel water to sumps;
- Using collected surface water for dust suppression;
- Removing salt collected in sumps resulting from the use of saline groundwater for dust suppression; and
- Progressively rehabilitating and revegetating disturbed areas.

No mitigation measures are proposed in the EIS to minimise use of potable water drawn from the Darling River.

Community/Agency Position

The private submissions received by the Department did not raise any concerns relating to surface water protection and management.

DLWC requested further information to enable them to assess whether GTAs can be issued. Amongst other issues, DLWC sort further information regarding:

- Landholders consent for the Applicant to use their surface water entitlement; and
- Various landholders consent for the construction of the potable water pipeline through their properties.

This information was supplied to DLWC by the Applicant and DLWC expressed satisfaction with the information.

Department's Position

The Department is satisfied that due to the topography and other characteristics of the land, the Project does not pose a significant risk to surface water quality or quantity. However, in order to ensure that any potential impacts are effectively minimised the Department has recommended in the conditions of consent that Applicant be required to prepare a Site Water Management Plan. This plan must detail, amongst other issues, proposals for the management of surface water quality and quantity, measures to prevent the quality of any surface waters being degraded and measures for the segregation of waters of varying qualities. The conditions also impose a restriction on the rate of extraction of water from the Darling River to 63 megaliteres per annum. The recommended conditions of consent have taken into account the comments from DLWC regarding soil and erosion management and incorporated the recommendations of DLWC where possible. The development of an Erosion and Sediment

Control Plan is also required under the conditions, and shall include details of sediment and erosion control systems, and ways of measuring the effectiveness of these systems. The Department considers that the mitigation measures proposed by the Applicant along with the recommended consent conditions will adequately protect surface waters in the Project areas.

5.2 Air Quality

Applicant's Position

The Applicant commissioned Holmes Air Science to undertake an air quality assessment for the Project. This assessment report is contained in full in Appendix D to the EIS, and the results are summarised in Section 4.4 of the EIS.

Existing Environment

The EIS states that due to the rural location of the mine site, background air pollution levels other than particulate matter, would be insignificant. A qualitative estimate of background levels of particle size less than 10 microns (PM_{10}) and total suspended particles (TSP) was made and is shown in Table 2 below.

Table 2 - Existing background dust levels.

Dust Fraction	Estimated Background Concentration	Timeframe
PM_{10}	5 to 200 μg/m^3	24-hour average
PM_{10}	<10 μg/m^3	Annual average
TSP	25 μg/m^3	Annual average
TSP	2 grams/m^2/month	Annual dust deposition

Air Quality Criteria

The air quality criteria used to assess the impacts of dust were compiled using criterion from various regulatory bodies. The health based and amenity based air quality criteria used in the EIS for the assessment of air quality at the mine site and in areas surrounding the MLA Area are shown in the Tables 3 and 4 below.

Table 3. Air Quality Criteria (Mine Site).

POLLUTANT	CRITERION	AGENCY
TSP	90 μg/m^3 (annual mean)	NHMRC
PM10	150 μg/m^3 (average of 99th percentile of 24-hour averages over three years)	US EPA Standard
	50 μg/m^3 (annual mean)	US EPA Standard
	50 μg/m^3 (24-hour maximum)	NSW EPA reporting standard
	30 μg/m^3 (annual mean)	NSW EPA long-term reporting goal
	50 μg/m^3 (24 hour average, 5 exceedences permitted per year)	NEPM reporting standard
PM2.5	65 μg/m3 (98th percentile of 24-hour averages over three years)	US EPA Standard
	15 μg/m3 (1-year average)	US EPA Standard

Table 4. Air Quality Criteria (Beyond MLA area).

Existing dust fallout level (g/m2/month)	Maximum acceptable increase over existing fallout levels (g/m2/month)	
	Residential	Other
2	2	2
3	1	2
4	0	1

Selected Climate Data

Climate data for the purposes of air quality data was collected from a number of sites located in the region of the MLA Area. The source of data collected is described in Table 5 below.

Table 5. Source of Climatic Data

Parameter	Source
Rainfall	Bureau of Meteorology data for Menindee (108km NNW of the MLA area)
Wind	Lake Mungo (60km SE of the MLA area)
Temperature and humidity	Bureau of Meteorology data for Menindee (108km NNW of the MLA area)

Assessment of Impacts

To assess the impacts of the estimated emissions, dispersion modelling was undertaken. The US EPA's Short-term Industrial Source Complex Model was used to model emissions from the mine site emissions and emissions from haulage trucks. The main sources of dust emissions were found to result from the operation of site dozers, wind erosion from cleared areas ahead of the dredge and traffic generated road dust along the mineral concentrate haulage.

It was estimated in the EIS that operational activities in Year 10 would represent the worst case scenario for air dust emissions. The estimated emissions were therefore calculated for Year 10 of operation based on calculated emissions from specific activities undertaken during that year.

The results of the modelling at the nearest receptor of Manilla Homestead approximately 4 km from the mine site are shown in Table 6 below for both emissions from the mine site and from haulage operations.

Table 6. Results of the dispersion modelling at Manilla Homestead

Pollutant	Predicted Concentration	Criteria
Mine site		
PM10 (max. 24-hour average)	6 $\mu g/m^3$	150 $\mu g/m^3$ (US EPA standard) 50 $\mu g/m^3$ (NSW EPA standard)
PM10 (annual average)	0.5 $\mu g/m^3$	50 $\mu g/m^3$ (US EPA Standard) 30 $\mu g/m^3$ (NSW EPA long-term goal)
TSP (annual average)	0.5 $\mu g/m^3$	90 $\mu g/m^3$ (NMHRC guideline value)

Dust (increase in average annual deposition)	<0.2 g/m^2/month	2 g/m^2/month (NSW EPA goal)
Haulage Trucks		
PM10 (max. 24-hour average)	6 μg/m^3	50 μg/m^3 average over 8-hour
PM10 (annual average)	0.5 μg/m^3	

Based on the modelling results and considering the likely existing dust levels, the EIS concludes that emissions of dust would be within the various dust criteria.

Mitigation Measures proposed by the Applicant

Notwithstanding the low levels of dust deposition and generation of suspended particulate matter, the EIS does outline a number of air quality safeguards which would be employed to reduce emissions of atmospheric dust. These measures are as follows:

- minimisation of disturbance areas and exposed surfaces;
- application of organic and or biodegradable dust suppressant;
- prevention of machinery overloading;
- progressive rehabilitation of disturbed areas;
- watering of road surfaces on project roads to reduce dust emissions with the MLA where required.

The Applicant advises that the safeguards are based on current control techniques as recommended by the NSW EPA and should effectively minimise the dust impact from the proposal.

Community/Agency Position

Two submissions received by the Department from members of the community stated that they were concerned about the potential impacts of dust generated by haulage trucks using the unsealed highway access road.

One submission explained that although dust levels would be low at the homesteads located close to the mine, it is the dust levels in the paddocks, located close to the mine and roads, that are relevant because this is where the owners of these properties live and work.

Other specific concerns were for the impacts of transport generated dust on pastures and vegetation. The submissions stated that from local experience dust generation from the proposed use of triple load road trains would be significant and that this dust will impact the quality of pastures. One submission posed the question of who would be the authority who would determine whether their dust-affected pastures are suitable or otherwise for grazing.

The Department raised these concerns with the Applicant. A response to the issues raised in the submissions was provided by the Applicant and their consultant, Holmes Air Sciences. The Applicant advised the Department that dust deposition levels resulting from 40 road train passes per day is likely to be less than 4/g/m^2 month at distances of greater than 50 m from the road corridor. The Applicant also emphasised that photosynthesis and leaf diffusion resistance was reduced at 5 to 10 g dust per m^2 leaf surface. Accordingly, the Applicant concluded that dust deposition levels as a result of the Project would not adversely impact on agricultural activities in the local area. The Departments response to this issue is outlined below in the "Department's position".

The EPA did not raise any concerns about the dust assessment criteria used in the EIS or in respect of the potential dust impacts resulting from the proposal. The EPA therefore provided its GTAs for the Project, which included requirements for the operation to be carried out in a manner that will minimise dust emissions and requiring dust mitigation measures to be undertaken.

The submission received from the Department of Mineral Resources stated that the EIS failed to state the volume, quantity and quality of water to be used for dust suppression. The issue was raised with the Applicant and a satisfactory response was provided to clarify this issue.

Department's Position

The Department considers that the air quality assessment given in the EIS satisfactorily assessed the possible effects on air quality and dust deposition due to the Projects activities. The Department also concurs with the conclusions made in the EIS that TSP and dust levels generated at the nearest receptor (Manilla Homestead) are expected to be low and below the relevant criteria.

Although the EIS does not predict exceedances of the air quality goals, the recommended consent conditions provide that the Applicant shall manage the Project so as to satisfy the relevant EPA air quality criteria for dust deposition. Due to the remote location and the very low TSP increases predicted, the Department has not incorporated a TSP criteria.

The conditions also require the Applicant to prepare a Dust Management Plan detailing air quality safeguards and procedures for dealing with dust emissions from the Project. The Plan shall include, amongst other issues, protocols for dust suppression and equipment to be used to control dust generation, details of a dust monitoring program and the establishment of a protocol for handling dust complaints.

The conditions of consent provide also that if a landholder believes that the relevant air quality criteria is being exceeded at his/her residence, and the Director-General is satisfied that further investigations are required, the Applicant must:

- consult with the landholder to determine his/her concerns;
- arrange for independent dust investigations to quantify impact and determine the source of the effect;
- if dust criteria are demonstrated to be in exceeded take steps in accordance with the Dust Management Plan including the introduction of additional controls and/or the negotiation of an agreement regarding amenity at the residence.

In light of the submissions received, and taking into account the experience of local residents of the region, the Department was concerned that transport generated dust may cause unacceptable impacts to pastures and vegetation located adjacent to the highway access road and other existing roads likely to be used by mine generated traffic.

Theses concerns were raised with the Applicant. The Applicant responded that scientific analysis has found that photosynthesis and leaf diffusion resistance was reduced at 5 to 10 g dust per m^2 leaf surface. Deposition levels greater than this would be restricted to a narrow corridor near the road. The Applicant further advised that Holmes Air Sciences indicates that dust deposition levels is likely to be less than $4g/m^2$/month at distances of greater than 50 m from the road corridor.

Notwithstanding, the Applicant's response to this issues, the Department has included a condition that the Applicant shall ensure agricultural activities on properties adjacent to the Mine and the Minerals Concentrate Transport Route are not adversely affected by dust generated by the Project. Should agricultural activities be affected, the condition requires the Applicant to identify measures to remediate this impact in consultation with the lease holders of the affected property. This condition will adequately protect the agricultural land uses within the local area and provide a mechanism for consultation with affected leaseholders, and where necessary appropriate remediation measures.

The Department considers that the recommended conditions of consent regarding management, mitigation and monitoring, in addition to the measures detailed in the EIS, will adequately address the concerns raised in submissions and enable a sufficient level of management of potential dust impacts.

5.3. Noise

Applicant's Position

The Applicant commissioned Holmes Air Sciences to undertake a noise assessment for the Project. This report is contained in full in Appendix C of the EIS, and the key findings outlined in Section 4.3 of the EIS.

Existing Environment

The Applicant undertook a noise assessment in accordance with the NSW Industrial Noise Policy (2000) (INP) and the NSW EPA Environmental Criteria for Road Traffic Noise (1999). Mine site and road transport noise was assessed for both the construction and operational phases of the Project.

Due to the existing surrounding land use, namely primarily low intensity rangeland grazing, no existing noise monitoring was undertaken. The existing noise level was assumed to be 30dBA in accordance with the INP.

Similarly, no background noise monitoring was undertaken at the Silver City Highway. Existing noise was calculated based on RTA data of vehicle passes and proportion of heavy vehicles passing through Wentworth. Based on this data, the calculated existing vehicle traffic noise for Wentworth is given in Table 7 below.

Table 7 - Calculated Existing Vehicle Traffic Noise - Wentworth

Distance from Highway to Receiver (m)	L_{Aeq}(1h) (dB(A)) Week Day	L_{Aeq}(1h) (dB(A)) Weekend
10	64.8	63.1
50	55.8	54.1
100	52.8	51.0
1000	42.4	40.4

Noise Criteria

The INP specifies that the intrusiveness criteria requires that the L_{Aeq}, 15 mins should not exceed the measured background noise levels by more then 5 dB(A). Given the low background noise the intrusiveness criteria is the most stringent criteria to be applied. The EIS therefore identifies that provided the Project is predicted to result in L_{Aeq} levels over the relevant averaging period of less than 35dB(A), then noise levels would fall within the acceptable range required by the INP.

Noise criteria used in the EIS to assess off-site noise transport levels were derived using the NSW EPA Environmental Criteria for Road Traffic Noise. The criteria used are show in Table 8 below.

Table 8. NSW EPA Environmental Criteria for Road Traffic Noise

Road Category	Level dB(A)	Time
Collector Road	60	7am to 10 pm
	55	10 pm to 7 am
Local Road in rural area	50	7am to 10 pm
	45	10 pm to 7 am

Noise impacts

Noise levels in the surrounding areas to the mine site were predicted using a computer-based noise prediction model NOISE5. Both the construction and operation phase noise levels were considered and it was determined that the construction phase would generate the most noise, and hence the construction noise levels were modelled as the worst case scenario.

- Construction

The results of the noise modelling indicate that the maximum L_{Aeq} likely to occur at the closest residence, the Manilla homestead (approximately 4km from the mine site), is 29dB(A). This result assumes all construction activity commences at the point closest to the approach that the ore-body makes to the Manilla Homestead, and that all equipment used for initial mine development was in simultaneous operation. This prediction is within the most stringent of the noise goals (the intrusiveness criteria)) of 35dB(A).

- Operational

As discussed above, the EIS reasons that on the modelling conducted in the EIS the operational noise generated at the mine site would be less than the construction noise impact, and therefore the noise levels would also be below the intrusive criterion.

- Transport and road noise

Transport noise has been assessed for mineral concentrate haulage traffic only as this was considered to be the worst case scenario for traffic noise emissions. Noise levels generated by off-site transport were also shown in the EIS to be below the local road level criteria at the nearest receptor (Manilla Homestead). However as shown in Table 9 below, the existing noise levels in the Wentworth area exceed EPA goals for residences close to the road. The EIS states that because the increase in total traffic caused by the Project in the Wentworth area is only minor, the increase in the total noise level caused by the haulage trucks would not be discernible. Thus it is stated that the predicted noise emissions from the mineral concentrate haulage vehicles would not significantly increase the existing noise levels.

Table 9. Predicted transport noise levels

Distance from Receiver (m)	Noise Levels predicted from Existing Vehicles L_{Aeq} (1h)	Noise Levels calculated for Expected Total VehiclesL_{Aeq} (1h)	Criteria EPA Collector Road
10	64.8	65.1	60 dB(A) daytime 55 dB(A) night time
50	55.8	56.1	
100	52.8	53.1	
1000	42.4	42.8	

Mitigation Measures

The Applicant does not propose any initial mitigation measures to minimise noise emissions from the mine site. However, should noise impacts be raised as a concern, the Applicant proposes to consult with those affected in order to resolve these issues. Should an appropriate agreement not be reached, monitoring arrangements would be implemented to assess compliance with relevant criteria. If warranted the Applicant would then seek to implement mitigation measures.

The Applicant proposes several mitigative measures to control transport noise levels. Firstly, road train drivers would be trained to avoid exhaust braking at night in built up areas and in the vicinity of homesteads along the highway access road. Secondly, in the event of a landholder or resident raising concern regarding traffic noise that cannot be resolved by consultation, the Applicant will implement monitoring to assess compliance with the applicable road transport noise criteria would be undertaken in consultation with regulatory authorities and the affected resident. Further if Project related traffic noise effects are demonstrated by compliance monitoring then further mitigation measures would be considered in consultation with regulatory authorities and the affected resident. The EIS outlines that such measures may include acoustic barriers or alterations to dwellings.

Community/Agency Position

Neither of the submissions received from the public raised concern with the expected noise levels generated from the mine or from associated mine activities.

DMR stated in their submission that noise issues relating to occupational health and safety of mine employees was their responsibility and periodic monitoring will be undertaken by them to ensure noise exposure limits are not exceeded.

EPA did not raise any issues in regard to the noise modelling and impact assessment, nor any concerns about the predicted noise levels as a result of the Project.

Department's Position

The Department considers the noise assessment undertaken in the EIS to be satisfactory and concurs that noise emissions from the mine site during the construction and operational phases would not increase noise levels at the nearest receptor (Manilla Homestead) above the relevant statutory criteria.

The EIS indicates that a small increase in total traffic through Wentworth will occur as a result of the Project. The EIS considers that additional noise caused by this greater traffic volume will be indiscernible compared with the noise from existing traffic. The Department concurs with this finding.

The Department did however note that the EIS did not consider the noise levels expected to occur at nearby residences during the construction of the highway access road. This issue was raised directly with the Applicant and an appropriate response was provided. The Applicant submitted that in light of the distance from the noise source to the nearest residence, the short term nature of these works and their restriction to daytime hours, noise emissions will be well within EPA criteria at the nearest residences.

Notwithstanding that the modelling in the EIS suggests the Project will satisfy the relevant noise criteria, the Department has recommended a number of conditions be incorporated in the conditions of consent. Firstly, the Applicant must ensure that noise emissions from the operation of the mine and associated activities do not exceed 35dB(A) at all non-project related residences. In the event that a landowner or occupier of a non-mined owned property considers that noise from the Project at their dwelling is in excess of 35dB(A) and the Director-General is satisfied that an investigation is required, the Applicant shall be required to consult with the landowner or occupants affected to determine their concerns, and where necessary make arrangements for appropriate independent to quantify the impact and determine the source of the effect and the contribution of the Project to the effect. If the exceedences are demonstrated by the investigation to result in part from the mine related activity, the Applicant will be required to introduction of additional controls or seek agreement of the landowner to undertake noise mitigation measures at the dwelling or to provide acceptable compensation for the noise levels experienced. If a landowner disputes any noise mitigation or other measures proposed by the Applicant in accordance with sub-clause (a) above, the matter shall be referred by either the Applicant or landowner to the Director-General. If the matter cannot be resolved within 21 days, the matter shall be referred to the Independent Dispute Resolution Process.

The conditions of consent also required the Applicant to prepare a Noise Management Plan for the construction and operation of the Project, and for traffic noise associated with the Project along the Minerals Concentre Transport Route. The Plan shall include, but not be limited to mitigation measures to limit noise emissions; response to any community issues of concern and details of proposals to limit road transport noise, including an outline of an education and training program to avoid exhaust braking at night in built up areas and in the vicinity of homesteads along the highway access road.

The Department considers that the recommended conditions of consent as outlined above will adequately minimise noise impacts from the Project and provide adequate protection for the local community.

5.4 Flora and Fauna

5.4.1. Flora assessment

Applicant's position

The Applicant commissioned Orchid Research and Marianne Porteners Environmental Consulting to undertake a terrestrial flora survey and assessment addressing the Project MLA and ancillary infrastructure areas. This report is contained in full at Appendix G to the EIS and the findings of the reports are summarised in Section 3.5.1 of the EIS.

The EIS describes that overall, the region retains most of its natural vegetation cover and a large range of native fauna, albeit habitat has been significantly altered by over 150 years of European settlement and pastoral activities. The flora study revealed that the flora in the Project areas has been altered by the grazing preferences of livestock and the clearing of woodlands and shrublands, however the areas maintain their natural integrity. Fortunately the remote location of the Project and the historical landuse of low intensity grazing of native grassland and shrubs has resulted in only a limited intrusion of weed species.

The surveys for the Mining Lease Application (MLA) area where conducted in Spring 2000 after high rainfall while the remainder of the study area was surveyed in Autumn 2001. The flora field survey, undertaken in October 2000, incorporated the MLA Area and areas surrounding the MLA Area that may be subjected to indirect impacts. Survey of the corridors to be affected by the highway access road, transmission line and potable water pipeline were undertaken in May 2001.

The flora surveys undertaken as part of the EIS involved both transect and quadrat based surveys and included targeted searches for threatened flora species. No threatened flora species were recorded in the study area, however assessments of significance were conducted for 21 threatened flora species based on the presence of habitat in the study area. All 21 assessments concluded that the proposal is unlikely to significantly affect these species and therefore a SIS is not required.

The flora study involved:

- A review of relevant flora publications, the *Threatened Species Act* 1995 and the *Environmental Protection and Biodiversity Conservation Act* 1999 for listed vulnerable, endangered and extinct species that could possibly occur in the Project area;
- Consultation with and review of information provided by NPWS;
- Field flora surveys;
- Preforming eight-part tests for selected threatened species

The flora field survey, undertaken in October 2000, incorporated the MLA Area and areas surrounding the MLA Area that may be subjected to indirect impacts. The flora field survey also incorporated the corridors to be affected by the highway access road, transmission line and potable water pipeline. The flora surveys of the infrastructure areas were undertaken in May 2001.

The results of the flora study revealed:

- Eight flora communities in the MLA Area;
- The flora in the Project areas has been altered by the grazing preferences of livestock and the clearing of woodlands and shrublands, however the areas maintain their natural integrity;
- 261 flora species were identified in the Project areas including 219 native and 43 exotic species;
- No plant communities listed as threatened under the TSC Act were found in the Project areas; and
- No species listed as threatened under the TSC Act and EPBC Act were found in the Project areas.

Potential Impact

The Applicant undertook an assessment of the impacts on threatened species that could potentially occur in the Project and undertook eight-part tests on 21 selected species. The results of the eight-part tests concluded that the potential impact would be limited because the primary habitat for these species would only be affected by the electricity transmission line and highway access road construction, where disturbance would be short lived and of limited area.

The study identified that within the MLA Area, disturbance would be restricted primarily to behal (21% of total behal area) and chenopod (22% of total chenopod area) habitats. Fourteen percent of the MLA Area will be directly disturbed by the Project. Disturbance of flora in the infrastructure areas is considered to be minor because vegetation clearance along corridors would be limited and some infrastructure would be constructed along already high-disturbed area such as roads and tracks.

Mitigation Measures

The Applicant proposed a range of mitigation measure to minimise the impact of the Project on flora. These measures are as follows:

- Unnecessary clearance would be avoided;
- Vegetation marking or fencing will be used to ensure accidental damage does not occur to flora located adjacent to disturbance areas;
- Minimising soil disturbance in the electricity transmission line corridor during clearing;
- Maximising the use of cleared vegetation in the rehabilitation programme;
- A flora and fauna management plan and a weed management plan would be implemented.

Community/ Agency Position

Both public submissions expressed concern about the impacts of dust, which would be generated by mine traffic (particularly the mineral concentrate road-trains), on vegetation and pastures located adjacent to mine access roads. The Department's position on this issue and proposed conditions to address this concern is outlined in Section 5.2 (Air Quality) of this report.

NSW Agriculture expressed concern in their submission that a weed management programme had not been addressed in the MLA Area. The Applicant indicated that this issue would be included as part of the Flora and Fauna Management Plan.

Department's Position

The Department is satisfied that the flora study undertaken for the MLA Area adequately identified the existing flora in this area and addressed the potential impacts of the Project on the identified flora and potentially occurring threatened flora species in the Project Areas. In relation to the MLA area, the Department is satisfied that an adequate amount of survey effort was applied and the surveys were done at a highly appropriate time, when the ability to detect the majority of threatened species would be high. However, the Department did raise some concerns with the surveys conducted for the remainder of the study area.

The Department noted concerns about the appropriateness of the surveys for short-lived threatened species that die off after rain (in particular *Swainsona flavicarinata* and *Swainsona.adenophylla*) within areas outside the MLA area. This includes the Potable Water Pipeline and Highway Access Road corridors. It is understood that when the surveys were conducted within these areas, most evidence of these species would have disappeared due to their ephemeral nature (App GA p35 & 39). Although the flora assessment recognises this (suggesting pre-clearance surveys targeting these species to be conducted) the Department requested a quantification of the amount of potential habitat of these species to be cleared. In addition, the Department requested information on the manoeuvrability of the infrastructure to avoid impacts on threatened species found from the pre-clearance surveys and the practicality of restricting these pre-clearance surveys till after rain.

The Applicant responded that the study area lies entirely outside the known range of *Swainsona flavicarinata* and does not support potential habitat of the species. In respect of *Swainsona adenophylla* the Applicant responded

that within the project area the potential habitat for this species occurs only where the proposed highway access road crosses the Great Darling Anabranch and where the proposed electricity transmission line crosses the Darling River. The Applicant submits that the small portion of potential habitat to be removed/modified at these crossings constitutes an insignificant area in relation to regional distribution, but did not quantify the amount of habitat to be disturbed. The response noted that some flexibility exists for the placement of the electricity transmission line where it crosses the Darling River and may be able to be positioned to avoid any local populations if they were found to occur during pre-clearance surveys. In order to address this issue, the Department has included conditions of consent requiring the Applicant to quantify the amount of clearing to be undertaken as part of the formulation of a vegetation clearance protocol under the Flora and Fauna Management Plan, and conditions to minimise unnecessary clearance of native vegetation.

The Applicant's response however did concur that it was impractical to restrict pre-clearance surveys until after rain. The Applicant submitted that the more practical approach is to assess the potential habitat within the study area. The Department is satisfied with this response and believes that the vegetation clearance protocol should address these concerns.

In addition, as a general overriding management response the Applicant will also be required to prepare and implement a Flora and Fauna Management Plan. The plan shall include formulation of a vegetation clearance protocol and methods for species management. The Applicant is also required to develop a translocation protocol outlining measures to be adopted should individuals of the nominated species be identified in the area of disturbance. As part of the plan, the Applicant is also required to provide details for the reconstruction of native bushland, including the establishment of long term post mining land use objective over the site; details of the goal to replace each community type to be removed on site, with communities of same or similar dominant species composition; measures to connect existing areas and future areas of habitat rehabilitation to form a network of wildlife corridors throughout the site and to adjoining lands; and details of the utilisation of local endemic species or species naturally occurring only in the area of the development for regeneration.

The Department is satisfied that the conditions of consent will adequately minimise the impact of the proposal on flora and provide for further assessment, species management and reconstruction of native bushland.

5.4.2. Fauna

The Applicant engaged Mount King Ecological to survey and assess the Project area for amphibians, mammals, reptiles and avifauna. In addition, the results of regional fauna surveys and assessments, NPWS records and predictive data were reviewed and included in the fauna assessment. The fauna assessment is contained in full in Appendix G to the EIS, and the findings are summarised in Section 3.5.2 of the EIS.

The fauna study covered the MLA area, ancillary infrastructure areas and a general area within 50 km of the MLA area. The fauna surveys were conducted on two occasions, in November 2000 and May 2001. The November 2000 survey assessed the mine site area and a small area near Greenvale Homestead. The May 2001 survey assessed the proposed infrastructure areas associated with the project (transmission line, highway access road and potable water pipeline) outside the MLA area.

A total of 37 fauna survey sites were established within or close to the Project area using a variety of methodologies including traps, call broadcasting, spotlighting and searches.

The results revealed the following:

- 56 species listed in the Threatened Species Conservation Act and Environmental Protection and Biodiversity Act that are known to occur or may possibly occur within the survey area;
- 188 fauna species in the survey area;
- 89 fauna species were identified as occurring in the mine area and 109 fauna species in the infrastructure areas;
- 13 threatened fauna species were identified as occurring in the Project area; and
- 3 broad habitat types occur within the mine site.

The EIS concludes that the mine site is not considered to be of exceptional habitat value to native fauna, however the MLA Area contains several patches of woodland that is considered to be of high quality habitat because of the presence of a high numbers of nesting hollows. The Applicant advises that vegetation communities in the infrastructure areas are not considered to be of high value to wildlife.

The EIS assessed the potential impacts in respect of the 'modification of habitat', 'creation of barriers to movement' and 'other impacts'. In doing so, the Project would impact on the habitat of fauna as a result of the clearing of vegetation and removal of topsoil. The study indicated that approximately 680 ha of land would be disturbed during the Project activities. In percentage terms, the area of habitat modification to the total habitat areas within the region is very small.

The project would also restrict movement of fauna in the Project area due to the removal of vegetation and the construction of infrastructure. Impacts to fauna movement are expected to be greatest due to vegetation clearance near the Darling River and Great Darling Anabranch. Death of fauna is also expected due to road collisions. Other Project impacts to fauna would result from noise, lighting and dust generation associated with construction and operation activities at the mine.

The Applicant conducted 8-part tests conducted for the fifty-six listed threatened species and given in the fauna study, concluded that no threatened species are likely to be significantly impacted by the development. Based on this, the Applicant is of the opinion that a Species Impact Statement is not required.

Mitigation measures

The Applicant has proposed a number of mitigation measures to minimise the impacts of the Project on fauna. The main mitigation measures include:

- Avoiding the clearance of sensitive habitat identified in the Projects areas;
- Undertaking pre-clearance surveys and implement action to minimise impacts on threatened species;
- Timing vegetation clearance to minimise disturbance to potential breading activities;
- Constructing culverts to prevent barriers to movement;
- Introducing speed limits to minimise vehicle strikes.

Community/ Agency position

There were no submissions from the public that raised concerns with the impacts of the Project on fauna.

NSW Agriculture raised concern that pest management of the MLA area had not been addressed in the EIS. This issue was raised with the Applicant and an adequate response was provided. The Department will also ensure that these issues would be addressed as part of the Flora and Fauna Management Plan.

NPWS, in their submission expressed concerns with the conclusions that were drawn from the application of the eight-part test, that there will be no significant impact upon threatened species or their habitat. The concern raised was made in particular reference to the Painted Burrowing Frog (PBF). NPWS stated that in their opinion the project would have a significant impact on the PBF and a this species is listed as Endangered under the TSC Act, a Species Impact Statement (SIS) should be prepared by the Applicant. The Department raised these concerns with the Applicant and requested the Applicant to provide additional information and revise the 8-part test for this species. NPWS further reviewed the information and participated in a phone conference meeting with the Applicant's amphibian specialist. Following this further review and consultation, NPWS however maintained that an SIS was required for this species. NPWS did not accept the "certainty" of the species widespread distribution throughout other areas, and considered that the population of N.pictus that is currently known to occur on the development site is highly significant given the limited number of records for the species state wide. In addition, NPWS submitted that remain significant issues around the impact of the development upon local populations of the species occupying the development site due to limited distribution and low population numbers in the state.

Department's position

The Department's ecologist reviewed the fauna assessment and considered that satisfactory survey methods and efforts had been applied for the Project. However, the Department raised a number of concerns with the material presented in the EIS. The key issues are outlined as follows, along with the adequacy of the response from the Applicant:

a. Impact on Western Blue tongue Lizards – the Department noted inconsistencies in the reporting of the habitat to be removed for this species. The Applicant was requested to clarify this issue and redo the assessment of significance for the Western Blue-tongue lizard. The Applicant adequately clarified this information.
b. Vegetation Clearance – the EIS states that vegetation clearance would be timed to minimise the disturbance to potential breeding and roosting activities, but no details are provided on when this likely to occur. Given that 56 threatened fauna species are potential inhabitants of the study area and the timing of their breeding/ roosting activities is unlikely to occur all the at the same time, the Department was concerned about the generality of this statement. The Applicant conceded that there is no time of the year that will avoid the breeding/roosting activities of all fauna species, however there are certain times of the year when a large number of fauna are known to breed/ roost. For a large number of fauna species, vegetation clearance is most suitable in late summer/ early autumn. The Department has conditioned the formulation of a vegetation clearance protocol, in which the Applicant must outline proposals to time vegetation so as to minimise disturbance to threatened species. The Department has also recommended conditions of consent requiring the Applicant to provide further details for the pre-clearance inspections, including when and where the inspections will occur.
c. Feral animal control program – a control program is proposed but no details were provided in the EIS. The Department notes that with any program of this nature, concerns are raised as to the impacts on native fauna populations. This concern was raised with the applicant and a direct response was provided. Accordingly, the recommended conditions require this issue to be addressed as part of the Flora and Fauna Management Plan.
d. Management of species – the EIS describes that management measures are proposed but provides only limited details. The Department has included in the conditions a requirement that the Applicant includes details of the propose road culvert, site employee education and road speed limits.
e. Impact on the painted Burrowing Frog – following the review of the EIS, the Department's ecologist raised concern about the potential impact of the Painted Burrowing Frog. The Department therefore sought further information from the Applicant. The further information received from the Applicant included:
   - A map showing all known recording of the species in Australia;
   - A revised eight-part test for the species; and
   - Expert opinion from an amphibian expert commissioned by the Applicant.

The revised eight-part test also concluded that the Project would not cause a significant impact to the PBF and a SIS should not be required. The reasons for this conclusion provided by the Applicant are summarised below:

i. It was considered that a viable population of the PBF would occur across the region in which the MLA AREA lies. Comparable habitat to that of the MLA AREA exists in the region and MLA AREA surrounding areas. The PBF would be continuously distributed across the Project area and well beyond the confines of the mine disturbance area. Thus the Project would only impact a small portion of potential habitat and population.

ii. The PBF occurs outside the MLA AREA and extensively in the wider region (Victoria and South Australia). In these areas the PBF is not listed as threatened or as endangered. The PBF is not listed on the EPBC Act.

iii. The biological characteristic and ubiquitous nature of the PBF enable it to live and breed in various habitats

iv. The likely outcome of a SIS would be the implementation of a detailed management plan, developed in consultation with NPWS, to protect the PBF. The development of a detailed management plan could still be achieved without a SIS and the delay to the Project that a SIS would cause.

v. Even if a SIS was required it may be of limited benefit due to the fact that the PBF typically only comes to the surface to breed after substantial rain. It is at these times that the PBF can be observed and studied. Substantial rain may not occur in the area for many months.

The Department concurs with the findings of the Applicant in respect to the Painted Burrowing Frog, and considers an SIS is not warranted for this project. The Department considered that the species is likely to occur in greater abundance than is currently known. This conclusion was reached due to the diverse habitat in which the species is known to occur (ie. from back-yard vegetable gardens to sandy and mountainous environments), the likelihood that limited surveying has not identified the full extent of its occurrence in NSW, and the favourable conditions encountered by the Applicant during the survey period during which a number of individuals were found.

However, in accordance with the recommendation of the amphibian specialist and NPWS, the conditions of consent stipulate that the Applicant is to prepare a Painted Burrowing Frog Management Plan. This plan is to include details of monitoring for the species, procedures for the management of the species and methods to minimise any potential impacts and threats. Further, the Applicant is required to establish a protocol for compensatory measures for any potential disturbance to the Painted Burrowing Frog in consultation with NPWS and to the satisfaction of the Director-General. These compensatory measures may include the establishment of compensatory habitat(s) in or near the Project area; dedication of an area of suitable ecological integrity and characteristics elsewhere; financial contributions; or the ecological enhancement and management of an area of land that is determined to represent suitable habitat for the species. The condition also provides that the establishment of compensatory measures shall consider the results of monitoring for the species undertaken in accordance with this consent.

In addition to the specific measures outlined above, the Applicant will also be required to prepare and implement a Flora and Fauna Management Plan. The plan shall include, as outlined above, the formulation of a vegetation clearance protocol to reduce the impact on fauna, proposals for the reconstruction of native bushland and methods for the management of flora and fauna species. The Applicant is also required to develop a translocation protocol outlining measures to be adopted should individuals of the nominated threatened species be identified in the area of disturbance. The Department is satisfied that the mitigation and management measures outlined in the EIS and the recommended consent conditions will mitigate any potential adverse impacts on flora and fauna in the Project area, including threatened species. The Department also believes that the Painted Burrowing Frog Management Plan provides adequate measures to ensure that the species is appropriately managed and that adequate monitoring regimes are developed to mitigate any potential impacts. In addition, the plan will ensure that appropriate reporting requirements adequately document the appropriateness and suitability of the mitigation measures developed, and allow for the implementation of further measures should they be determined to be required.

5.5 Archaeology

5.5.1. Aboriginal heritage

Applicant's Position

The Applicant engaged Witter Archaeology to undertake an Archaeology and Aboriginal Heritage survey for the Project area. The results are summarised in Section 3.8 and Section 4.9.1. of the EIS, and the report is contained in full in Appendix B to the EIS.

The Aboriginal heritage survey was undertaken with input from the following Aboriginal organisations:

- Dareton Local Aboriginal Land Council
- The Bakandji native title claimants; and
- The Pooncarie Mission peoples

The survey included a search of the NSW National Parks and Wildlife Services (NPWS) Aboriginal Site Register and a field survey of the MLA area, the highway access road, the water pipeline and the electricity line corridors.

No Aboriginal heritage sites were recorded on the NPWS register within the proposed development area. However the field surveys identified numerous Aboriginal sites and artefacts. The Aboriginal heritage identified during the surveys are listed in Table 10.

Potential Impacts

The survey identified 31 sites including camp sites, scar trees, artefact scatters and a burial site, and a range of isolated finds. Of these sites, 3 sites will be directly impacted, 2 sites partially impacted and 10 sites will be potentially impacted, as summarised in Table 10.

Table 10 – Potential Project Impacts on Identified Aboriginal Sites and Artefacts

Project Area	No. of Aboriginal Sites Identified	Site Type	No. of Isolated Finds Identified	Project Impact	Description of Impacted Heritage
Mine Site	9 (2 within and 7 outside the mine disturbance area)	8 Camp sites 1 Camp site/ Quarry site	24	2 sites which are within the proposed mine path are to be removed; 2 other sites are partially within the proposed mine path are are to be partially removed.	Artefacts, fireplaces, oven stones, scattered hearths
Highway Access Road	11 (located mostly near the Great Darling Anabranch)	9 Camp sites 1 burial site 1 Artefact Scatter	24	1 site is located at the Great Darling Anabranch and is to be directly impacted.	Artefacts, *in-situ* and scattered hearths
Electricity Transmission Line	4 (located mostly near the Darling River)	4 Camp sites	5	Four sites to be potentially impacted, but maybe able to be avoided by deviation of the Line	Silcrete flakes, artefacts, *in-situ* and scattered hearths
Potable water Pipeline	7 (located mostly near the Darling River)	6 Scar Trees 1 1 Midden site	2	Six sites in close proximity of the pipeline and could potentially be impacted.	Midden site

Mitigation Measures proposed by the Applicant

The Applicant proposes a range of mitigation measures to minimise the potential impact of the proposal on Aboriginal archaeological items. The EIS indicates that these measures were prepared in accordance with local Aboriginal community attitudes as ascertained during the consultation process with the relevant groups. The mitigation measures are as follows:

- avoidance of identified sites by deviations of the linear routes;
- salvaging the heritage items that lie in the mine path and Anabranch crossing, excavation of hearths, undertaking radiocarbon dating of charcoal extracted from the hearths;
- erection of protective fencing around sites located close to the working Project areas so as to prevent indirect impact during construction activities;
- monitoring of selected construction activities by the on-ground observers, most suitably members of the Aboriginal community; and
- where appropriate, replacement of collected artefacts to their original or approximate locations after construction activities or during rehabilitation.

Community/Agency Position

Neither of the two private submissions received raised concerns about the impacts to Aboriginal heritage.

The NSW National Parks and Wildlife Service (NPWS) raised a number of issues in their submission to the Department. These issues are summarised as follows:

- the views of the Native Title claimants are presented and are favourable, however the views of the Local Aboriginal Land Council are not presented in the EIS;
- specific details on the storage and curation of the relics and specific details as to the avoidance of relics not specified;
- concern as to the proximity of some of the relics to the mine path. It was emphasised that monitoring would be required to assess the effectiveness of the buffers around the sites to ensure the relics are not inadvertently damaged;
- the EIS does not present a clear path for dissemination of cultural heritage information;
- the isolated finds have not been listed as relics that need removal consent and the Applicant needs to include all isolated artefacts in the mine path and within the areas of the powerline and water pipe and roads within the consent application.

In further correspondence, NPWS advised that these issues could form the agencies GTAs. Accordingly, the Department has incorporated these requirements as matters which must be addressed as part of the Aboriginal Heritage Plan to be submitted prior to commencement of construction.

Department's Position

The Department is satisfied that the Aboriginal assessment provided in the EIS provides a comprehensive overview of the items and sites of Aboriginal significance that may potentially be impacted by the Project. The Department has included the NPWS's GTAs and other recommended conditions in the consent instrument. In addition, the Department believes that the formulation of a Aboriginal Heritage Management Plan will provide a framework for the identification and management of all sites of archaeological significance and effectively minimise the impacts on and loss of archaeological values in this area.

5.5.2. European Heritage

Applicant's Position

The Applicant commissioned Witter Archaeology to undertake a European heritage survey of the proposed Project area. The report is contained in full at Appendix M to the EIS and the results of which are summarised in Section 3.8.2 and 4.9.2 of the EIS.

The survey covered the proposed MLA area, the highway access road, the electricity transmission line and potable water pipeline. The survey also included a review of exploration, settlement, pastoralism and mining exploration history in the area. The EIS reports that all the historic sites and relics found within the Project area belong to the early pastoralism period of western NSW European settlement. The most significant item found included a surveyors post marking the western lands lease boundaries which dates back to the 1860's. A summary of the historic sites and relics found is outlined in Table 5.X below.

Potential Impacts

The EIS describes that the historic surveyors mark of the western lands lease lies on the highway access road alignment. It is proposed to permanently remove this survey mark and replace it with a modern marker. No other direct impacts to any other European heritage are proposed by the project. The Proposed impacts are summarised in Table 5.13 below.

Table 5.11 - European Heritage and Project Impacts

Project Area	No of sites identified	European Heritage identified	Project Impact to Heritage Item
MLA area	2	Tank, historic refuse dump	No direct impacts. Items will be marked and avoided
		Tank and Windmill	
Highway access road	1	Carved wooden surveyors post marking western lands lease boundaries	Permanently Remove
Potable Water Pipeline	1	Greenvale Homestead complex comprising graves, stockyards, fences and pump station	No direct impact. Deviations can avoid items
Electrical Transmission Line	None	-	-

Mitigation Measures proposed by the Applicant

The mitigation measures proposed by the Applicant to minimise impacts to the identified European heritage items include:

- deviating the potable water pipeline to avoid heritage items at the Greenvale Homestead and exercising due care to avoid damage to these items, and
- marking of heritage items in the MLA Area to avoid accidental damage.

Community/Agency Position

Neither of the two private submissions received raised concerns about the potential impacts to European heritage.

The NSW Heritage Office made a submission indicating that the EIS had been reviewed and recommended a number of conditions be incorporated into the consent. These conditions were as follows:

- implementations of the recommendations made in Appendix M of the EIS;
- if during the development process any evidence of any relic is found other than those identified in the EIS, all work on the site is to cease and NSW Heritage be contacted;
- an application must be lodged for the removal of the early surveyor's post. If the application is approved, the survey post is to be recorded in situ prior to removal.

The Department has implemented these recommendations in the conditions of consent.

Department's Position

The Department is satisfied that any potential adverse impacts on items of European heritage significance can be mitigated by the management and mitigation measures outlined in the EIS and the recommended consent conditions. The Department has also included the recommended conditions of consent in accordance with the advice from NSW Heritage.

5.6 Transport

Applicant's Position

The Applicant engaged the company Traffix to assess the transport requirements and impacts of the project during construction and operation of the project. This report is included in full in Appendix A to the EIS and the key findings are described in Section 3.9 and 4.10 of the EIS.

The EIS assessed transport related impacts resulting from transport of minerals concentrate to the MSP and for other vehicles associated with the construction and operation of the Project. This transport requires use of part of Old Roo Roo Road, a section of a newly constructed highway access road, and a section of the Silver City Highway south to the Victorian Border.

Construction Stage

The construction phase for the project is expected to have a duration of 18 months. The construction phase is expected to generate light traffic associated with the construction workforce and visitors as well as heavy vehicles delivering equipment and consumable.

The EIS details that on a peak day the site would experience 50 vehicle worker visits (10 trips) on a peak day. External light traffic would range of between 1 visit (2 trips) and 5 visits (10 trips) per day.

The Project would experience on average 1 visit (2 trips) from heavy vehicles, occurring via the Silver City Highway from the north and south.

The expected average and maximum total daily traffic movements generated by the Project during the construction phase stated in the EIS are shown in Table 12 below.

Table 12 - Average And Maximum Daily Traffic Expected During Construction Phase

Vehicle	Average daily trips (both directions)	Maximum daily trips (both directions)
Light Traffic	23	110
Heavy Traffic	2	2
Total Daily Traffic	***25***	***112***

The EIS indicates that based on the expected vehicle movements during the construction phase, the maximum total daily vehicle rips on the Silver city highway would increase from 1.5% near the Victorian border to 18% 48 km north of Wentworth, and 15% near Broken Hill.

The EIS states that this increased flow would be well accommodated without any adverse impacts and with no change to existing levels of service.

Operational Stage

During the operations phase, Project traffic would include the workforce, visitors, heavy vehicles delivering consumables ad and triple road trains (up to 20 round trips per day) hauling mineral concentrate. Given the accommodation requirements at the site and the roster arrangements, the EIS considers that a maximum of 50 employees would be expected to travel to or from the site on any given day. Visitors and deliveries to the site are expected to contribute a maximum further 20 visits per day resulting in additional 40 light vehicle trips. The expected maximum daily traffic generated stated in the EIS is summarised in Table X below.

The EIS outlines that the major generator of truck traffic would be the haulage of mineral concentrate by road train from the mine site to a MSP in Victoria. It is estimated that the Project will require a fleet of up to 7 haul trucks, operating a total of 20 round trips per day. Accordingly these trucks would generate a total of 40 trips per day. In addition to these movements, up to 10 visits to the site per day could be expected associated with food deliveries, maintenance, spare parts deliveries etc resulting in a total of 20 heavy vehicles trips per day.

Table 13 - Maximum Daily Traffic Expected During Operation of the Mine

Trip Source	Daily Light Traffic	Daily Heavy Traffic	Maximum daily trips
Concentrate Haulage	0	40	40
External	40	20	60
Mine Workers	50	0	50
Total	**90**	**60**	**150**

The EIS indicates that based on the expected vehicle movements during the operation stage, the maximum total daily vehicle trips on the Silver City Highway would increase from 3% near the Victorian border to 30% 48 km north of Wentworth. The EIS also suggests that the percentage increase on roads under maximum daily traffic volumes during the operational stage is 14% near Broken Hill.

The EIS states that this increased flow of traffic would be well accommodated without any adverse impacts and with no change to existing levels of service.

Community/Agency Position

General concerns about traffic generated dust were raised in a few submissions. However, no agencies raised concern about the increase in traffic.

Council raised impact on roads as a concern. Council required that the Applicant enter into an appropriate agreement with Council regarding the construction and maintenance of the road from the mine entrance to the Silver City Highway. The Council also noted that agreement would need to be reached for the Applicant to maintain this road for the duration of the mine project to Council standards, and that the road would be dedicated as a Council road to be available for the use of all other road users. The Department has recommended conditions to address Council's concerns including a road maintenance program and a road construction program.

Department's Position

The Department concurs with the assessment provided in the EIS. Notwithstanding, the recommended conditions of consent provide that the Applicant is required to prepare a road construction program and enter into a Road Maintenance Agreement with Wentworth Shire Council for the haulage route from the Silver City Highway to the mine site, and for other roads within the Shire which are likely to be used by project related traffic. The agreements shall include details of traffic monitoring and mechanisms to calculate contributions for road maintenance commensurate with mine-traffic use.

The Department has also included the condition that the Applicant is required to prepare a Traffic Code of Conduct. This Code shall ensure that operators conform to designated haulage routes, drive within speed limits, adequately maintain vehicles and ensure loads are covered.

The Department is satisfied that the management and mitigation measures outlined in the EIS and the recommended conditions of consent adequately address the potential transport impacts arising from the project.

5.7 Visual

Applicant's Position

The EIS describes that the mine site is located within an area of low rolling sandplains containing native grasses and low growing bluebush shrublands and woodlands. The Applicant considers that due to the limited natural relief and the lack of elevated vantage points and local roads, the visibility of operations at the mine site is very limited. Distant public viewpoints would be available along Nob Road where the bluebush shrublands are sufficiently low to allow view into the north-western MLA area. The EIS describes that the closest residence to the MLA boundary is located approximately 4km away within a slight topographical depression. The EIS describes that no views of the MLA area are available from this location.

The mine will however produce some temporary and permanent landscape impacts. The EIS describes that three components could present limited visual impacts to surrounding viewpoints as follows:

- The accommodation camp;
- The initial overburden emplacement; and
- The initial sand residue dam.

In respect of night lighting, the EIS describes that there are presently no significant artificial light sources in the vicinity of the proposed mine site. However, the Ginkgo Project will require night lighting to be of sufficient intensity to provide a safe working environment for operations at the site. The EIS describes that this lighting would alter the night-time light levels in the vicinity of the mine. In addition, the EIS describes that increased night-time vehicle traffic on Project roads could potentially impact on those residences located within reach of the vehicle lights in the project Area. Notwithstanding the mitigation measures described below, some light spill would be anticipated at Nob Road from the accommodation camp and a glow would be visible above the mine site. The residents at Manilla homestead could potentially experience a glow in the night sky that could also be visible from roads and properties adjoining the mine site.

Mitigation Measures proposed by the Applicant

The Applicant does not pose any mitigation measures to address the potential visual impacts of the development. The EIS justifies this position by the distance of the nearest homestead, the temporary nature of the accommodation camp and the proposed low elevation of the initial overburden emplacement and initial sand residue dam.

In terms of night lighting, the EIS describes that directional light would be employed at the site, along with light shields to limit light spill where practicable.

Community/Agency Position

The issue of visual impacts of the Project was not raised in any of the submissions received by the Department.

Department's Position

The Department is satisfied that the issue of visual impacts of the Project has been adequately addressed in the EIS. The Department concurs with the findings in the EIS that conclude that there will be limited visual impacts from the proposal. In order to ensure the visual amenity of the landscape is protected, the Department t has also recommended a number of conditions. The conditions require that all buildings and structures shall be designed and constructed so as to present a neat and orderly appearance and to blend into the landscape. In addition that vegetation shall be planted in areas where views of Project works are visible from public viewpoints. The conditions also provide that in the event that a landowner disputes the visual impact of the proposal the Applicant

shall consult with the landowner, discuss their concerns, and where appropriate implement further mitigative measures.

The Department is satisfied that the visual impacts of the proposed Project are minimal and that the rehabilitation measures outlined in the EIS along with the recommended conditions of consent will adequately minimise potential adverse and permanent visual impacts.

5.8 Waste Management

Applicant's position

The EIS considered the generation and management of the following types of waste from Project activities:

- Acid forming overburden material;
- Saline overburden material;
- Saline sand residue; and
- Minerals Separation Plant (MSP) waste (monazite)

Acid forming potential of waste

In considering the waste products from the Project, the EIS assessed the potential for extracted materials to produce acidic leachate. Testing included acid forming potential, multi-element scans and element solubility of ore, overburden and sand residue samples. The results of the testing showed the ore, overburden and sand residues are non-acid forming material and are not expected to generate environmentally harmful leachate when exposed to surface oxidation processes.

Salinity

The EIS outlines that the analysis of overburden samples indicated salinity levels that are comparable to, but in some cases higher than, the natural salinity recorded in near surface soils at the site. The sand residues at the mine site would contain entrained groundwater, which is highly saline.

Monazite

The Applicant describes that all heavy mineral sand ore bodies contain traces of the natural radioactive elements uranium and thorium, together with their decay products. The only mineral sand component that is significantly radioactive is monazite. Monazite is a radioactive material and is a source of the radioactive element thorium. The EIS notes that in ore or heavy mineral concentrate produced by a wet concentrator, radiation levels from monazite are typically too low for classification or handling as a radioactive substance. However, when monazite is separated from other heavy minerals at a MSP, radiation levels may increase to levels that require some minor health and safety controls. These measures are outlined below.

Mitigation Measures proposed by the Applicant

Salinity

The EIS describes that in order to mitigate against increased salinity levels from the overburden, the overburden would be kept separate from topsoils and subsoils during handling, replacement and rehabilitation works and overburden stripping, and handling would be undertaken within operational areas where surface water is contained.

In light of the characteristics of the sand residues outlined above, sand residues would be treated as saline material and surface run-off would be controlled (eg. directed to evaporation/sediment sumps), and seepage from the initial sand residue dam minimised.

Monazite

The EIS states that it is proposed to mix the monazite with other silica waste to lower the radiation and return this material to the mine as backfill. The Applicant proposes to place the monazite/ silica mix above the watertable covered by a minimum of 10 m of overburden. The Applicant also proposes to conduct measurements of radioactivity levels at the mine site and MSP to ensure radioactivity levels remain below occupational health and safety exposure limits throughout the mining and processing operations.

Community/Agency Position

The private submissions received by the Department did not raise any concerns relating to the generation and management of municipal, saline or radioactive wastes.

The EPA requested further information regarding the classification of generated wastes, to enable them to assess whether General Terms of Approval could be granted. The EPA sought the following information:

- The classification of wastes generated off-site, to be disposed at the mine; and
- A landfill management plan appropriate for the proposed disposal of the waste types.

The Applicant provided an appropriate response to this request for information from the EPA. The response outlined that:

- The non-radioactive waste is classified as *inert* waste and the radioactive waste is classified as either *industrial* waste (if radioactivity is 1-100 Bq/g) or *inert* waste (if radioactivity is <1 Bq/g);
- The waste is not a Controlled waste under the National Environment Protection Measure (NEPM) for the Movement of Controlled Wastes Between States and Territories; and
- A landfill management plan will be developed prior to the commencement of project operations.

Following receipt of this information, EPA provided their GTAs for the project. These GTAs included conditions relating to waste management, landfilling of waste and monitoring of waste movements. The GTAs have been incorporated in the recommended conditions of consent.

Department's Position

The Department is satisfied that the wastes generated at the mine site have been adequately considered and assessed. The Department concurs with the findings in the EIS.

The recommended conditions of consent also include a number of requirements relating to waste management. In accordance with the EPA GTAs, these conditions include the requirement for the Applicant to prepare a Landfill Environmental Management Plan to provide procedures and a monitoring program to ensure that the requirements of the *Code of Practice on The Management of Radioactive Wastes from the Mining and Milling of Radioactive Ores 1982* are complied with. The conditions also impose limitations on the type of waste to be disposed of at the premises and stipulate that the Applicant is required make appropriate arrangements for the disposal of domestic waste and sewerage.

The Department considers that the proposed management and monitoring of waste, including radioactive material, will adequately ensure protection for employees and the environment from waste generated as a result of the Project.

5.9 Hazard and Risk

Applicant's Position

The Applicant conducted a preliminary hazard analysis (PHA) to gain an understanding of the potential hazards and risks associated with the Project. The Project components and operations were subdivided into areas and each area was assessed for various hazardous scenarios.

The risk analysis stated that the main potential risk areas include:

- The operation of the sand residue and groundwater reticulation system (eg. spills and leaks);
- The transport and storage of diesel for use in mining and at the potable water pump station (fires, leaks/spills); and
- The haulage of mineral concentrates to the MSP and the backloading of MSP waste products to the mine by road train (eg vehicle accidents, leaks/spills).

The analysis of the consequences and likelihood of these hazardous scenarios was carried out with regard to the public, property and the environment. The analysis concluded that no identified risks posed significant off-site impacts, provided the proposed mitigation measures were implemented.

Mitigation Measures proposed by the Applicant

Mitigation measures proposed by the Applicant relating to specific hazard mitigation and/or preventative measures include :

- The construction and upgrade of the highway access road to make it suitable for the expected traffic flows;
- The regular maintenance of all plant and equipment to prevent failures;
- The training of staff in safety matters;
- The implementation of an emergency response plan;
- The safe storage of diesel;
- The development of a site emergency response team.

Community/Agency Position

No submissions received by the Department raised concern with the risks and hazards associated with the Project.

Department's Position

The Department is satisfied that the PHA was conducted in accordance with the DUAP Multi Level Risk Assessment Risk Assessment guidelines. The Department's assessments indicated that there no dangerous goods on site, and the only material likely to cause concern is diesel fuel. However, as the site is not within close proximity to residencies and other land uses, and the diesel is stored in accordance with good mine practice, further hazard related studies are not considered required. Accordingly, the conditions of consent require the storage of diesel to be in accordance with the requirements of WorkCover NSW and the relevant Australian Standards.

The Department considers, in view of the low hazard risk of the development as outlined in the EIS, that the implementation of mitigation measures proposed in the EIS and the recommended conditions of consent will adequately minimise the risk of hazardous incidents.

5.10 Socio-Economics

Applicant's Position

The Applicant engaged Gillespie Economics to undertake an economic assessment for the Project. The findings of the assessment are included in full in Appendix F to the EIS and outlined in Section 4.8 of the EIS. In addition, the Centre for International Economics was commissioned to undertake a community infrastructure assessment for the Project. This report is contained in Appendix E to the EIS and discussed in Section 4.7 of the EIS.

Economic analysis

The establishment and operation of the Project would contribute to the local and regional economies, increase business turnover in a number of sectors and provide employment opportunity to towns that can provide products and services to the project.

Economic activity associated with construction of the project would primarily occur within the building and construction sectors and the metal/machinery/ equipment/ and other manufacturing sectors. The capital costs of mine site and ancillary infrastructure construction activities are estimated to be in the order of $84M. However, given the largely specialist nature of the equipment it is assumed that all purchases would be made from outside the region. The EIS describes that a regional economic impact assessment using input-output analysis estimated that the construction phase may contribute up to $9.2 M in annual direct and indirect regional output or business turnover, and $4.7 M in direct and indirect regional value added, including $2.5M in household income. The EIS notes that these particular impacts are likely to be only experienced for up to two years.

With reference to the operational phase, the Ginkgo project is likely to contribute in the order of $48 M in annual direct and indirect regional output or business turnover. Direct and indirect regional value adding is likely to contribute approximately $19M including $9 M in household income. The Applicant notes that the Project would generate total royalties of $28.7M, at an average of $2.6M per annum once mining commences.

The EIS outlines that even though the construction and operation of the Project would stimulate demand in the local and regional economy, cessation of the Project may however, lead to a reduction in economic activity unless other similar local and regional economic stimuli coincide with the cessation of the Project. These impacts would be expected to be felt two to three years after the Project.

Sociol impact assessment

- Construction phase

As previously outlined, the 18 month construction period would require an average of 90 works, and for a 2-3 month period, a peak number of approximately 145 workers. The EIS advises, that of these employees, 30% are expected to be local employees from the Far West/ Murray Darling Region.

Th mine site accommodation camp would be completed in month three of the construction phase. The EIS states that prior to the accommodation camp becoming operational the workforce would be relatively small and would increase slowly to approximately 50 workers. The EIS considers that a large proportion of these workers are anticipated to be locals and would not require accommodation. The remainder would require short term accommodation at Pooncarrie, Wentworth or Dareton. From the third month onwards, the non-local labour force would be housed at the mine site camp. Construction workers would stay at the camp while on rotation and stay elsewhere while on leave. It is anticipated that at any one time up to 25 non-local workers would require accommodation while on leave in the regional centres of Mildura and Broken Hill.

The EIS also describes that there will be no significant demands on the existing social infrastructure during the construction phase other than short term accommodation requirements and a slight increase in demand on medical services.

- Operational phase

The operational phase would comprise approximately 100 people. Of these, the EIS considers that some 75% are anticipated to derive from the Far West/ Murray Darling region. The EIS considers that the Project would be able to draw on the existing pool of unemployed people in both Broken Hill and the Wentworth Shire. The Applicant describes that approximately 25 incoming non-local workers and their families would require accommodation in the region. Given the low level of services and limited long term accommodation available in the smaller towns such as Pooncarrie, these workers are considered likely settle in Broken Hill or Wentworth/ Mildura. The EIS considers that sufficient accommodation is available in these centres to accommodate the non-local workers and their families.

During operation, the EIS describes that the limited number of incoming non-local workers and the expectation that the workers will settle in the larger regional towns will and limit the potential local impacts of the project on community infrastructure. The EIS describes that the potential impacts could include a slight increase in the demands for health care, emergency services and fire brigade services because of the increase population at the mine site.

Mitigation measures proposed by the Applicant

The EIS describes that the potential community infrastructure and services impact are limited by the proposed use of an accommodation camp to house workers while on-site and the employment of a significant number of workers from within the Far West/ Murray Darling region. During the initial three months of the construction period additional short term accommodation would be provided at the Pooncarie Hotel if required. Consultation would also be undertaken with the WSC and other service provides to monitor the effect of the Project on the demand for and delivery of health and other community services.

The EIS describes that the minimisation on regional economic impacts may occur through the retention of displaced workers within the region. The development of further projects or other significant economic developments would assist in retaining displaced workers within the region.

Community/Agency Position

No socio-economic issues were raised in any of the submissions received by the Department.

Department's Position

The Department is satisfied that potential socio-economic impacts of the Project can be minimised by the mitigation and management measures outlined in the EIS and the recommended conditions of consent. The Department also considers that the proposal will have a socio-economic benefit at a local, regional and state level through the provision of direct and indirect employment and economic output.

5.11. Ecologically Sustainable Development (ESD)

Applicant's Position

The EIS addresses the principles of ESD in Section 1.5 of the EIS. The EIS states that the principles of ESD have been applied to the Project and have been incorporated in the overall development description and addresses each of the four principles.

Community/Agency Position

No submissions raised concerns about ESD.

Department's Position

Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* states that an EIS must include reasons justifying the carrying out of development in the manner proposed having regard to amongst other things, the principles of ESD. For the purposes of Schedule 2 the principles of ESD are:

(a) The precautionary principle – namely, that 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.
(b) Inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
(c) Conservation of biological diversity and ecological integrity.
(d) Improved valuation and pricing of environmental resources.

The EIS addresses the four ESD principles and the Department believes the principles are reinforced through the recommended consent conditions.

6.0 SCOPE OF CONDITIONS OF CONSENT

The recommended conditions of consent at Attachment "A" have been prepared taking into consideration the General Terms of Approval and other issues raised by Government agencies, Council, and all other submitters including land owners.

The recommended conditions of consent provide for appropriate management of noise and dust, surface and groundwater management, flora and fauna, and archaeological issues. The conditions of consent also include specific provisions for independent monitoring, set appropriate noise and dust criteria, require the preparation of Annual Environmental Management Plan Reports and compliance reports, a number of environmental management plans, and provisions for the involvement of the local community.

The Department has undertaken extensive consultations with the Applicant concerning the content and intent of the conditions of consent.

7.0 CONCLUSION

The Department considers that there are no environmental impacts from the proposed Ginkgo Mineral Sands Mine which could not be effectively managed through the recommended consent conditions. The proposal is consistent with State and regional planning objectives.

8.0 RECOMMENDATION

It is RECOMMENDED that the Minister approve the development application (DA 251-09-01) for the proposed Ginkgo Mineral Sands Mine as submitted by Bemax Resources NL Limited subject to the attached conditions of consent.

Endorsed

Gordon Kirkby
Acting Assistant Director

Sam Haddad
Executive Director

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

79C EVALUATION

(1) Matters for consideration - general

In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:

(a) the provisions of:
  (i) any environmental planning instrument, and
  (ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority, and
  (iii) any development control plan, and the regulations (to the extent that they prescribe matters for the purposes of this paragraph), that apply to the land to which the development application relates,

  Refer to pages 7 to 8 of this Report

(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality, ***Refer to pages 12 to 38 of this Report.***
(c) the suitability of the site for the development, ***Refer to pages 4 to 38 of this Report.***
(d) any submissions made in accordance with this Act or the regulations, ***Refer to pages 2 to 3 and 9 to 11 of this Report.***
(e) the public interest, ***Refer to pages 1 to 38 of this Report.***

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