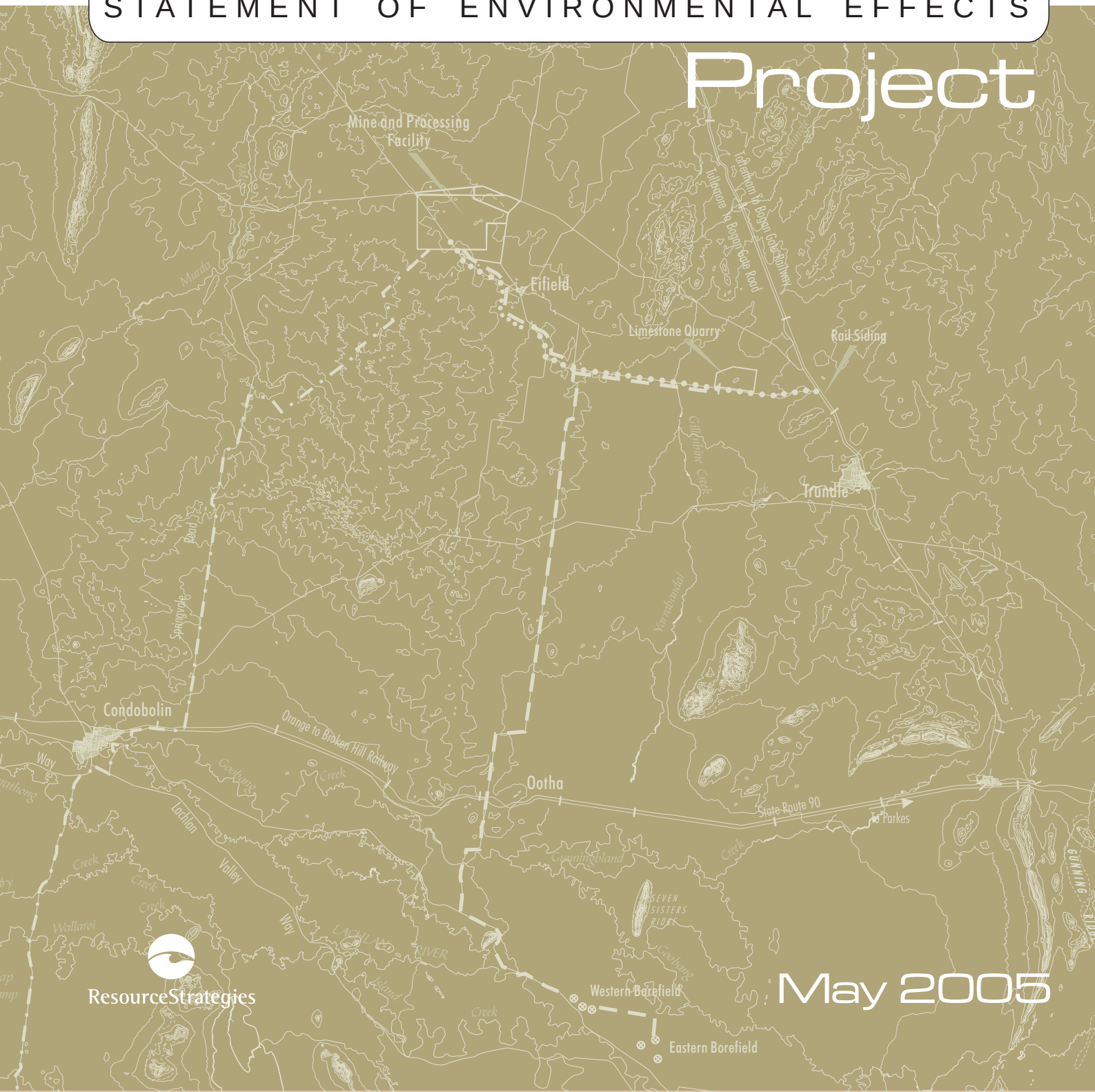
IVANPLATS SYERSTON
PTY LIMITED

Syerston

Nickel Cobalt

STATEMENT OF ENVIRONMENTAL EFFECTS

Project



ResourceStrategies

May 2005

SYERSTON NICKEL COBALT PROJECT

LIMESTONE QUARRY, RAIL SIDING, MINE AND PROCESSING FACILITY MODIFICATION

STATEMENT OF ENVIRONMENTAL EFFECTS

IVANPLATS SYERSTON PTY
LIMITED

Project No. IVP-04-01
Document No. SEE-01-D

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EXECUTIVE SUMMARY

The Syerston Nickel Cobalt Project (the Project) is owned by Ivanplats Syerston Pty Limited (IVP).

This Statement of Environmental Effects (SEE) is provided to support the application to modify the original Project Development Consent under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposed modification arises predominantly as a consequence of proposed changes in the rate of ore processing from 2.3 million tonnes per annum (Mtpa) to approximately 2.5 Mtpa (acid pressure leach autoclave feed rate), and removing the refinery section of the processing plant. This results in some changes, including:

- simplification of the metallurgical processing plant;
- change in the product mix from metal and mixed sulphide to just mixed sulphide;
- increase in the production of mixed nickel and cobalt sulphide;
- reduced number of process consumables used and changes to consumable quantities;
- changes in some processing air emissions;
- a reduction in power consumption;
- change in the number of transport movements from the Rail Siding and Limestone Quarry (Quarry);
- increased production rate from the Quarry; and
- a reduction in the operational workforce.

Environmental reviews that have been conducted to evaluate the Project modification proposal have concluded the following:

- From an operational noise perspective, a specialist review has concluded that the proposed modification to the Quarry design would result in no additional significant noise impacts beyond those assessed in the approved, consented Project Environmental Impact Statement (EIS).
- From an air quality perspective, a specialist review has concluded that as a result of the proposed Project modifications at the Mine and Processing Facility (MPF) and Quarry, no residences are likely to experience dust deposition or emission concentration levels above the current Department of Environment and Conservation (DEC) assessment criteria.
- From a traffic perspective, a specialist review has concluded that the management measures detailed in the EIS and Development Consent would remain unchanged and applicable to the modified Project.
- The proposed modification would involve an approximate additional 53 hectares (ha) of land disturbance at the Quarry. IVP is required to implement management procedures for stripping, stockpiling and re-using soil resources in its progressive rehabilitation programme as part of the original Project Development Consent.
- The additional material to be placed on the Quarry waste emplacement would have similar geological and geochemical characteristics to the waste rock generated by the approved Project, and is therefore not predicted to alter the potential impacts described in the EIS.

- Due to the screening effect of local ridgelines and vegetation screens, the number of publicly accessible roads and privately owned residences from which views of the Quarry would be available would remain substantially the same as those described in the EIS. For the privately owned residences which do have views of the Quarry, the visual impact of the proposed modification is predicted to be substantially the same as documented in the EIS due to the distances involved, screening effects of the local topography, and implementation of management measures required by the Development Consent.
- From a flora perspective, through the application of Eight Part Tests of Significance, no threatened flora species, populations, ecological communities, or their habitats would be significantly affected by the Project modification proposal to the extent that the viability of a species, population, ecological community, or their habitats would be undermined.
- From a fauna perspective, through the application of Eight Part Tests of Significance, no threatened fauna species, populations, ecological communities, or their habitats would be significantly affected by the proposal to the extent of undermining the viability of a species, population, ecological community, or their habitats.
- Potential surface water and groundwater impacts for the modified Project are expected to be similar to those predicted for the approved Project.
- Based on the findings of previous surveys and assessments of European heritage in the approved Project area for the EIS, no significant European heritage sites have been identified within the modified Project areas.
- Based on the findings of the archaeological surveys conducted in 2000 for the EIS within the Project area, the likelihood of identifying significant Aboriginal sites in the vicinity of the modified footprint of the Quarry is considered to be remote. IVP would obtain relevant permits and consents pursuant to the *National Parks and Wildlife Act 1979* prior to any land disturbance.
- It is considered that the proposed modifications to the Project design would not increase the existing potential risk areas identified in the risk assessment study and preliminary hazard analysis for the EIS.

The environmental reviews conducted for this SEE provide justification for the conclusion that the modified Project would remain substantially the same development as the original Project Development Consent (ie. the application of Section 96(2) of the EP&A Act is justified).

The reviews have also demonstrated that with the implementation of the environmental monitoring and management programmes required by the original Development Consent, and the proposed Project modifications (including staging the implementation of management measures) there would be minimal additional environmental impacts as a result of the Project modification proposal.

1 INTRODUCTION

1.1 OVERVIEW

The Syerston Nickel Cobalt Project (the Project) is owned by Ivanplats Syerston Pty Ltd (IVP). IVP acquired the Project from Black Range Minerals Pty Ltd during July 2004. The Project is located approximately 4.5 kilometres (km) north-west of the village of Fifield and approximately 45 km north-east of Condobolin in the Central West Region of New South Wales (NSW) (Figure 1).

An Environmental Impact Statement (EIS) was submitted to the Department of Urban Affairs and Planning (DUAP) as part of the Development Application (DA) for the Project in September 2000. Development Consent was issued for the Project on 23 May 2001 by the Minister for Urban Affairs and Planning under Sections 76(A)9 & 90 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). A copy of the Project Development Consent is provided as Appendix A.

The approved Project (ie. the Project for which Development Consent was issued in May 2001) includes the construction, operation and rehabilitation of an open-cut nickel-cobalt mine, processing facility and service infrastructure to provide road access, water and natural gas to the site. Figure 2 shows the location of the approved Project mining and ancillary infrastructure areas.

The major components of the approved Project comprise:

- an open pit mining operation;
- an ore processing facility (including refinery);
- production plants for ore processing reagents including sulphuric acid, hydrogen sulphide, hydrogen, oxygen and nitrogen;
- a natural gas fired co-generation plant for electricity and steam generation;
- mine waste emplacements;
- a tailings storage facility (TSF);
- process water evaporation ponds and surge dam;
- water treatment facilities, administration offices and workshop/maintenance facilities;
- a Limestone Quarry (Quarry);
- a dedicated Rail Siding;
- a materials transport route between the Quarry, Rail Siding and the Mine and Processing Facility (MPF) (Figure 3);
- two borefields for provision of process water and an associated water supply pipeline; and
- a natural gas pipeline from the existing Moomba to Sydney gas pipeline south of Condobolin to the MPF site.

The Project mining areas are located within Mining Lease Application (MLA) areas 113, 132, 139, 140, 141 and Quarry MLA 162. The MLA areas cover approximately 3,000 hectares (ha) of land owned by or optioned to IVP.

Since the issue of the Development Consent, the Project has new ownership. IVP proposes to modify the approved Project under Section 96(2) of the EP&A Act.

SYERSTON NICKEL COBALT PROJECT SEE

FIGURE 1

Project Location

IVANPLATS SYERSTON PTY LIMITED

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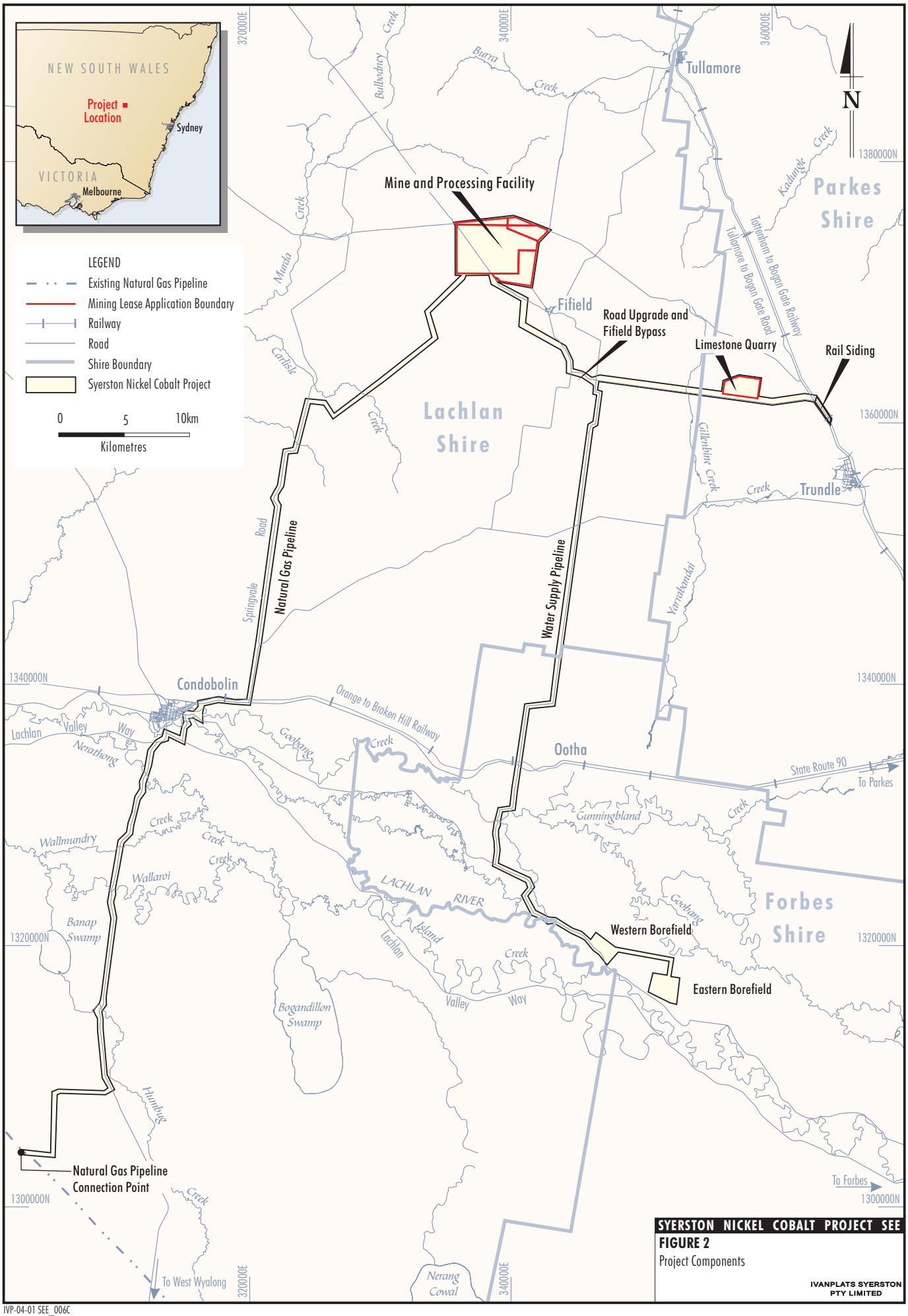

SYERSTON NICKEL COBALT PROJECT SEE

FIGURE 2

Project Components

IVANPLATS SYERSTON PTY LIMITED

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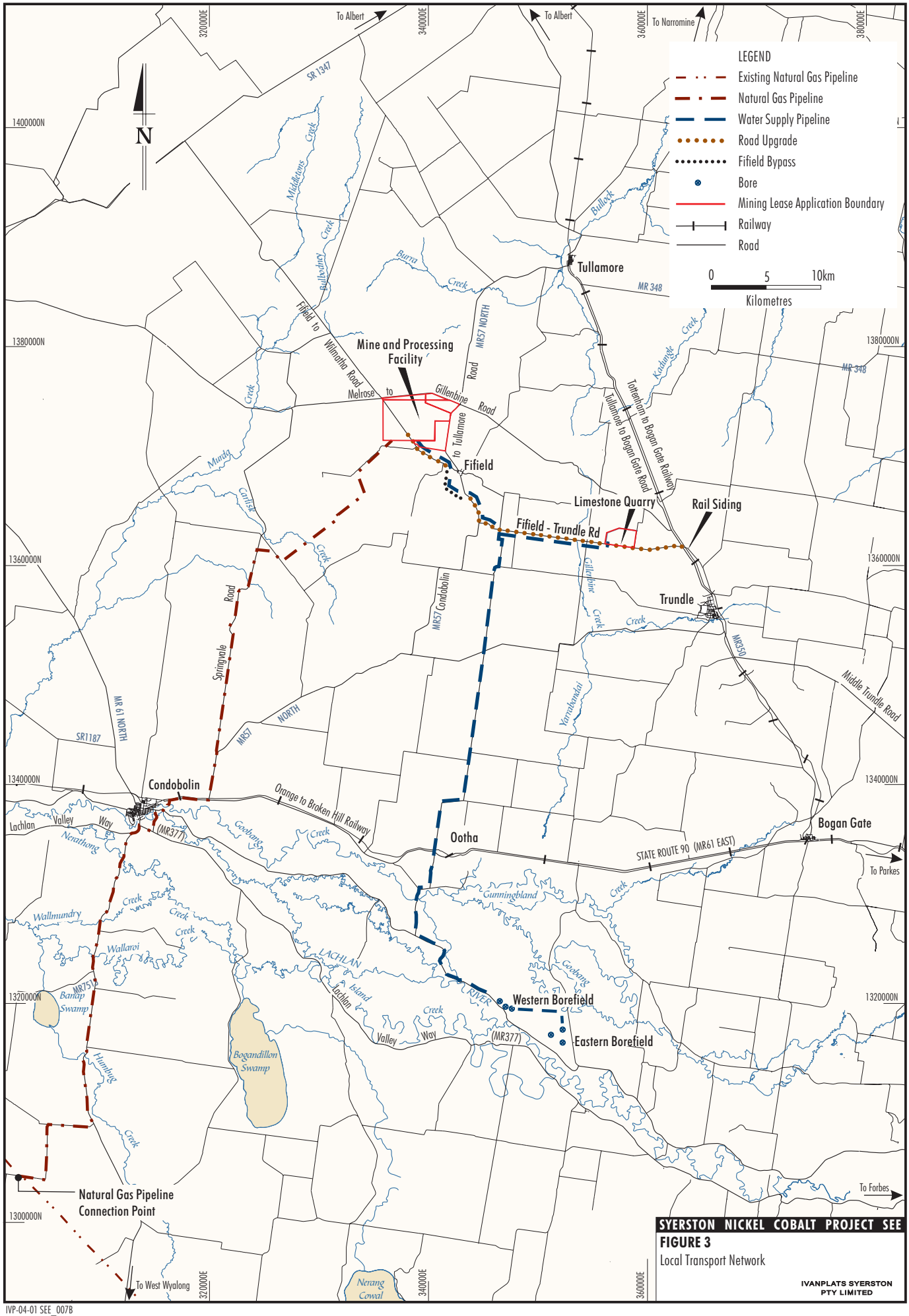

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The proposed modification relates predominately to a change in the autoclave feed rate of ore from 2.3 million tonnes per annum (Mtpa) to approximately 2.5 Mtpa and removing the refinery section of the processing plant (Figure 4). This results in the proposed changes, including:

- alterations to the general arrangement;
- an increase in the production of mixed nickel and cobalt sulphide;
- a change in transport movements;
- alterations to process consumables;
- a reduction in power consumption;
- the removal of waste liquid streams; and
- a reduction in the workforce.

No changes are proposed to the water supply or water supply pipeline or gas supply pipeline components of the approved Project. A more detailed description of the proposed modification is provided in Sections 2, 3 and 4.

1.2 PURPOSE OF THIS REPORT

This Statement of Environmental Effects (SEE) has been prepared by IVP to support an application to modify the Project Development Consent under Section 96(2) of the EP&A Act. This SEE describes the proposed modification, discusses the findings of the environmental review of the proposed modification design, and provides justification for the conclusion that it would be substantially the same development as the original approved Project (ie. the application of Section 96(2) of the EP&A Act is justified).

1.3 STRUCTURE OF THIS REPORT

This SEE is structured as follows:

Section 1: Describes the purpose of this report, outlines the legislative and approval requirements and describes the consultation undertaken in relation to the proposed modification.

Section 2: Provides a description of the approved MPF and the proposed modification.

Section 3: Provides a description of the approved Quarry and Rail Siding and the proposed modification.

Section 4: Provides a description of the approved materials transport route and the proposed modification.

Section 5: Discusses key environmental aspects of relevance to the proposed modification.

Section 6: Describes IVP's environmental management and monitoring programmes and proposes relevant modifications to these based on the results of the assessments presented in Section 5.

Section 7: Compares the approved Project and the proposed modification, and summarises the findings of the SEE.

Appendices A to F provide supporting information as follows:

Appendix A	Syerston Nickel Cobalt Project Development Consent.
Appendix B	IVP's Letter of 18 April 2005 to DIPNR.
Appendix C	Air Quality Assessment.
Appendix D	Noise and Blast Assessment.
Appendix E	Traffic Report.
Appendix F	Eight Part Tests of Significance.

1.4 LEGISLATIVE FRAMEWORK - OVERVIEW

The following section provides a general overview of the typical legislation that may be relevant to the modification. Specific requirements may be further advised upon consultation with advisors and relevant agencies.

Development Consent History

The original DA for the Project was assessed under Part 4 of the EP&A Act. For the purposes of Part 4 of the EP&A Act the development the subject of the DA was categorised as being:

(i) designated development;
(ii) integrated development; and
(iii) State Significant Development pursuant to State Environmental Planning Policy 34 (Major Employment Development) ('SEPP 34').

Given the above the DA was accompanied by an EIS and was also assessed in accordance with the integrated development procedure outlined in Division 5 of Part 4 of the EP&A Act. The Minister for Urban Affairs and Planning (as the Minister for Infrastructure and Planning was then known) was the consent authority.

Approval Process for the Modification Application

In January 2005, IVP submitted a Briefing Paper on the proposed modification to the Department of Infrastructure, Planning and Natural Resources (DIPNR). In February 2005, IVP consulted with the DIPNR with regard to defining the process for seeking the necessary approvals for the proposed modification to the approved Project. Based on these discussions, DIPNR advised IVP that it could seek approval to modify the Project Development Consent under Section 96(2) of the EP&A Act which states:

> *"A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*
>
> - *it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all under this section)".*

Section 96(3) of the EP&A Act requires that in determining an application for modification of a consent the consent authority must take into consideration such of the matters referred to in section 79C(1) of

the EP&A Act as are of relevance to the development the subject of the application. Section 79C(1) of the EP&A Act requires that the consent authority, when determining an application consider, amongst other things, any environmental planning instruments that apply to the land to which the application relates and the environmental impacts of the development the subject of the application.

DIPNR has indicated that a SEE should be prepared to support the Project modification proposal and the Minister for Infrastructure and Planning will be the consent authority for the application.

Local Environmental Plans

The majority of the Project lies within the Local Government Area (LGA) of Lachlan with ancillary Project components located in the Parkes and Forbes LGA's. These areas are addressed in the Lachlan Local Environmental Plan (LEP), Forbes LEP and Parkes LEP. The land to which the Project relates is within zone 1(a) (rural) under these LEP's.

The relevant extracts of the zoning table for each LEP is as follows:

Lachlan Local Environmental Plan

"Zone No 1 (a) (Rural Agricultural Zone)
1 Objectives of zone. The objectives of this zone are:
(a) to allow development for purposes that are:
(i) appropriate in a rural location, and
(ii) sympathetic with the environmental characteristics of the land and the costs of providing public services and amenities,
(b) to promote the efficient and effective use of agricultural land (particularly prime crop and pasture land) in a manner which sustains its agricultural potential,
(c) to facilitate farm adjustment,
(d) to conserve prime crop and pasture land by ensuring that:
(i) it is not unnecessarily converted to non-agricultural purposes, and
(ii) any allotment created for intensive agricultural purposes is potentially and physically capable, on its own, of sustaining a range of such purposes or some other agricultural operation suitable to the locality.
(e) to protect and conserve:
(i) soil suitability by controlling development in accordance with soil capability,
(ii) forests of existing and potential commercial value for timber production,
(iii) valuable deposits of minerals and extractive materials by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits,
(iv) trees and other vegetation in environmentally sensitive areas where the conservation of the vegetation is likely to reduce land degradation,
(v) water resources for use in the public interest,
(vi) areas of significance for nature conservation, including areas with rare plants, wetlands and significant habitat, and
(vii) places and buildings of archaeological or heritage significance and aboriginal relics and places, and
(f) to minimise the cost to the community of:
(i) fragmented and isolated development of rural land, and

(ii) providing, extending and maintaining public infrastructure and services.
2 Without development consent Agriculture (other than ancillary dwellings and intensive livestock keeping); forestry (other than ancillary dwellings).
3 Only with development consent any purpose other than a purpose included in Item 2 or 4.
4 Prohibited Boarding-houses; motor showrooms; residential flat buildings; shops."

Forbes Local Environmental Plan

"Zone No 1 (a) (Rural Zone)
1 Objectives of zone. The objectives of this zone are:
(a) to continue the existing rural zoning, and
(b) to promote the maintenance of quality rural land for continued agricultural use.
2 Without development consent Agriculture (other than feed lots, poultry farms or pig keeping establishments); animal boarding establishments; forestry; landscaping and gardening.
3 Only with development consent. Any purpose other than a purpose included in Item 2 or 4 of the matter relating to this zone.
4 Prohibited Boarding houses; motor showrooms; professional and commercial chambers; public buildings; residential flat buildings; shops (including shops listed in Schedule 2). "

Parkes Local Environmental Plan

"Zone No 1 (a) (Rural "A" Zone)
1 The objectives of zone. The objectives of this zone are:
(a) to enable the continuation of traditional forms of rural land use and occupation and the development of new or changed forms of agricultural enterprise,
(b) to enable other forms of development which are associated with rural activity, which require an isolated or rural location, or which support tourism objectives, and
(c) to ensure that the type and intensity of development is appropriate in relation to the characteristics of the land, the rural environment, the need to protect agricultural activity from the effects of other development and the costs of providing public services and amenities.
2 Without consent Agriculture (other than ancillary dwellings and intensive livestock keeping establishments); forestry (other than ancillary dwellings and pine plantations).
3 Only with consent. Any purpose other than a purpose included in Item 2 or 4.
4 Prohibited Motor showrooms; residential flat buildings; shops (other than general stores)."

The Project, as proposed to be modified, is permissible with development consent within the zone (1)(a) rural zoning in each of the three relevant LEPs.

State Environmental Planning Policy No. 45 (Permissibility of Mining)

SEPP 45 Clause 5(2) states:

"(1) If mining is permissible on land with development consent in accordance with an environmental planning instrument if provisions of the instrument are satisfied, mining is permissible on that land with development consent without those provisions having to be satisfied and those provisions have no effect in determining whether or not mining is permissible on that land or to the determination of a development application for consent to carry out development for the purposes of mining on that land.

> *(2) Without limiting subclause (1), if mining is permissible on land with development consent in accordance with an environmental planning instrument if the consent authority is satisfied as to certain matters specified in the instrument, mining is permissible on that land with development consent without the consent authority having to be satisfied as to those specified matters."*

As stated above the land upon which Project will be conducted is zoned (1)(a) (rural) under each of the applicable LEPs and there are no restrictions that would trigger the application of clause 45 of SEPP 45 in relation to the modification application for the Project. Accordingly SEPP 45 has no application to the modification application for the Project.

State Environmental Planning Policy No. 11 (Traffic Generating Developments)

SEPP No. 11 – Traffic Generating Developments requires that the RTA is made aware of, and given the opportunity to make representations in respect of, developments listed in Schedule 1 of that SEPP. Extractive industries and mining are listed in Schedule 1 and therefore this SEPP is applicable to the Project.

As the proposed modification to the SEPP will have an impact on traffic movements SEPP 11 requires the consent authority to refer a copy of the DA for the Project to the Roads and Traffic Authority (RTA).

State Environmental Planning Policy No.33 (Hazardous and Offensive Development)

SEPP 33 requires the consent authority, in considering a DA for a potentially hazardous or a potentially offensive industry, to take into account:

- current guidelines or circulars published by DIPNR;
- consultation with public authorities;
- any preliminary hazard analysis (PHA);
- any feasible alternatives to the carrying out of the development and the reasons for choosing the development;
- the subject of the application; and
- any likely future use of the land surrounding the development.

For potentially hazardous development, SEPP 33 requires a PHA to be prepared (refer to Section 5).

State Environmental Planning Policy No. 44 (Koala Habitat Protection)

SEPP 44 requires the consent authority for any DA in certain LGAs (including Forbes and Parkes) to consider whether the land, which is the subject of the DA, is "*potential koala habitat*" or "*core koala habitat*" (Section 5).

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) commenced on 16 July 2000 and is administered by the Commonwealth Department of the Environment and Heritage.

Under the EPBC Act, approval of the Commonwealth Minister for the Environment and Heritage is required for any action that may have a significant impact on matters of national environmental significance. These matters are:

- World Heritage properties;
- National Heritage;
- Ramsar wetlands of international importance;
- listed threatened species and communities;
- migratory species protected under international agreements'
- nuclear actions; and
- the Commonwealth marine environment.

An action that is likely to have a significant impact on a matter of environmental significance is described in the EPBC Act as a "*controlled action*". A person proposing to take an action that may be a controlled action is required by the EPBC Act to refer the proposal to the Commonwealth Minister for Environment. The Minister then decides whether or not the action is a "*controlled action*" and requires assessment and approval under the EPBC Act.

The proposed Project modification is not located on a World Heritage property or Ramsar wetland area. It is also not a nuclear action, nor would it impact on the Commonwealth marine environment.

Tests for any impact from the Project, including the Project surrounds, on threatened species listed under the Eight Part Tests of Significance have been conducted under Part 5A of the EP&A Act for a number of threatened species and communities including those listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and EPBC Act and considered to have possible occurrences in the study area or surrounds (Appendix F). The Eight Part Tests of Significance concluded that the modification would not have a significant impact on any flora or fauna species or communities listed as threatened under the EPBC Act. Similarly, the flora and fauna assessment concluded that the modification would not have a significant impact on any listed migratory species or marine protected species (Section 5).

The Project modification proposal has therefore not been referred to the Commonwealth Minister for the Environment for consideration under the EPBC Act, as no "*controlled action*" is proposed.

Threatened Species Conservation Act 1995

Eight Part Tests of Significance have been conducted under Part 5A of the EP&A Act for a number of threatened species and communities, including those listed under the TSC Act, and also considered possible occurrences in the study area or surrounds (see Appendix F).

The Eight Part Tests of Significance concluded that the modification would not have a significant impact on any flora or fauna species or communities listed under the TSC Act. Similarly, the flora and fauna assessment concluded that the modification would not have a significant impact on any listed migratory species or marine protected species (see Section 5).

Other Approvals

In addition to the modified Development Consent which is required to be obtained from the Minister for Planning, the following other approvals (ie. consents, permits and/or licences) could potentially be required as a result of the modification:

- Consent under section 90 of the *National Parks and Wildlife Act 1974* is required prior to the destruction of any known Aboriginal archaeological objects, with a section 87 Preliminary Research Permit required to conduct excavations in areas of potential archaeological deposit or in areas where further work to define the extent of a particular site is required.
- An Environmental Protection Licence from the NSW Environmental Protection Agency (EPA) (now part of DEC) pursuant to Sections 47 and 48 of the *Protection of the Environment and Operations Act, 1997*.
- Consent to undertake works on a road, pursuant to Section 138 of the *Roads Act, 1993* from the appropriate "roads authority" to undertake road works.

1.4.1 DIPNR Requirements for the SEE

DIPNR has confirmed with IVP the aspects to be addressed in this SEE (Appendix B and DIPNR confirmation by email on 4/5/05). Table 1 itemises these issues and indicates the section of the SEE where each has been addressed.

Table 1
Issues to be Addressed in the SEE

Aspect	Section
Identify the proposed modifications.	Sections 2, 3 and 4
Justify the proposed modifications.	Section 7
Assess the proposed modifications against the relevant provisions of the Lachlan and Parkes Shires LEPs and other statutory planning documents.	Section 1
Assess the potential impacts of the proposed modifications, and describe what measures would be implemented to prevent, mitigate, and/or manage the potential impacts at the MPF and Quarry.	Section 5
Potential impacts associated with the following will be addressed for the MPF: • *Air (gaseous emissions) and noise;* • *Traffic;* • *Waste management; and* • *Surface and ground water (waste water management and water supply).*	Sections 5 & 6
Potential impacts associated with the following will be addressed for the Quarry: • *Air (dust emissions) and noise; and* • *Traffic (including potential impacts on stock movement).*	Section 5

Source: IVP's Letter of 18 April 2005 to DIPNR (Appendix B)

1.5 CONSULTATION

IVP are committed to an open and constructive consultation programme. The objectives of the programme are to:

- inform government and public stakeholders about the progress and nature of the Project;
- present information to stakeholders to permit an informed assessment of the Project;

- recognise local concerns or interests in the modified Project; and
- continue dialogue between IVP and government and community stakeholders.

Consultation with the regional and local community and regulatory agencies has been undertaken for the modified Project. A summary of the consultation activities conducted by IVP with government agencies and the community is detailed in Table 2.

Table 2
Summary of Consultation on Modified Project

Organisation/ Agency	Date of Consultation	Location	Description
DIPNR	December 2004	DIPNR Office, Sydney	Verbal briefing on Project status and update on ownership. Discussed proposed modifications.
DIPNR	27 January 2005	N/A	Forwarded Briefing Paper describing proposed modification.
DIPNR	8 February 2005	DIPNR Office, Sydney	Discussed contents of Briefing Paper and level of assessment required.
Department of Minerals & Resources (DMR)	27 January 2005	N/A	Forwarded Briefing Paper for information.
DMR	8 February 2005	DMR Office, Sydney	Discussed contents of Briefing Paper and level of assessment required. Verbal briefing on Project status and update on ownership
DMR	16 March 2005	DMR Office, Orange	Forwarded Briefing Paper for information. Presentation of overall Project, EIS and proposed modification
EPA	7 April 2005	EPA Office, Bathurst	Forwarded Briefing Paper for information. Presentation of overall Project, EIS and proposed modification
Lachlan Shire Council (LSC)	December 2004	Shire Offices, Condobolin	Verbal briefing on Project status and update on ownership. Discussed proposed modifications.
LSC	16 March 2005	Shire Offices, Condobolin	Presentation of overall Project, EIS and proposed modification
Parkes Shire Council (PSC)	December 2004 9 February 2005	Shire Offices, Parkes	Verbal briefing on Project status and update on ownership. Discussed proposed modifications.
PSC	17 March 2005	Peak Hill	Presentation of overall Project, EIS and proposed modification
Forbes Shire Council (FSC)	December 2004	Shire Offices, Forbes	Verbal briefing on Project status and update on ownership. Discussed proposed modifications.
FSC	18 March 2005	Shire Offices, Forbes	Presentation of overall Project, EIS and proposed modification
Affected Landholders	9 February 2005	Trundle Bowles Club	Presentation of overall Project, EIS and proposed modification
Community	10 February 2005	Fifield Hall	Presentation of overall Project, EIS and proposed modification
Community	10 February 2005	Tullamore Bowles Club	Presentation of overall Project, EIS and proposed modification
Community	11 February 2005	Trundle Golf Club	Presentation of overall Project, EIS and proposed modification

2 DESCRIPTION OF THE APPROVED AND PROPOSED MINE AND PROCESSING FACILITY MODIFICATION

2.1 APPROVED MINE AND PROCESSING FACILITY

2.1.1 Overview

The approved design for the MPF presented in the approved Project EIS, utilises conventional open-pit mining methods to an average depth of 35 metres (m) with localised deeper areas up to approximately 55 m below the surface, with the majority of the ore to be free dug by excavator. Ore and mine waste are to be loaded directly to haul trucks for transfer to the run-of-mine (ROM) pad, ore stockpiles or the waste emplacements.

A feasibility study of the Project undertaken in 2000 by Black Range Minerals Ltd estimated an ore reserve of 76.8 million tonnes (Mt) graded at 0.73% nickel and 0.13% cobalt. The ore reserve is largely confined within goethite and siliceous goethite zones at depths of 10 m to 60 m from the surface in deposits up to 40 m in thickness.

The major infrastructure components of the approved MPF include:

- up to 11 open pits, two waste emplacements and temporary ore and topsoil stockpiles;
- haul roads, ore and limestone ROM pads;
- processing plant and metals refinery;
- electricity and steam co-generation plant;
- sulphuric acid and industrial gas plants;
- administration and maintenance facilities;
- fuel and reagent storage, preparation and distribution systems;
- TSF and evaporative structures;
- potable and raw water supply treatment and distribution facilities; and
- MPF site water management structures.

2.1.2 Operation

As described in the EIS, up to 11 open pits would be developed throughout the life of the mine, which would be expanded to form two open pits by Year 20. The ore production rate would be adjusted as necessary to maintain a process plant feed rate of approximately 2.3 million tonnes per annum (Mtpa) (Development Consent condition 2.3(a)) following the removal of reject ore material which would range from 5% to 40%, depending upon ore type.

Mine waste material removed from the open pits during mining would be stored in two waste emplacements. The emplacements (a western and eastern waste emplacement) would be adjacent to the open pits and located along the north-eastern and north-western MLA boundaries. At the completion of mining activities (Year 21) the waste emplacements would contain approximately 125 Mt of mine waste, consisting predominately of alluvium.

The process plant would process 2.3 Mtpa of ore to produce saleable nickel and cobalt products. Ore processing would involve the following eight stages:

- ore preparation;
- acid leaching;
- thickening and tailings neutralisation;
- solution neutralisation;
- sulphide precipitation;
- sulphide leaching and removal of impurities;
- solvent extraction; and
- electrowinning to produce metal product.

Various stages of the ore processing circuit would require chemical inputs. The MPF design enables on-site production of some of these inputs. Production of these chemical inputs would require their own on-site infrastructure and processes, and include the following production plants:

- oxygen;
- sulphuric acid;
- hydrogen;
- hydrogen sulphide;
- nitrogen; and
- lime slurry.

Tailings from the ore processing circuit would be deposited in the TSF. Approximately 50 Mt of tailings would be produced over the term of the EIS with a tailings production rate of approximately 2.55 Mtpa at 48% solids.

Two adjoining tailings storage cells would be constructed in the south-east of the MPF site with a combined area of approximately 220 ha. The TSF would have sufficient capacity to contain tailings for more than 20 years and would be of conventional subaerial design.

The saline nature of tailings water (principally magnesium sulphate or Epsom salts) prevents reuse within the ore processing system and an evaporation system is required to remove excess supernatant water from the TSF. The evaporation system would comprise seven adjoining evaporation ponds and an evaporation surge dam, and would have a combined capacity of some 3,900 megalitres (ML) and combined surface area of approximately 180 ha.

2.1.3 Ancillary Infrastructure

Ancillary infrastructure of the MPF to be located adjacent to the process plant area would include an on-site power station, water treatment plant, sulphuric acid plant and several chemical production plants, construction camp and internal haul and access roads.

The on-site natural gas fired power station would supply the MPF's estimated 34 megawatt (MW) electrical and steam demand. The power station would comprise two gas turbine power generators, with two heat recovery steam generators (HRSG) and a condensing steam turbine. Power would be reticulated around the site at 11 kilovolts (kV) (high voltage) and 415 volts (V) (low voltage) power lines. Natural gas for the power station would be provided by a spurline from the existing Moomba to Sydney natural gas pipeline which runs south of Condobolin.

2.1.4 Workforce

During the peak year of the construction phase of the MPF, an average of approximately 600 contractors would be required to build and install the infrastructure at the MPF site and approximately 400 personnel would be employed to maintain approved MPF operations. During operations, mining and processing would be undertaken 24 hours per day (hrs/day), seven days per week (days/week).

2.2 PROPOSED MINE AND PROCESSING FACILITY MODIFICATION

2.2.1 Reasons for the Proposed Modifications

The modification is primarily proposed as a result of change in ownership and assessment of Project risk.

2.2.2 Description of the Proposed Mine and Processing Facility Modification

IVP propose to modify the Project in the following manner:

1. Increasing the autoclave feed rate of nickel/cobalt ore from 2.3 Mtpa to approximately 2.5 Mtpa to improve the financial viability of the Project.

2. Removing the refinery section of the processing facility to reduce the complexity of the facility. The removal of the refinery would result in a reduction in the number of reagents required for processing and a reduction in power and natural gas. The following sections of the processing facility (comprising the refinery) would be removed:

    - sulphide leaching and removal of impurities;
    - solvent extraction; and
    - electrowinning to produce metal product.

The proposed modification would allow for the production of up to approximately 53,000 tonnes per annum (tpa) of mixed sulphide precipitate. This represents an increase of approximately 11,000 tpa from what was approved.

No significant modifications to the other components of the MPF such as mobile equipment or infrastructure requirements (ie. water pipeline, natural gas pipeline) are proposed.

The approved MPF and the proposed modification are shown in Figure 4. Table 3 provides a comparison between the approved MPF and the proposed modification.

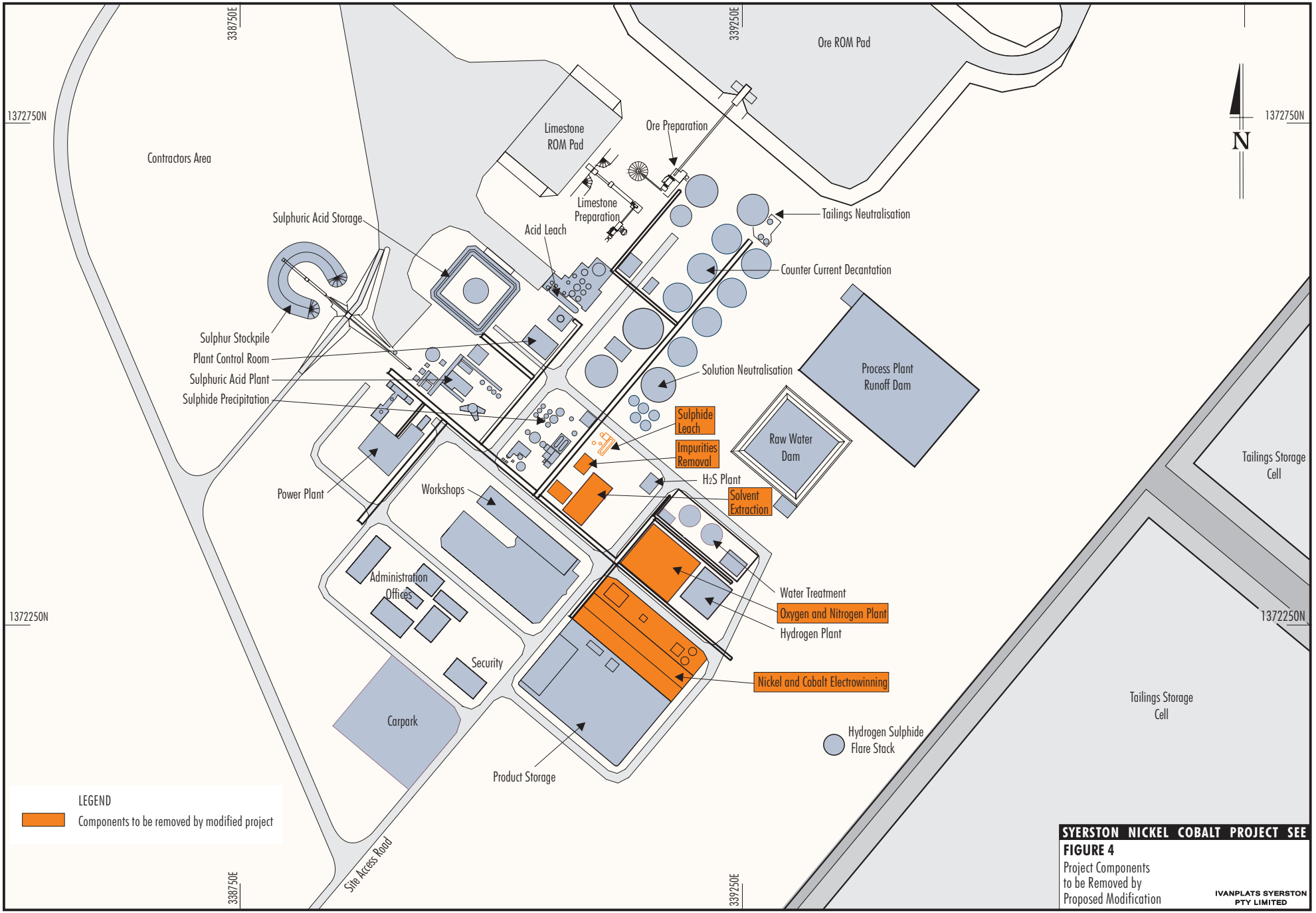

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FIGURE 4

Project Components to be Removed by Proposed Modification

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Table 3
Comparison of Approved and Modified MPF

Project Component	Approved Project	Project Modification (Approximate)
Project Life (EIS term)	21 Years	Unchanged
Hours of Operation	24 hours (hrs), seven days per week	Unchanged
Autoclave feed rate	2.3 million tonnes per annum (Mtpa)	2.5 Mtpa
Product	Production of up to 42,000 tonnes per annum (tpa) of mixed sulphide precipitate or up to 20,000 tpa of nickel and 5,000 tpa of cobalt	Production of up to 53,000 tpa of mixed sulphide precipitate
Refinery	Used in the refinery	Refinery removed
Minor reagents (ie. sodium sulphate, barium hydroxide, boric acid, gelatine, nitric acid, hydrochloric acid, diatomaceous earth)		Reagents not required
Process Consumables		
Sulphur	210,000 tpa	260,000 tpa
Limestone	600,000 tpa	790,000 tpa
Flocculant	900 tpa	1,100 tpa
Magnesium oxide	21,000 tpa	0 tpa
Caustic soda	10,000 tpa	100 tpa
Extractant	3,000 Lpa	0 pa
Modifier	1,500 Lpa	0 pa
Diluent	15,000 Lpa	0 pa
Minor reagents (hydrated lime, mill balls, coagulant, diatomaceous earth, hydrochloric acid)	Used in ore preparation, thickening and tailings neutralisation, solution neutralisation, sulphuric acid plant, water treatment plant	25% increase in consumption of hydrated lime, mill balls, coagulant 35% overall reduction in consumption of diatomaceous earth
Production of Reagents		
Sulphuric acid	620,000 tpa	700,000 tpa
Hydrogen sulphide	64 tonnes per day (tpd)	88 tpd
Hydrogen	4.5 tpd	5 tpd
Nitrogen	Nitrogen for plant purge air.	10% increase production of nitrogen
Oxygen	44,000 tpa	0 tpa
Atmospheric Emissions		
Carbon dioxide emission rate	• Tailings neutralisation vent stack: 1.22 kg/s • Leach Liquor Neutralisation Tank Vents: 2.83 kg/s • Power Plant HRSG: 4.5 kg/s • Hydrogen Reformer Stack: 0.48 kg/s • Total: 9.03 kg/s	• Tailings neutralisation vent stack: 1.6 kg/s • Leach Liquor Neutralisation Tank Vents: 3.7 kg/s • Power Plant HRSG: 3.5 kg/s • Hydrogen Reformer Stack: 0.55 kg/s • Total: 9.35 kg/s
Gaseous emission rate from Extraction Fan over Sulphide Filter.	4.2 Nm^3/s (dry, 273K, 101.3 kPa)	5.3 Nm^3/s (dry, 273K, 101.3 kPa)
Gaseous emission rate from Sulphuric Acid Plant stack.	17.0 Nm^3/s (dry, 273K, 101.3 kPa)	19.2 Nm^3/s (dry, 273K, 101.3 kPa)
Gaseous emission rate from Flare Stack.	0.52 Nm^3/s (dry, 273K, 101.3 kPa)	0.65 Nm^3/s (dry, 273K, 101.3 kPa)

Table 3 (Continued)
Comparison of Approved and Modified MPF

Project Component	Approved Project	Project Modification (Approximate)
Atmospheric Emissions (cont.)		
Gaseous emission rate from Hydrogen Reformer Stack	1.23 Nm^3/s (dry, 273K, 101.3 kPa)	1.42 Nm^3/s (dry, 273K, 101.3 kPa)
Gaseous emission rate from Power Plant HRSG	23.8 Nm^3/s (dry, 273K, 101.3 kPa)	18.4 Nm^3/s (dry, 273K, 101.3 kPa)
Power Consumption	34 MW	25 MW
Natural Gas Requirements	651 GJ/h, comprised of approximately 350 GJ/h usual demand and approximately 300 GJ/h for supplementary steam raising and acid plant start-up	500 GJ/h (total, maximum) 270 GJ/h usual demand
Waste Liquid Streams	Waste liquid streams from solvent extraction and electrowinning to tailings neutralisation and tailings disposal areas	Waste liquid streams associated with the refinery removed. Geochemical nature of tailings remains unchanged
Tailings Production Rate	2.55 Mtpa at 48% solids	Expected increased rate with increased plant throughput. Geochemical nature of tailings remains unchanged
Tailings Design	Embankment heights, surface areas and storage capacities	Tailings storage footprint remains unchanged
Employees	Approximately 400 permanent positions during operational phase	The number of permanent positions during the operational phase is likely to reduce to approximately 300

Source: IVP, 2005

The proposed modification to the MPF would not involve any significant changes to the disturbance footprint.

IVP would construct the MPF using the same type of equipment and construction techniques described in the EIS.

The rehabilitation concepts and the long-term rehabilitation strategy for the MPF would remain as described in the EIS.

3 DESCRIPTION OF THE APPROVED AND PROPOSED QUARRY AND RAIL SIDING MODIFICATIONS

3.1 APPROVED QUARRY

3.1.1 Overview

For the approved Project crushed limestone is required to neutralise process liquids and slurries, following acid leaching. In order to meet this requirement IVP has approval to mine a maximum of 600,000 tpa of crushed limestone (Development Consent condition 2.2(b)) from the Gillenbine limestone deposit, situated approximately 20 km south-east of the MPF and adjacent to the Fifield to Trundle Road. The Quarry site is located within MLA 162.

The EIS describes the limestone deposit as a low hill located within the Gillenbine Creek plain. The deposit is a sedimentary sequence of shale and siltstone and extends some 1 km north-south and 1 km east-west and has been identified to a depth of 35 m. The elevation of the deposit is approximately 260 m AHD.

The site of the approved Quarry is located within previously cleared agricultural land which has been used for grazing and occasional cropping and has mostly been cleared of its native vegetation cover.

Construction and site preparation activities that would be undertaken for the Quarry are described in the EIS as follows:

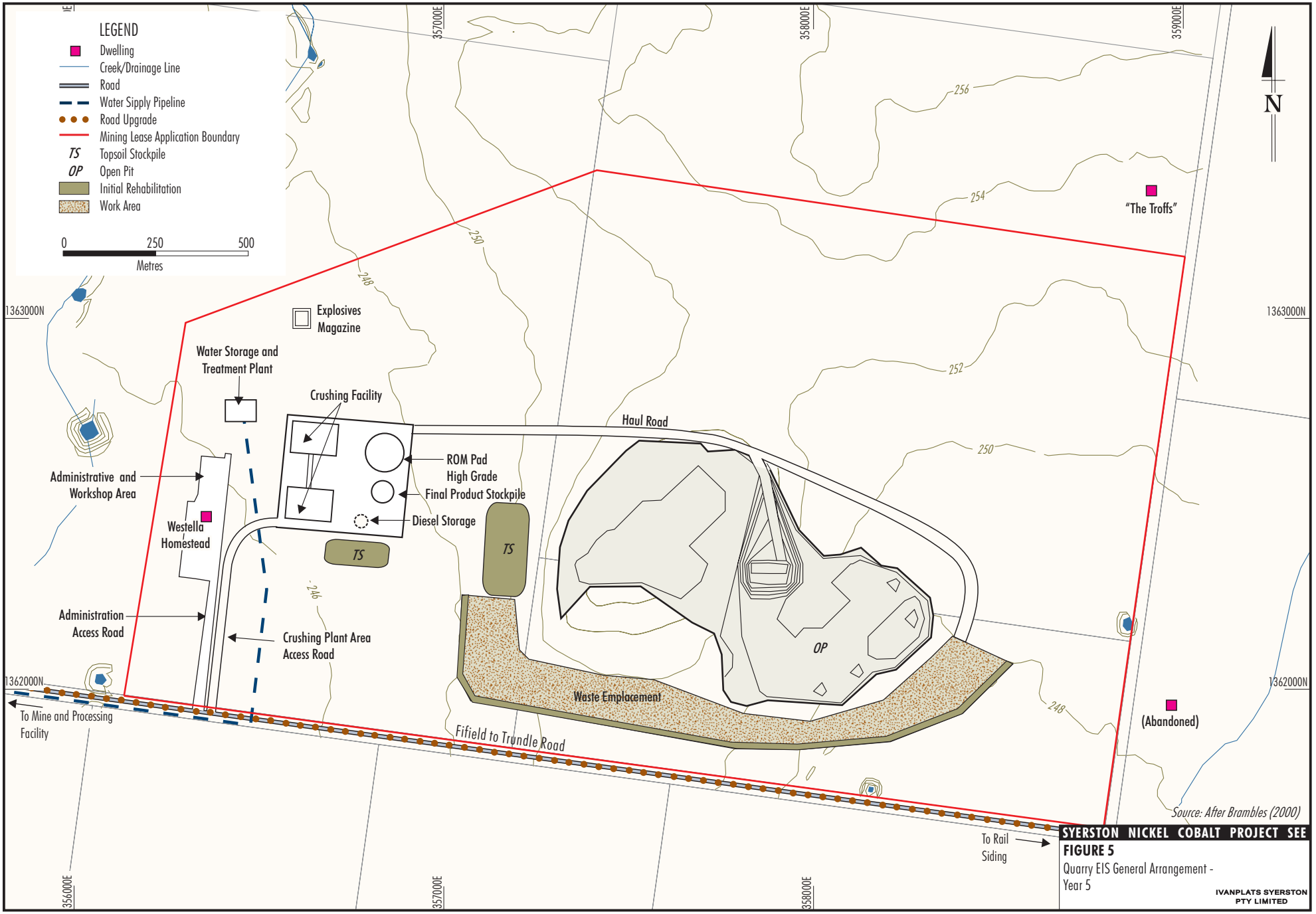
- soil stripping and stockpiling;
- construction of site offices and workshops;
- construction of water supply and water management infrastructure; and
- construction and commissioning of a crushing facility.

The approved design for the Quarry presented in the EIS includes the removal and stockpiling of waste rock and limestone extraction using conventional open-pit drill and blast methods. Waste rock and low grade limestone would be deposited in an emplacement surrounding the open pit. Figures 5 and 6 show the approved Quarry during Year 5 and Year 21.

ROM high grade limestone, as described in the EIS, would be crushed at the Quarry site prior to transport to the MPF site. The ROM stockpile material would be fed by a front end loader onto a screen to separate oversize material which would be fed by conveyor directly into a 200 tonnes per hour (t/hr) throughput primary jaw crusher. The primary crusher output would then pass through a second screen, and any oversize material would be returned to the crusher. The high grade limestone product would be less than 100 millimetres (mm) in size.

The crushed high grade limestone is approved to be transported to the MPF site via the Fifield to Trundle Road, the proposed Fifield Bypass, and the Fifield to Wilmatha Road using side tipping road trains. Loading and haulage of crushed limestone to the MPF would be conducted five to six days/ week, 52 weeks/year.

Ancillary infrastructure approved to be constructed at the Quarry includes site offices to be located at the existing “Westella” homestead, workshops and maintenance facilities. The existing electricity supply to the “Westella” homestead would be utilised at the site offices and workshops. Industrial electrical requirements of the crushing facility would be provided by a diesel powered 500 kV generator set.



Source: After Brambles (2000)

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FIGURE 5

Quarry EIS General Arrangement - Year 5

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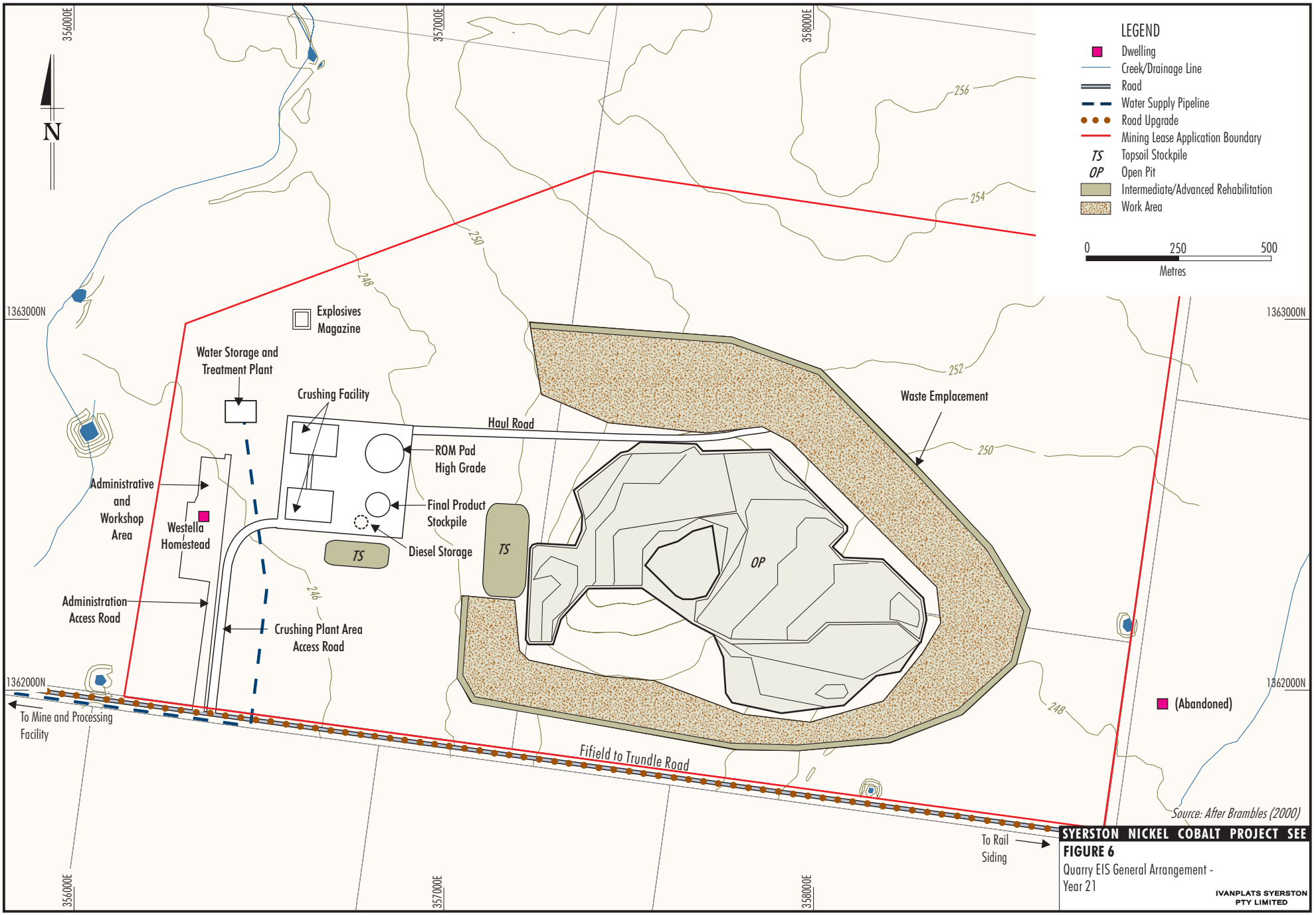

Source: After Brambles (2000)

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FIGURE 6

Quarry EIS General Arrangement - Year 21

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IVP-04-01 SEE_002B

A water supply pipeline was included in the EIS and subsequently approved to supply water for the Project. A 12 km spur line from the main water supply pipeline would supply approximately 50 ML of raw water per annum to the Quarry for crushing and mining activities. Potable water requirements of the Quarry workforce would be provided by a package water treatment plant. Sewage would be treated in the existing septic system at the "Westella" homestead.

During the Quarry construction period, approximately 15 to 20 personnel would be required on-site to construct the crushing facility, administration and workshop facilities, develop site water control structures and commence soil stripping and stockpiling. During operations approximately 30 personnel would be required to operate the Quarry, crushing facility and undertake the associated maintenance and administrative duties. Operation of the Quarry is approved to be undertaken during daylight hours, five days/week in 7.00 am to 5.00 pm shifts, with loading and transport of crushed limestone to be undertaken 24 hrs/day on six days/week.

3.2 PROPOSED QUARRY MODIFICATION

3.2.1 Reasons for the Proposed Modifications

The increased throughput at the MPF described in Section 2.2.2 would require an increase in the amount of limestone consumed at the MPF, and hence an increase in the rate of extraction of limestone from the Quarry.

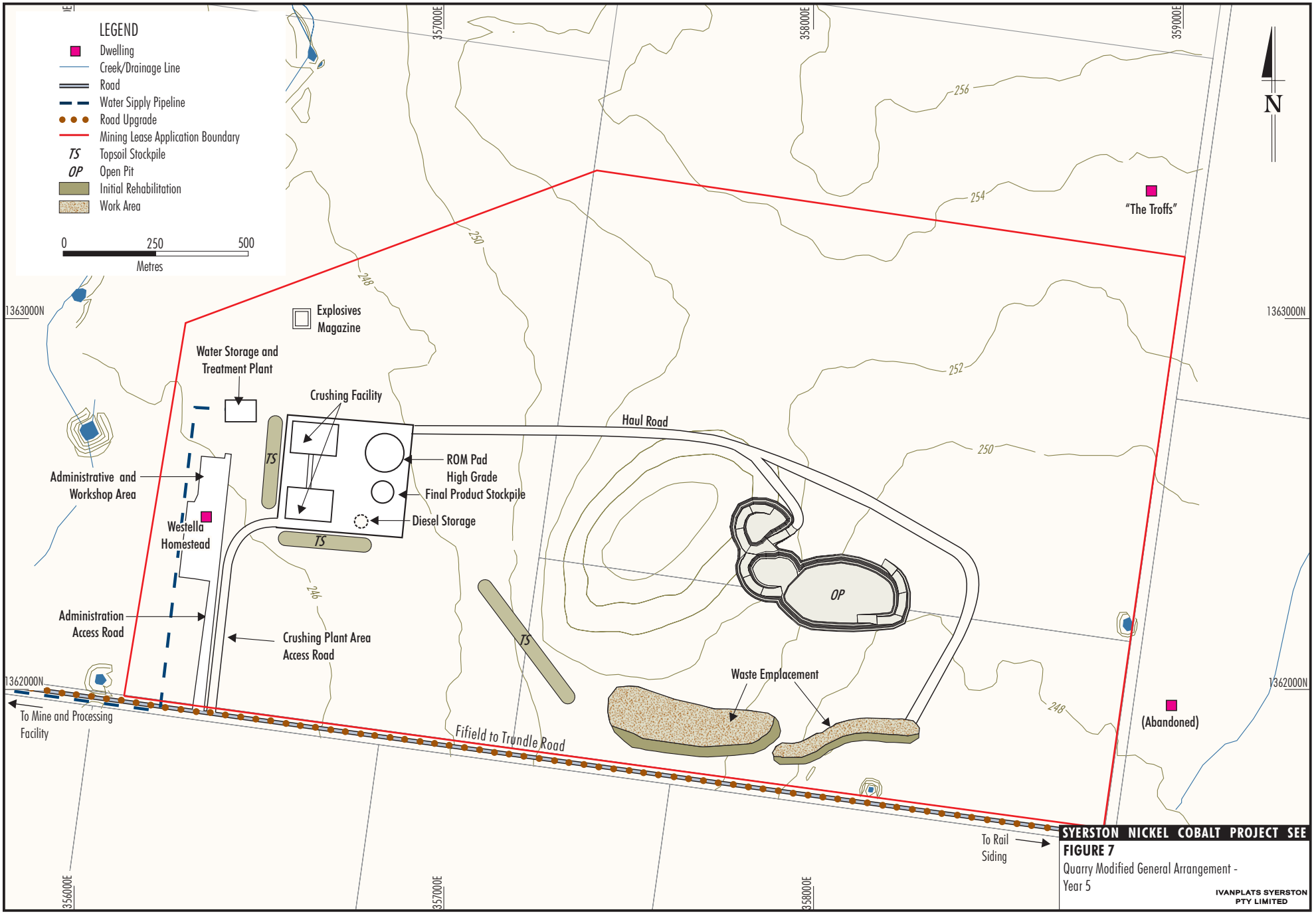
3.2.2 Description of the Proposed Quarry Modification

The proposed modification would allow for approximately 790,000 tpa of limestone to be extracted from the Quarry over the term of the EIS. This represents an increase of approximately 190,000 tpa from the approved quantity. The modification of the Quarry is restricted to an increase in limestone extraction, more rapid development of the pits and embankments, and some adjustments to the general layout of the Quarry.

No modifications to the other components of the Quarry such as mobile equipment requirements or infrastructure requirements (ie. electricity supply and water pipeline) or workforce are proposed.

The proposed modification to the Quarry design would involve changes to the general arrangement and revision of waste emplacement footprint to allow for an increase in annual production. It is not proposed to increase the depth of the open pit.

General arrangements showing the proposed development of the modified Quarry in Year 5 and Year 21 are provided on Figures 7 to 8. A comparison of the land disturbance for the proposed modification and approved Quarry is provided in Table 4.



SYERSTON NICKEL COBALT PROJECT SEE

FIGURE 7

Quarry Modified General Arrangement - Year 5

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IVP-04-01 SEE_003C

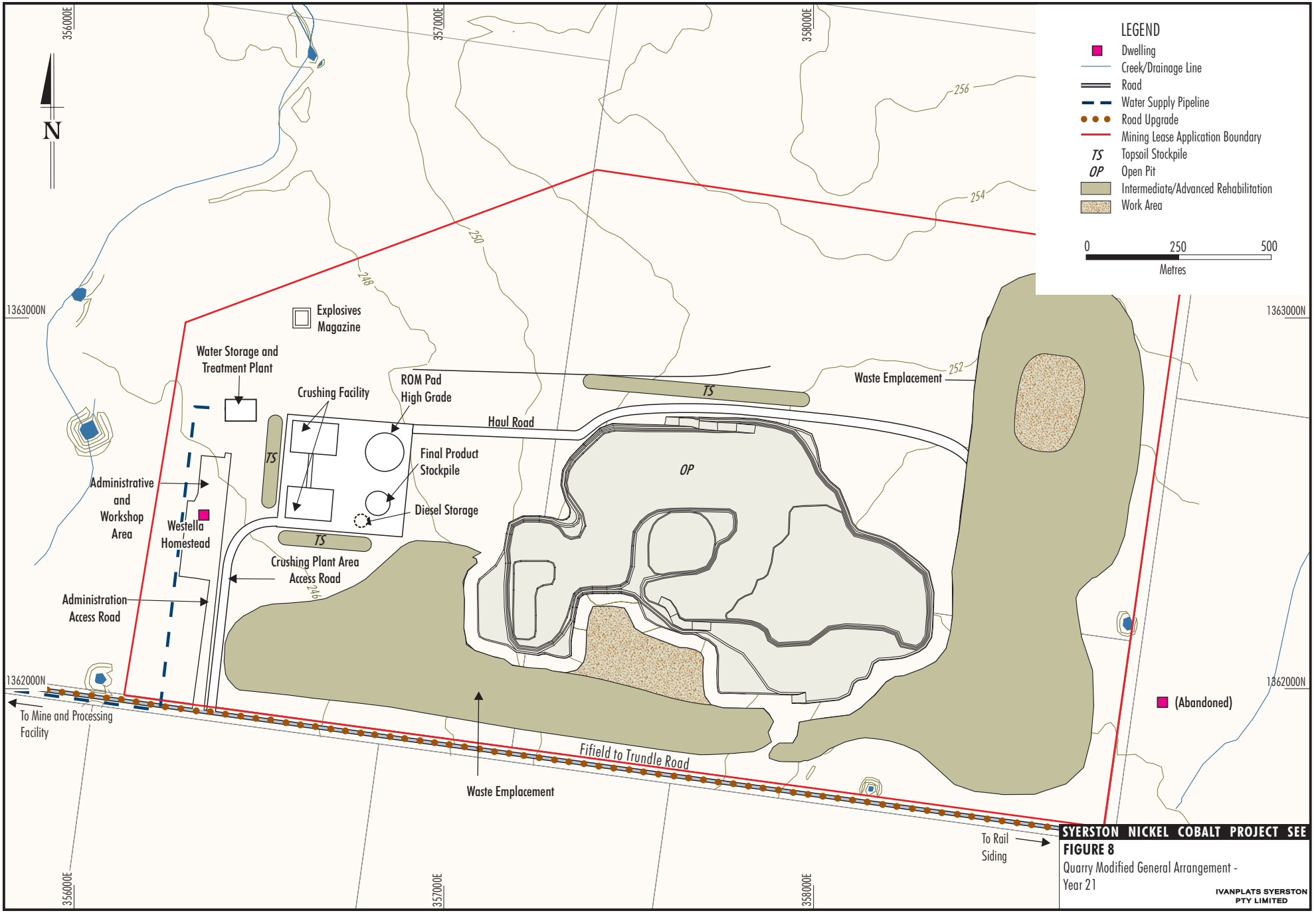

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FIGURE 8

Quarry Modified General Arrangement - Year 21

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IVP-04-01 SEE_004C

Table 4
Land Disturbance – Approved and Modified Quarry

Mine Year	Approved Quarry (ha)	Proposed Modification (ha)
Year 5		
Open Pit	41.5	10
Waste Emplacement	21	8.5
Completion of EIS Term		
Open Pit	46	61
Waste Emplacement	56	110

Source: Areas calculated from IVP, 2005 Project layouts

The additional land disturbance due to the revision of the waste emplacement footprint would occur in an area of cleared agricultural land to the north and to the west of the currently approved footprint. As was the case in the EIS, there would be no need to clear native vegetation. The locations of the topsoil stockpiles are also proposed to be modified (Figures 7 and 8).

The final surface of the modified waste emplacement would remain within the maximum height envelope described in the EIS (ie. about 7 m above the natural ground level).

IVP would construct the waste emplacement using the same type of equipment and construction techniques described in the EIS. The existing haul road would be extended during the mine life to access the northern part of the waste emplacement. To allow for the construction of the western toe of the waste emplacement, the alignment of the water pipeline spur would be moved to the western side of the "Westella" homestead (Figures 7 and 8).

The mobile fleet to be used at the modified Quarry and the workforce would be the same as assessed in the EIS.

The rehabilitation concepts for the modified Quarry would remain as described in the EIS. The top surface of the waste emplacement would be constructed to a height of approximately 7 m above the natural ground level and would be rehabilitated with soil and a combination of endemic woodland species and pasture grasses. The open pit would be approximately 35 m deep and is expected to gradually partially fill with water. The long-term rehabilitation strategy for the pit void is to leave the void surrounds safe (for humans and stock) and revegetate in accordance with the overall approved Project rehabilitation philosophy and objectives contained in the EIS.

3.3 APPROVED RAIL SIDING

3.3.1 Overview

The approved Project includes the development of a Rail Siding on the Tottenham to Bogan Gate Railway to be used in the delivery of consumables to and the conveyance of product from the Project area. The site of the Rail Siding is located approximately 25 km south-east of the MPF site (Figure 2).

The EIS describes the development of the Rail Siding as including the construction of a rail spur line, loading and unloading facilities, hardstands and administration facilities, the installation of appropriate switching and rail signals and the upgrade of the access road and the rail crossing.

The approved Rail Siding would primarily be used to transfer some 210,000 tpa of prilled elemental sulphur railed from Newcastle, and for nickel and cobalt product back-loading in general goods wagons. Each sulphur wagon would be fitted with two purpose-built tipping containers. The general goods wagons would carry conventional, lockable containers. The trains would be approximately 44 wagons in length and would generally comprise 39 sulphur wagons and five general goods wagons.

Containers arriving at the Rail Siding would be loaded onto road trains for transport to the MPF site via the materials transport route. Road trains would enter the site from the south-east and then travel past the Rail Siding and exit at the north.

The EIS states that an average of six rail movements per week (three trains) would be required. The trains would arrive or depart according to freight scheduling.

Ancillary infrastructure located at the Rail Siding would include electricity supply, an administration office, site lighting, security fencing, an equipment storage compound including 50,000 litre (L) bunded fuel storage and on-site ablution facilities.

Approximately 15 personnel would be required on-site during the three month construction period.

3.4 PROPOSED RAIL SIDING MODIFICATION

The general arrangement of the approved Rail Siding is not proposed to change. However, due to the proposed increase in throughput at the MPF (Section 2), the sulphur demand would increase to 260,000 tpa from 210,000 tpa (approved Project). The demand for other project consumables including caustic soda would reduce as a result of the modifications to the MPF (Section 2). Table 5 provides an overview of the rail movements for the approved Project and modified Project.

Table 5
Weekly Rail Movements – Approved and Modified Project

Project Component	Approved Project Rail Movements	Modified Project Rail Movements
Sulphur	4	6
Caustic Soda	2	0*

* Caustic soda may be delivered by rail with other goods, or alternatively, delivered only 2-4 times per year.

Source: Masson Wilson Twiney, 2000; 2005

As a result of the proposed modification, one additional rail trip per week between Newcastle/Sydney and the Rail Siding would be required during those weeks when caustic soda is delivered. As with the original, approved Project transport assessment (contained in the EIS), there would be adequate capacity on the rail network between Newcastle and Trundle to accommodate the additional rail trips, which would not necessitate any additional upgrades to the current rail network.

4 DESCRIPTION OF THE APPROVED AND PROPOSED MATERIALS TRANSPORT ROUTE MODIFICATION

4.1 APPROVED MATERIALS TRANSPORT ROUTE

4.1.1 Overview

Heavy vehicle road access to the MPF site from Sydney or Newcastle, as described in the EIS, would be via Parkes, State Route 90 and the Tullamore to Bogan Gate Road to the intersection with the Fifield to Trundle Road. From this intersection general heavy transport for the approved Project would join the materials transport route.

The EIS describes the access to the MPF site from the Rail Siding, Quarry and the Tullamore to Bogan Gate Road as comprising:

- the constructed Fifield Bypass;
- the upgraded Fifield to Trundle Road; and
- sections of the Condobolin to Tullamore Road and the Fifield to Wilmatha Road.

The Fifield Bypass would link the Fifield to Wilmatha Road with the Condobolin to Tullamore Road, allowing traffic to bypass Fifield approximately 1 km to the south-west of the village. The approved Project transport routes are shown on Figure 3.

Transport-related impacts resulting from the approved Project were assessed in the EIS. The assessment was based on the original Project design and process methods including quantity of limestone extracted and processed, quantities of process consumables to be transported to the mine site, and volumes of employee-related generated traffic and other mine traffic expected on the materials transport route during mine operation. The EIS indicated the total number of vehicle movements per day during mine operation for the approved Project to be in the order of 550, comprising approximately:

- 300 employee vehicle movements per day;
- 150 truck and van raw materials transport vehicle movements per day; and
- 100 other vehicle movements per day.

Table 6 provides a summary of the expected daily raw materials road transport movements assessed in the EIS for the approved Project.

Table 6
Summary of Materials Movement – Approved Project

Product	Average Daily Truck Movements To or From				
	Rail Siding	Quarry	Young	Local Sources	Sydney
Sulphur	24	0	0	0	0
Caustic Soda	2	0	0	0	0
Magnesia	0	0	4	0	0
Limestone	0	72	0	0	0
Misc Bulk	4	0	0	0	0
Other	0	0	0	40	4
Fuel/Lubricants	0	0	0	1	0
Mine Product*	0	0	0	0	0

Note: Each return trip = two movements, average daily movements are shown
* Backloaded
Source: Masson Wilson Twiney, 2000

A number of road upgrades along the materials transport route are required for the approved Project and would involve the following works:

- widening of existing roads to provide a 8.5 m pavement and 3 m wide gravel shoulder at property accesses;
- upgrades of intersections where necessary to the relevant AUSTROADS standards in order to accommodate the increased traffic numbers and to improve the safety and/or operational efficiency (ie. the Rail Siding access road and the Tullamore to Bogan Gate Road; and the intersection of the Tullamore to Bogan Gate Road and the Fifield to Trundle Road); and
- construction of the Fifield Bypass to have an 8.5 m pavement and AUSTROADS standard intersections with existing roads.

In addition to upgrades of the materials transport route from the Rail Siding and Quarry to the MPF site, the EIS describes some intersections (ie. Middle Trundle Road) where additional light and heavy traffic on local roads associated with the approved Project would require upgrades. Gravel sections of the Middle Trundle Road (SR83) will be sealed to a heavy vehicle standard in accordance with AUSTROADS specification (Development Consent condition 7.2c).

4.2 PROPOSED MATERIALS TRANSPORT ROUTE MODIFICATION

4.2.1 Description of the Proposed Materials Transport Route Modification

The proposed modifications to the Project will only result in changes to the volumes of Project related traffic generated on the materials transport route. The route, design and construction of the approved transport route are not proposed to change. The Project modifications will not have any additional effect on the regional transport network, materials transport route upgrades and general intersection and road upgrades beyond those detailed in the EIS.

The proposed modifications to the Project will result in changes to the transport related impacts assessed in the Project EIS due to a change to the vehicle movements on the materials transport route. Table 7 summarises transport related differences in Project components between the proposed Project and the approved Project as assessed in the EIS, including changes to the quantity of ore extracted and processed, quantity of process materials transported to the mine site and the operational workforce.

Table 7
Summary of Key Transport-related Differences

Project Component	Original Project Proposal	Proposed Project Modification
Final Product	Production of up to 42,000 tpa of mixed sulphide precipitate or up to 25,000 tpa of nickel and cobalt metal.	Production of up to 53,000 tpa of mixed sulphide precipitate.
Operational Workforce	400 employees.	300 employees.
Limestone Production and Transport	Extraction of up to 560,000 tpa	Extraction of up to 790,000 tpa.
	Limestone-related truck movements of 36 return trips per day.	Limestone-related truck movements of 45 return trips per day.
Sulphur Demand and Transport	Annual demand of 210,000 tpa.	Annual demand of 260,000 tpa.
	Two rail trips from Newcastle per week and 12 truck deliveries per day.	Three rail trips from Newcastle per week and 15 truck deliveries per day.
Caustic Soda Demand and Transport	Annual demand of 10,000 tpa.	Annual demand of 100 tpa.
	One truck delivery from the Rail Siding every two days.	One truck delivery from the Rail Siding every three months.
Magnesium Oxide (Magnesia), Extractant, Modifier and Diluent Transport	2 return trips per day.	Not required.

Source: Masson Wilson Twiney, 2005

Material Vehicle Movements

Table 8 compares materials vehicle movements of the original, approved Project with the vehicle movements resulting from the modified Project.

Table 8
Summary of Materials Movement – Approved and Modified Project

Product	Daily Truck Movements									
	Rail Siding		Quarry		Young		Local Sources		Sydney	
	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.
Sulphur	24	30	0	0	0	0	0	0	0	0
Caustic Soda	2	0	0	0	0	0	0	0	0	0
Magnesia	0	0	0	0	4	0	0	0	0	0
Limestone	0	0	72	90	0	0	0	0	0	0
Misc. Bulk	4	4	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	40	40	4	4
Fuel	0	0	0	0	0	0	1	1	0	0

Note: Orig. = Original Proposal; Mod. = Modified Original Proposal
Source: Masson Wilson Twiney, 2005

Employee-Related Vehicle Movements

As shown in Table 7, under the proposed modification the operational workforce of the MPF would be reduced from 400 to 300 employees, resulting in a decrease in employee-related traffic. This reduction is due to the removal of the refinery component of the MPF. Table 9 compares the expected daily volumes and distribution of employee-related traffic assessed in the EIS, and that expected under the proposed Project modifications. It is anticipated that the proposed Project modification would reduce employee-related traffic generation to 225 vehicle movements per day.

Table 9
Expected Distribution of Employees and Associated Traffic

Location	Employee Distribution	Daily Volume (vehicle movements)	
		Approved Project	Modified Project
Parkes	65.5%	192	147
Trundle	2.5%	8	6
Tullamore	2.0%	6	5
Condobolin	29.0%	84	65
Bogan Gate	0.5%	2	1
Ootha	0.5%	2	1
Total		**294**	**225**

Source: Masson Wilson Twiney, 2005

Total Vehicle Movements

The transport assessment conducted in the EIS estimated a total of 550 vehicle movements per day during mine operation. As a result of the proposed modification, this number is reduced to 469, which would be compromised of approximately:

- 225 employee vehicle movements per day;
- 169 truck and van raw materials transport vehicle movements per day; and
- 75 'other' vehicle movements per day.

There would be no other changes to traffic movements for the modified Project.

5 ENVIRONMENTAL REVIEW

Comprehensive surveys and assessments of the approved Project area and surrounds have been undertaken as part of the EIS.

The following subsections review the key environmental aspects of relevance to the proposed Project modification. The findings of the environmental review support the conclusion that the modified Project would remain substantially the same development as approved by the original Development Consent.

5.1 MINE AND PROCESSING FACILITY

5.1.1 Land Resources

Environmental Review

The MLA areas for the MPF site cover approximately 2,665 ha. The MPF site is characterised by cleared, grazing and cropping land with areas of State Forest, Crown reserve and Crown land. The general landscape of the MPF site is flat to very gently undulating and is bisected by a shallow drainage line running diagonally across the site to the north-east. Several areas of low hills occur across the site with broad shallow valleys between.

The EIS assessed the agricultural suitability of the MPF in accordance with the five class system (Riddler, 1996), which classifies land according to its productivity for a wide range of agricultural activities. The EIS mapped the land located on flat areas associated with the northern drainage line as Suitability Class 3 land. The area is characterised by flat to gently inclined cropping and grazing land. The MPF area is currently cropped on a rotational basis for fodder crops and grain and grazed by sheep on improved pastures.

The EIS identified that the potential impacts of the MPF on land use would be the loss of existing land associated with the development of the following MPF components:

- TSF;
- evaporation ponds and surge dam;
- waste emplacements;
- open pits; and
- infrastructure areas.

The proposed modification to the MPF design, involving the removal of the refinery infrastructure sections of the processing plant, would involve no additional disturbance to the footprint of MPF infrastructure areas and no additional changes to the MPF site topography.

Mitigation Measures

As described in the EIS, the rehabilitation concepts and objectives proposed for areas disturbed during the construction and operation of the MPF area, target grazing and areas of endemic woodland. Significant areas of existing land degradation within the MPF site (associated with historic mining areas) would be consumed by the progressively rehabilitated eastern waste emplacement and open pit. No changes to the original Project rehabilitation concepts or final land use described in the EIS are proposed as part of this Project modification application.

5.1.2 Soils

Environmental Review

The soils of the MPF area were surveyed for the EIS. Soils within the MPF footprint area include two main soil types of red earth and lithosols. These soil types are well represented in the local area. No additional disturbance to the footprint of the approved MPF infrastructure areas is proposed as part of the modification to the MPF.

Mitigation Measures

The approved management measures for controlling soil erosion and sediment migration during construction and operation of the MPF are described in the EIS and Development Consent condition 3.5 and would not change as a result of the proposed modification to the MPF.

5.1.3 Landforms

Environmental Review

The small village of Fifield is located approximately 4.5 km to the south-east of the MPF area, with Condobolin (the largest nearby town) located approximately 45 km to the south-west (Figure 2). The topography of the area is relatively flat with the greatest expressions of relief being Boona Mountains situated approximately 20 km to the west and Gobondry Mountains located approximately 10 km to the east of the site.

As documented in the EIS, views of the MPF site from the surrounding region are limited due to the lack of public vantage points, the relatively flat topography and shielding roadside vegetation.

The southern portion of the MPF site is visible from the Condobolin to Tullamore Road when heading north from Fifield and on the Fifield to Wilmatha Road from both the northern and southern approaches to the MPF site. The northern view is limited due to vegetation along the northern boundary of the site.

As described in the EIS, the MPF is set in a rural environment that, in some areas, has been previously disturbed by mining activities. Other areas on the approved Project MPF site (including soil stockpile sites, ROM and low grade stockpile sites and processing facility) would be decommissioned at various stages during and after the mine life and rehabilitated to approximate original landforms.

The waste emplacements for the modified Project would remain as described for the approved Project and would have a progressively changing form. The approved waste emplacements have been designed to minimise their visual impact on the local landscape with 1V:4H overall outer batter slopes, a progressive rehabilitation strategy and relatively low elevation (equivalent to the regional topography of the low hills of Gobondry Mountains situated approximately 10 km to the east of the MPF site).

The footprint of the modified Project TSF would remain generally as described for the approved Project and would ultimately fill to form a flat plain that would be rehabilitated at the end of the mine life. The outer slopes of the TSF perimeter embankment would be battered to 1V:4H and revegetated progressively during mine operations. Screen planting would also be undertaken around the MPF site boundary to restrict views of the facility.

As for the approved Project, multiple open pits would be progressively developed for the modified Project over the mine life and by Year 20, two pits (eastern and western) would remain.

Mitigation Measures

The mitigation measures of the approved Project described in the EIS (ie. use of progressive rehabilitation, native vegetation enhancement and the planting of vegetation screens/bunds) are considered adequate to minimise the landform impacts of the proposed modification to the MPF design. As such, no changes to the landforms described in the EIS are proposed as part of the Project modification.

5.1.4 Visual Impact

Environmental Review

The visual impact of the approved MPF was determined in the EIS by the scale and massing of buildings and the degree of landscape change that was proposed (ie. through altering vegetation patterns or substantial landform change). These changes were assessed based on views from adjoining properties or public access areas. Visual simulations were undertaken around the MPF site for the EIS to provide existing and simulated views of the approved MPF landforms during early (Year 5) and advanced stages (Year 20) of the approved Project operation.

As described in the EIS, the approved processing facility is located approximately 500 m from the Fifield to Wilmatha Road. Views of sections of the approved processing facility would be available from both the “Sunrise” and “Wanda Bye” homesteads and the Fifield to Wilmatha and the Condobolin to Tullamore Roads, however views of the facility from both roads would be obscured due to the location of MPF structures and landforms such as the evaporation ponds, TSF and topsoil stockpiles. Views from “Sunrise” would include the tops of stacks which would rise above the treeline approximately 3 km to the north-east of the homestead, however visibility at such a large distance would be limited. Lighting associated with the stacks and the H_2S flare would be visible from greater distances.

The proposed modification to the MPF involves the removal of the refinery (and associated elevated gaseous emission points) from the processing facility (Figure 4). It is expected that the removal of this component would result in a small degree of visual modification (ie. changes in the views of the processing facility from the ”Sunrise” and “Wanda Bye” homesteads and Fifield to Wilmatha and the Condobolin to Tullamore Roads), however this modification would be minor as those stacks with high elevations for the approved Project (ie. sulphuric acid plant stack, flare stack) would remain.

Mitigation Measures

The visual impact mitigation measures of the approved Project described in the EIS (ie. use of progressive rehabilitation, native vegetation enhancement and the planting of vegetation screens/ bunds) are considered adequate to minimise the visual impacts of the proposed modification to the MPF design (ie. removal of the refinery component of the process plant). As such, no changes to the visual impact mitigation measures described in the EIS are proposed as part of the modified Project.

5.1.5 Night Lighting

Environmental Review

The potential impacts of lighting of the processing facility, active open pits and waste emplacement areas for 24 hour mine operations was assessed in the EIS. The lighting requirements of the proposed modification to the MPF would remain the same as the approved Project.

The significance of night lighting impacts relates to the contrast between light and dark in a rural landscape. The main regional impact of light emissions is that a glow would be seen in the night sky above the MPF from the surrounding region and residences. Fixed (buildings and stacks) and mobile lights, such as used on the waste emplacement, would be visible from some roads and on occasions at some of the surrounding properties. Site lighting and the flare (one of the higher stacks) are likely to be visible from portions of the "Wanda Bye" and "Sunrise" properties. The removal of the refinery section of the processing facility under the modified Project is not expected to change the night lighting impacts assessed in the EIS.

Mitigation Measures

The mitigation measures for night lighting impacts described in the EIS remain applicable to the proposed modification of the MPF (ie. with the removal of the refinery section of the processing facility). The limited population residing in the vicinity of the MPF minimises the potential for visual impacts and views of the MPF would be limited by the boundary vegetation screens to be planted, existing vegetation (eg. roadside vegetation) and the absence of elevated public viewpoints surrounding the site.

5.1.6 Water Resources

Environmental Review

The MPF site is drained generally to the north-east by unnamed ephemeral drainage lines. Several of these drainage lines lose definition to the north-east of the site due to the flat open terrain or are excised by old mine workings. Portions of flow occurring in these drainage paths during periods of rainfall would be captured either in these workings, in farm dams or dispersed as overland flow in the floodplain to the north-east of the MPF site.

The potential impacts of the MPF on local surface water resources (ie. increased sediment loads and changes to the surface water chemistry) were assessed in the EIS. A water management system was developed for the approved MPF site to minimise any potential surface water quality impacts. The overall objective of the MPF site water management system is to contain any potentially contaminated water generated within MPF infrastructure areas during construction and operation, while diverting all other water around these areas. The removal of the refinery section of the processing facility would remove the associated liquid waste streams. As a result of the removal of the refinery liquid waste streams, the geochemical nature of the tailings would remain unchanged. The proposed modification of the MPF is not expected to have any additional impacts on surface water quality at the MPF site.

The EIS assessed the potential impacts of the MPF on local groundwater systems in the vicinity of the TSF, evaporation ponds and surge dam. The assessment concluded that seepage from the TSF, evaporation ponds and surge dam is likely to have negligible impact on existing groundwater levels or groundwater quality.

Mitigation Measures

No additional mitigation measures to those presented in the EIS to minimise potential surface and groundwater quality impacts are proposed for the modified Project. In accordance with the original Development Consent conditions, a Water Management Plan would be prepared for the approved Project.

5.1.7 Flora

Environmental Review

Historical activities at the MPF site have resulted in the clearance of native vegetation for grazing, cropping and historic mining activities. The majority of the MPF site is classified as land cleared for agricultural purposes while the north-eastern portion of the MPF site has been disturbed by previous mining and has regenerating trees and weeds.

Construction and operation of the approved MPF would disturb approximately 55% of the total MPF site. The proposed MPF modification would not change the disturbance footprint from that of the approved MPF. Table 10 compares the total area of vegetation to be disturbed by the approved MPF against that of the modified MPF.

Table 10
MPF Site Vegetation Disturbance

Vegetation	Approximate Area (ha)		
	Existing	Potentially Disturbed by Approved MPF	Potentially Disturbed by Modified MPF
Endemic woodland	600	320	320
Cleared land with Wilga/Rosewood patches	150	75	75
Cleared land for grazing and cropping	1,870	1,030	1,030
Historic mining land with regenerating Cypress pine and weeds	40	25	25
Total Area	**2,660**	**1,450**	**1,450**

Source: EIS, 2000

Studies have shown that excessive dust generation (eg. during the construction phase) can impact on the health and viability of surrounding vegetation. Dust can affect vegetation by inhibiting physiological processes such as photosynthesis, respiration and transpiration, and allow penetration of phytotoxic gaseous pollutants. Conservatively, maximum dust increases would be 9% (Appendix C). Such an increase would not be expected to change the potential impacts on vegetation from dust, described in the EIS assessment.

Eight Part Tests of Significance completed in the Project EIS assessed 18 threatened flora species known or considered to have possible occurrence in the MPF area. The tests concluded that the development of the MPF site would not have a significant effect on these threatened plant species, populations, ecological communities or habitats. There have been no additional individual flora species known or considered to possibly occur within the Project area listed under the TSC Act since the EIS was completed.

Since the EIS was completed two additional Endangered Ecological Communities (EECs) known or considered to possibly occur within the Project area have been listed under the TSC Act. The EECs for which Eight Part Tests of Significance were completed are provided in Table 11.

Table 11
EECs or Their Habitats Assessed by Eight Part Tests of Significance

Threatened Species, Populations, Ecological Communities or their Habitats	Conservation Status	
	TSC Act[1]	EPBC Act[2]
Endangered Ecological Communities		
White Box, Yellow Box, Blakely's Red Gum Woodland	E	E
Fuzzy Box Woodland	E	-

Source: Resource Strategies, 2005
[1] NSW *Threatened Species Conservation Act, 1995*
[2] Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*
E (Endangered)

The Eight Part Tests of Significance assessed whether the modified Project would have a significant impact on these communities (Appendix F). No components of either the White Box, Yellow Box, Blakely's Red Gum Woodland EEC or the Fuzzy Box Woodland EEC have been recorded during comprehensive flora surveys and mapping conducted within the Project area. Consequently, the tests concluded that areas of known habitat were unlikely to become isolated from current interconnecting or proximate areas of habitat for each EEC, and that the Project modification was unlikely to have significant effect on any EECs known or considered likely to occur in the area or their habitats (Appendix F).

The modified MPF is not expected to cause any additional potential impacts on flora to those identified in the EIS as the modified Project does not result in any additional land disturbance of the MPF area.

Mitigation Measures

A number of undertakings were outlined in the EIS to assist in the mitigation of potential impacts of the MPF on flora species. These include minimising disturbance areas, retaining mature remnant trees (where possible), implementing erosion and sediment control initiatives, management of weeds and rehabilitation initiatives. As detailed in the EIS, significant portions of the MPF area would be rehabilitated with pasture or endemic woodland. Portions of the final voids would be selectively rehabilitated to grassland or endemic vegetation. Following rehabilitation there would be a net increase in endemic woodland areas and a net decrease in pasture/cropping land on the MPF site when compared to the existing conditions.

As the proposed MPF modification does not result in any additional areas of disturbance, no mitigation measures beyond those outlined in the EIS to minimise impact on flora species would be required under the modified Project.

5.1.8 Fauna

Environmental Review

The EIS identified that despite the relatively disturbed nature of the MPF site and surrounds, existing patches of remnant vegetation provide (to varying degrees) opportunities for fauna foraging, breeding and/or nesting, predator avoidance, and movement between areas, thus promoting genetic diversity and facilitating species dispersal/migration. These opportunities could potentially be reduced as a result of vegetation clearance activities associated with the development of the MPF.

Eight Part Tests of Significance completed in the EIS assessed 21 threatened fauna species known or considered to possibly occur in the Project area. The tests concluded that no threatened fauna species would be significantly affected by the Project to the extent of undermining the viability of a local population of that species.

Since the EIS was completed, six additional threatened fauna species known or considered to possibly occur within the Project area have been listed under the TSC Act. Eight Part Tests of Significance were subsequently completed for these six threatened fauna species (Appendix F). Fauna species for which Eight Part Tests of Significance were completed are provided in Table 12.

Table 12
Threatened Fauna Species or Their Habitats Assessed by Eight Part Tests of Significance

Threatened Species, Populations, Ecological Communities or their Habitats		Conservation Status	
		TSC Act[1]	EPBC Act[2]
Fauna Species			
Climacteris picumnus victoriae	Brown Treecreeper	V	-
Pyrrholaemus sagittata	Speckled Warbler	V	-
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-
Melanodryas cucullata cucullata	Hooded Robin	V	-
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V	-
Stagonopleura guttata	Diamond Firetail	V	-

Source: Resource Strategies, 2005.

1 NSW *Threatened Species Conservation Act, 1995*

2 Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*

V (Vulnerable)

Two of the six species, the Brown Treecreeper (eastern sub-species) (*Climacteris picumnus victoriae*) and the Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*) have been recorded during targeted fauna surveys of the Project area and surrounds. The tests (Appendix F) concluded that:

- no local populations of threatened species would be placed at risk of extinction;
- the regional distribution of habitat of a threatened species would not be affected as no significant areas of known habitat would be modified or removed by the modified Project; and
- areas of known habitat were unlikely to become isolated from current interconnecting or proximate areas of habitat for each threatened species.

From a fauna impact perspective, the proposed MPF modification is considered to be the same development as the approved MPF. The proposal does not result in any additional land disturbance beyond that outlined in the EIS. The proposed modification to the MPF design would be unlikely to increase the occurrence of feral pests at the site due to the existing highly disturbed nature of the area. The potential impacts of noise, vehicular traffic and artificial lighting on fauna resulting from the modified Project would remain the same as those assessed in the EIS.

Mitigation Measures

The following initiatives/mitigation measures were developed during the EIS to minimise the potential impacts of the MPF on fauna and would remain relevant and unchanged for the MPF modification:

- In recognition of the habitat value of extant areas of native vegetation, the removal of native vegetation is to be undertaken, where possible, in late autumn or winter to minimise disturbance to potential breeding activities.
- Prior to ground disturbance works, mature trees with hollows are to be identified, marked and retained wherever feasible. Where feasible, mature, hollow-bearing trees within the proposed clearance zone could be used in the rehabilitation programme.
- Undertake pre-clearance surveys to establish bat roosts in trees which require removal and relocation of the roosts away from the impact areas.
- Provide a number of artificial roosts (bat houses) at strategic locations in the MPF site and surrounds to replace any roosts that would be lost.
- Rehabilitation concepts for the MPF site aim to maximise opportunities for the creation of habitat continuous with existing preserved woodland and giving consideration to the installation of nest/roost boxes and exclusion of grazing in selected areas.
- In addition to revegetation of the MPF site, areas of existing native habitat would, where possible, be preserved. A primary aim of preserving such areas would be to maintain biodiversity and to facilitate the potential for linking these areas to rehabilitation areas. Management activities could include (but not necessarily be limited to) exclusion of grazing, weed and feral species control, fertilising, supplementary planting and provision of habitat features (eg. hollows, ground shelter).
- A clean, rubbish-free environment is to be maintained across the MPF site, particularly around administration and contractor areas. This would discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (eg. introduced rodents, birds).
- To reduce the potential for vehicle strike, speed limits would be imposed on vehicles using roads and tracks in the MPF site and signposting installed. In addition employees would undergo an education programme during induction, on flora and fauna resources of the MPF site and surrounds.
- Feral animal control programmes and site management strategies developed for the MPF site would be co-ordinated with adjacent landholders.
- The TSF, evaporation ponds and surge dam would be inspected daily for fauna, as a precautionary measure, during the course of normal daily maintenance inspections. In the unlikely event that the storages become a focus for avifauna, the use of hazing techniques (as adopted in the mining industry elsewhere) could be considered to minimise bird usage of the storages.

5.1.9 Air Quality

Dust Deposition and Particulate Matter

Environmental Review

EIS air quality modelling identified that the most significant dust sources of the MPF would be from construction activities, mining and development of waste emplacements. The proposed modification to the MPF does not involve any changes to the haul routes and mine scheduling outlined in the EIS, and the disturbance footprint of the modified MPF would remain generally the same as the approved MPF footprint. The modification for the MPF proposes to increase the amount of mine product to be fed to the acid leach autoclave in the processing plant from 2.3 Mtpa to 2.5 Mtpa. An assessment of the potential air quality impacts of the proposed MPF modification has been conducted by Heggies Australia (2005a) and is presented as Appendix C. The assessment is conservatively based on a pro-rata increase in fugitive dust emissions equivalent to the proposed increase in processing plant throughput (ie. 9%). Appendix C identifies that the relevant criteria for fugitive emissions is National Environmental Protection Measure (NEPM) 24-hour PM_{10} goal of 50 $\mu g/m^3$ which should not be exceeded more than five times per year (ie. the 6^{th} highest 24-hour PM_{10} level).

As shown in Table 13, for the modified MPF, predicted 6^{th} highest 24-hour PM_{10} levels would comply with the NEPM goal of 50 $\mu g/m^3$.

Table 13
Comparison between Approved and Modified MPF – Predicted PM_{10} Concentrations at Nearest Residences

Residence	Approved MPF		Modified MPF
	Highest All-Year-Round Value	6^{th} Highest Value	6^{th} Highest Value Increased by 9%
Currajong Park	80 $\mu g/m^3$	44 $\mu g/m^3$	48 $\mu g/m^3$
Rosehill	50 $\mu g/m^3$	40 $\mu g/m^3$	44 $\mu g/m^3$
Sunrise	45 $\mu g/m^3$	36 $\mu g/m^3$	39 $\mu g/m^3$
Victoria Park	41 $\mu g/m^3$	33 $\mu g/m^3$	36 $\mu g/m^3$
Group 1	31 $\mu g/m^3$ to 37 $\mu g/m^3$	25 $\mu g/m^3$ to 30 $\mu g/m^3$	27 $\mu g/m^3$ to 33 $\mu g/m^3$
Group 2	20 $\mu g/m^3$ to 26 $\mu g/m^3$	16 $\mu g/m^3$ to 21 $\mu g/m^3$	18 $\mu g/m^3$ to 23 $\mu g/m^3$

Source: Heggies Australia, 2005a

The nature of the potential impacts and dust deposition levels predicted during mine construction and operation described in the EIS would remain the same under the modified Project if similar levels of controls are applied to the mine operation, including watering of haul roads, applying dust suppressants to stockpiles and minimisation of areas of exposed mine work sites (Heggies Australia, 2005a).

Mitigation Measures

A number of air quality safeguards were described in the EIS to minimise potential impacts from dust deposition and particulate matter generated at the MPF. These safeguards include watering of disturbed areas, road maintenance, prevention of truck overloading and the resulting spillage during loading and hauling, use of dust suppressants or cover crops on soil stockpiles, and progressive rehabilitation of disturbed areas.

No additional mitigation measures to those outlined in the EIS for managing air quality with respect to dust at the MPF would be required for the modified Project.

Gaseous Emissions

Environmental Review

An assessment of the potential effects from gaseous emissions of the proposed modification to the MPF design has been conducted by Heggies Australia (2005a) and is included in Appendix C.

The potential gaseous emissions of the approved processing facility during normal operations as described in the EIS are comprised of:

- low pressure steam from the acid leach flash vessel scrubber;
- water vapour (as evaporation) from open tanks, the TSF, evaporation ponds and surge dam;
- mist and water vapour from the main cooling tower;
- sulphur dioxide from the sulphuric acid plant and hydrogen sulphide flare;
- nitrogen oxides from the co-generation plant turbines, boilers and intermittent emissions from the nitric vent fan;
- oxygen, hydrogen and water vapour from the electrowinning processes;
- carbon dioxide from the neutralisation circuits where limestone is consumed and from the co-generation and hydrogen plants;
- trace emissions of hydrogen sulphide from the hydrogen sulphide plant and process circuits; and
- process steam releases.

Gaseous emission point sources for the modified MPF would be altered as a result of the removal of the refinery section of the processing facility. Removal of the refinery would result in the removal of the sulphide leach vent, nitric vent fan and nickel electrowinning tank house vents, cobalt electrowinning wet scrubber and cobalt degassing furnace discharge points (ie. removal of discharge points 5, 6, 7, 15 and 16 nominated in Development Consent condition 6.1.5). Table 14 provides a comparison between the point source gaseous emission rates generated by the approved MPF (excluding refinery point sources) and those of the proposed modified MPF.

Table 14
Comparison between the Approved and Modified MPF Emission Rates

Project Component	Approved MPF	Modified MPF
Carbon dioxide emission rate	• Tailings neutralisation vent stack: 1.22 kg/s • Leach Liquor Neutralisation Tank Vents: 2.83 kg/s • Power Plant HRSG: 4.5 kg/s • Hydrogen Reformer Stack: 0.48 kg/s • Total: 9.03 kg/s	• Tailings neutralisation vent stack: 1.6 kg/s (13% increase) • Leach Liquor Neutralisation Tank Vents: 3.7 kg/s (31% increase) • Power Plant HRSG: 3.5 kg/s (22% decrease) • Hydrogen Reformer Stack: 0.55 kg/s (15% increase) • Total: 9.3 kg/s (3% increase)
Gaseous emission rate from Sulphide Filter Extraction Fan	4.2 Nm^3/s (dry, 273K, 101.3 kPa)	5.3 Nm^3/s (dry, 273K, 101.3 kPa) (26% increase)
Gaseous emission rate from Sulphuric Acid Plant stack	17.0 Nm^3/s (dry, 273K, 101.3 kPa)	19.2 Nm^3/s (dry, 273K, 101.3 kPa) (13% increase)
Gaseous emission rate from Flare Stack	0.52 Nm^3/s (dry, 273K, 101.3 kPa)	0.65 Nm^3/s (dry, 273K, 101.3 kPa) (25% increase)
Gaseous emission rate from Hydrogen Reformer Stack	1.23 Nm^3/s (dry, 273K, 101.3 kPa)	1.42 Nm^3/s (dry, 273K, 101.3 kPa) (15% increase)
Gaseous emission rate from Power Plant HRSG	23.8 Nm^3/s (dry, 273K, 101.3 kPa)	18.4 Nm^3/s (dry, 273K, 101.3 kPa) (23% decrease)

The Heggies Australia (2005a) review of gaseous emissions under the modified MPF concluded that the ground level concentrations associated with the modification proposal would comply with all air quality goals. In addition, the removal of the discharge points associated with the refinery would further support this conclusion.

From an air quality perspective, the impacts from gaseous emissions released by the modified processing facility would be similar to the impacts outlined in the EIS.

Mitigation Measures

Mitigation and control measures to limit gaseous emissions or to aid dispersion have been incorporated into the design of the approved MPF. These measures, as described in the EIS and Development Consent, are applicable to the modified Project and include the following:

- Excess or waste hydrogen sulphide gas would be converted to SO_2, NO_2 and carbon dioxide (CO_2) at the hydrogen sulphide flare stack by combustion with natural gas at a height of up to 80 m.
- SO_2 emissions from the sulphuric acid plant would be released from a stack up to 80 m in height.
- Combustion gases of the hydrogen plant including CO_2 and NO_2, would be released from a 36 m high reformer stack.
- Entrained traces of sulphuric acid in uncondensed steam emitted from the final letdown flash vessel at the acid leach circuit would be removed by a scrubber with 99% efficiency and the steam released from a 40 m high stack.
- CO_2 emissions from the tailings neutralisation circuit and leach liquor neutralisation tank would be vented from a 16 m high stack and a vent above the tank respectively.

- Combustion gases at the co-generation power plant including SO_2, CO_2 and NO_2 would be vented from a 25 m high stack.
- Gases from the sulphide filter extraction fan would be vented from a 15 m high stack.

In addition to the proposed EIS emission mitigation measures, a Gaseous Emissions Management Plan is required as a condition of the original Development Consent to provide on-going assessment of compliance. No change to the mitigation measures and implementation of the Gaseous Emissions Management Plan required as a condition of the Development Consent is proposed for the modified Project.

5.1.10 Acoustics

Environmental Review

Richard Heggie Associates (2000) conducted an assessment of the potential MPF noise impacts for the EIS. This assessment identified noise sources and emission levels produced from the construction and operation of the MPF. These noise sources, and therefore the emission levels, would remain unchanged as a result of the proposed MPF modification despite the removal of the refinery section of the processing plant (Appendix D). The assessment concluded that the relevant EPA intrusion criteria could be met at all residences in the vicinity of the MPF except for "Currajong Park". The assessment recommended that noise attenuation activities or property acquisition be undertaken to meet the EPA intrusion criteria. As with the approved Project, these recommendations would remain applicable to the modified Project.

Mitigation Measures

The noise mitigation measures for the approved Project would apply to the modified Project. IVP currently have options to purchase a number of properties in the vicinity of the MPF.

5.1.11 Aboriginal Heritage

Environmental Review

Archaeological surveys were undertaken in the MPF area for the EIS by Archaeological Surveys and Reports (2000).

The MPF site was surveyed in two parts. The north-eastern corner of the MPF site has been significantly altered by historic open cut magnesite mines, mullock heaps and service roads. In the remaining northern half and central section of the MPF site vast areas were cleared in the 1970s, and have been under cereal crops since that time. Impacts to the southern and south-eastern sections are less apparent, but clearly show that vast areas have been cleared for pasture improvement. In the south-western corner of the site there are pits and mullock heaps that date from earlier phases of small scale mining activity.

The archaeological surveys identified four Aboriginal sites. Sites 1 and 3 contain isolated artefact finds, whilst Site 2 contains a scatter of artefacts. Site 4 contains a scarred tree located beside the Fifield to Wilmatha Road. Only Site 1 would be disturbed by the approved Project while the remaining sites would be demarcated to avoid accidental disturbance. As there is no proposed change to the disturbance footprint of the MPF for the modified Project, there would be no additional impacts on the identified Aboriginal heritage sites to what was assessed in the EIS.

Mitigation Measures

The mitigation measures for Aboriginal heritage impacts described in the EIS and original Development Consent conditions are applicable to the modification of the MPF.

Potential impacts to Site 1 (and any previously unidentified sites) would be subject to applications pursuant to Sections 87 and 90 of the *National Parks and Wildlife Act 1974*.

5.1.12 European Heritage

Environmental Review

During the EIS assessment of European heritage (Heritage Management Consultants, 2000), the remains of a pastoral outstation of local significance was located on the western boundary of the MPF site. Two building clusters (northern and eastern) were identified. The northern cluster consists of a collapsed building with a verandah which may have been a bunk house. The southern cluster consists of a loading ramp, engine mounting and stumps for a small shed. A rural dam, standing toilet shed and a two stand woolshed were also identified. These buildings were interpreted as being a post-1958 pastoral outstation for small-scale shearing operation.

As there is no proposed change to the disturbance footprint of the MPF for the modified Project, there would be no additional impacts on the identified European heritage sites to what was assessed in the EIS.

Mitigation Measures

The mitigation measures for the approved Project would apply to the modified Project. Where possible, disturbance to the pastoral outstation would be avoided. If disturbance is unavoidable, the site would be recorded for archival purposes (by plan, text and photographs prior to disturbance, and the information lodged in a public repository).

5.1.13 Risk Assessment

Environmental Review

A PHA was included in the EIS in accordance with the general principles of risk evaluation and assessment provided in DUAP's Hazardous Industry Planning Advisory Paper No. 4.

Potential hazards of the approved Project associated with the public, property and environment were identified and the consequences and likelihood of hazardous events were assessed qualitatively. Following the implementation of the proposed hazard mitigation measures, no risks posing significant off-site impacts were identified.

The main potential risk areas of the approved Project identified in the PHA included:

- gaseous releases including hydrogen sulphide and sulphur dioxide;
- fires including torch (ignition of pressurised flammable liquid), flash (ignition of flammable gas and air), pool (ignition of a pool of flammable liquid) and warehouse (dangerous goods stores) fires; and
- explosions.

The potential risks from the proposed Project modification would be similar to those assessed in the EIS.

Mitigation Measures

The PHA conducted for the EIS demonstrated that most incidences related to the MPF site would have negligible impacts as a result of the distance between the processing facility, the MPF site boundary and the nearest occupied residence (SHE Pacific, 2000).

A number of mitigation measures/factors were proposed in the EIS to reduce the potential hazardous risk imposed by the approved Project. These EIS mitigation measures would be applicable to the modified Project.

In addition to the EIS mitigation measures, the conditions of the original Development Consent also requires the formulation of a number of management plans and undertaking of studies which aim to reduce the likelihood and/or consequences of potentially hazardous incidents. The original Development Consent requirements include:

- Emergency Plan (Development Consent condition 5.2bii);
- Safety Management System (Development Consent condition 5.2biii);
- Fire Safety Studies (Development Consent condition 5.2ai);
- Transport of Hazardous Materials Study (Development Consent condition 5.2bi);
- Final Hazard Analysis (Development Consent condition 5.2aiii); and
- HAZOP studies (Development Consent condition 5.2aii).

5.1.14 Socio-Economics

Environmental Review

The operational workforce for the approved Project (including MPF, Quarry and Rail Siding) was predicted to be approximately 400 full time jobs.

The proposed removal of the refinery section would reduce the number of full time employees required at the modified Project during operations to approximately 300 persons.

It is not expected that the proposed workforce modification would significantly alter the community and social infrastructure impacts assessed in the EIS.

Mitigation Measures

The mitigation measures described in the EIS regarding housing and community infrastructure and services would be implemented for the modified Project.

In order to ensure that adequate levels of service are maintained in the communities affected by the modified Project, IVP would undertake on-going consultation with relevant Government authorities (eg. Education and Training, Health and Community).

5.2 QUARRY AND RAIL SIDING

5.2.1 Land Resources

Environmental Review

The Quarry and Rail Siding areas are characterised by cleared, grazing and cropping land. The general landscape of the Quarry site is a low hill composed of limestone with very shallow and generally infertile topsoil on the crest and slopes. Elevations within the vicinity of the limestone deposit vary from 250 m AHD to 260 m AHD.

The EIS assessed the predominant land uses in the vicinity of the Quarry and Rail Siding as agricultural production and existing road corridors. The agricultural suitability of land in the Quarry and Rail Siding areas is classified as Class 3 and/or Class 4.

Soil types mapped for the Quarry MLA area for the EIS were based on the Great Soil Group System (Stace *et al.*, 1968). Two soil types, red earth and brown clay were identified within the Quarry MLA area.

The proposed Project modification includes an increase in the rate of limestone extracted from the Quarry from 600,000 tpa to 790,000 tpa and involves a revision to the Quarry mine schedule as described in Section 3. Figures 5 and 6 show the approved Quarry at Years 5 and 21, while Figures 7 and 8 show the proposed modifications to the Quarry for Years 5 and 21. The final disturbance footprint for the modified Quarry in Year 21 would involve an approximate additional 53 ha of land disturbance on previously cleared pastoral land within the Quarry MLA.

The additional material to be placed on the Quarry waste emplacement would have similar geological and geochemical characteristics to the waste rock generated by the approved Project, and is therefore not predicted to alter the potential impacts described in the EIS.

There would be no additional disturbance to the footprint of the Rail Siding beyond that described in the EIS as a result of the Project modification.

Mitigation Measures

As described in the EIS, areas disturbed by construction and operation during the life of the Quarry would be fenced to exclude stock access. The overall rehabilitation strategy proposed for the approved Quarry is to revegetate disturbed areas with a mixture of pasture and native woodland species. No changes to the approved Quarry rehabilitation concepts or final land use described in the EIS are proposed as part of this Project modification application.

5.2.2 Visual Features

Environmental Review

Permanent landscape impacts associated with the construction and operation of the Quarry and Rail Siding assessed in the EIS included:

- construction of the Quarry open pit;

- construction of the Quarry waste emplacement; and
- construction of the additional Rail spur line, Siding and associated hardstand area.

Permanent landform changes associated with the approved Rail Siding considered in the EIS included a Rail spur line, administration building and hardstand area. There are no additional changes to the Rail Siding and associated infrastructure proposed for the modified Project.

Landscape impacts change the general character of the existing landscape. Such impacts can result from landform modification, vegetation removal and modifications to drainage patterns.

The proposed modification to the approved Quarry involves changes to the construction of the Quarry waste emplacement, modelled to encircle the open pit by Year 21 and provide a screen of the Quarry operations. Similar to the approved Quarry, the waste emplacement of the modified Quarry would be constructed progressively with the batters closest to the Fifield to Trundle Road developed first in order to screen Quarry operations (Figure 8). Progressive revegetation of the outer batters of the modified Quarry would be undertaken to soften the visual impact of the emplacement. In addition, a vegetation screen would be planted between the modified Quarry infrastructure areas and the Fifield to Trundle Road.

Views of the modified Quarry and infrastructure areas from the two nearest properties outside the Quarry MLA, “Reas Falls” and “Moorelands”, would be similar to the views assessed in the EIS. The modified Quarry operations would be obscured due to distance and existing vegetation within the road corridor, with scattered views across the surrounding properties.

Mitigation Measures

The mitigation measures to minimise visual impacts of the Quarry and Rail Siding described in the EIS would remain applicable to the modified Quarry and Rail Siding areas.

The waste emplacement batters of the modified Quarry would be graded to 1V:4H, with the final height of the waste emplacement not exceeding the existing topographical maximum within the Quarry MLA (ie. that of the original hill present on the site). Operations in the modified Quarry open pit and infrastructure areas would be progressively screened from view as the waste emplacement and topsoil stockpiles are developed and Quarry operations extend below the ground surface.

5.2.3 Water Resources

Surface Water

Environmental Review

An assessment of the potential impacts of the approved Quarry on surface water quality was conducted for the EIS. The Quarry MLA is situated on the crest of a gentle rise with slopes falling away to the sides and is drained by two unnamed drainage lines running north-south and located immediately west and east of the Quarry MLA. Surface water runoff from disturbed areas associated with the approved Quarry could potentially contain sediments, dissolved solids, oil, grease and other spilt consumables.

The proposed modification to the approved Quarry involves an additional 53 ha of land disturbance due to design alterations of the Quarry waste emplacement and open pit. As stated in Section 5.2.1, the design of the modified Quarry waste emplacement would be similar to that of the approved Quarry. It is not expected there would be a change in the nature of potential impacts on surface water quality at the Quarry resulting from the Quarry modification.

Mitigation Measures

No additional mitigation measures to those presented in the EIS are proposed for surface water management at the modified Quarry. In summary, all potentially contaminated water generated within Quarry construction and operation areas would be controlled via drainage channels and dams, while all other water would be diverted around these areas. In accordance with the original Development Consent, a Water Management Plan would be required for the approved Quarry. This requirement would remain unaltered for the modified Quarry. The Water Management Plan would contain the water management strategy outlined in the EIS and would involve the following principles:

(i) Operational areas of disturbance would be kept as small as possible;

(ii) Where practicable, construction works would be sequenced so as to minimise the area of progressive disturbance at any given time;

(iii) Work areas would be segregated into undisturbed runoff areas, construction runoff areas and operational runoff areas to minimise the generation of waters requiring on-site control;

(iv) Runoff from construction and operation areas would be intercepted and channelled to storages;

(v) Water which accumulated in these storages would be reused where practicable;

(vi) Progressive rehabilitation would be used to stabilise disturbed land surfaces (eg. Quarry waste emplacement). Once the areas have been reprofiled and/or revegetation is established, it is anticipated that runoff from these areas would be of comparable quality to runoff from surrounding undisturbed areas; and

(vii) Treatment systems such as temporary sediment retention dams, silt fences and vegetation buffers would be employed as interim erosion and sediment control measures during the rehabilitation process.

Groundwater

Environmental Review

An assessment of the potential impact of the approved Quarry on groundwater resources was conducted for the EIS. The excavation of the approved Quarry open pit would involve the intersection of some groundwater containing structures. Flow from these structures into the pit void would be expected to create a localised drawdown effect within the host rock. Limited groundwater resources encountered during exploratory drilling suggest that these effects would be minimal. No modifications are proposed to the overall depth of the open pit in the modified Quarry, and as such it is expected that there would be no additional potential impacts on groundwater resources from those detailed in the EIS.

The activities proposed at the Rail Siding are not predicted to create any impact on groundwater resources in the area.

Mitigation Measures

No additional mitigation measures to those presented in the EIS are proposed to manage impacts on groundwater at the modified Quarry. During Quarrying an in-pit water collection sump and pumping system would be operated. The sump would collect a combination of groundwater inflows, direct rainfall and surface runoff. This water would be pumped from the open pit for recycling in the crushing plant or would be used for watering Quarry haul roads.

No specific measures to reduce the groundwater effects of the open pit are proposed as a result of the proposed modification. As with the approved Quarry, groundwater level monitoring and measurement of underground inflow rates would be undertaken at the modified Quarry and used to evaluate the drawdown effects of the open pit.

5.2.4 Flora

Environmental Review

The potential impacts of the approved Quarry and Rail Siding on flora species were assessed in the EIS. Vegetation clearance would mostly be restricted to areas of open farm land with predominantly native grasses and scattered trees. No plant species listed as threatened under the TSC Act, or the Commonwealth EPBC Act were found within the Quarry or Rail Siding areas during the EIS surveys.

There have been no additional individual flora species known or consider to possibly occur within the Project area listed under the TSC Act since the EIS was completed.

Since the EIS was completed two additional EECs known or considered to possibly occur within the Project area have been listed under the TSC Act (Section 2.1.7). Eight Part Tests of Significance were subsequently completed for White Box, Yellow Box, Blakely's Red Gum Woodland and Fuzzy Box Woodland EECs.

Eight Part Tests of Significance conducted on the two EECs found that no components of either the White Box, Yellow Box, Blakely's Red Gum Woodland EEC or the Fuzzy Box Woodland EEC have been recorded during comprehensive flora surveys and mapping conducted within the Quarry area (Appendix F). Consequently, the tests concluded that areas of known habitat were unlikely to become isolated from current interconnecting or proximate areas of habitat for each EEC, and that the modified Project was unlikely to have significant effect on any threatened ecological communities known or considered likely to occur in the area or their habitats (Appendix F).

The modification to the Quarry involves an additional 53 ha of land disturbance on previously cleared pastoral land within the Quarry MLA. Construction of the modified Quarry would not result in the removal or modification of significant areas of native vegetation.

There would be no additional disturbance to the footprint of the Rail Siding from that described in the EIS resulting from the Project modification.

Mitigation Measures

The original Development Consent requires the implementation of a Flora and Fauna Management Plan prior to the commencement of construction, which would remain applicable to the modified Project.

The mitigation measures proposed in the EIS to mitigate potential impacts on flora associated with the approved Quarry include:

- adoption of vegetation clearance protocols during construction (including progressive clearing, maximum harvesting of cleared timber resources and recycling or disposal of other non-harvestable vegetative parts);
- development of a weed control programme; and
- progressive rehabilitation using a mixture of endemic woodland and grass species where practicable.

No additional mitigation measures to manage potential flora impacts beyond those detailed in the EIS are proposed for the modified Quarry.

5.2.5 Fauna

Environmental Review

The potential fauna impacts of the approved Quarry and Rail Siding were assessed in the EIS.

Eight Part Tests of Significance completed in the EIS assessed 21 threatened fauna species known or considered to possibly occur in the approved Project area. The tests concluded that no threatened fauna species would be significantly affected by the approved Project to the extent of undermining the viability of a local population of that species.

Since the EIS was completed six additional threatened fauna species known or considered to possibly occur within the Project area have been listed under the TSC Act. Eight Part Tests of Significance were subsequently completed for these six threatened species (Appendix F). Only two of the six species, the Brown Treecreeper (eastern sub-species) (*Climacteris picumnus victoriae*) and the Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*) have been recorded during targeted fauna surveys of the Project area and surrounds. The tests (Appendix F) concluded that:

- no local populations of threatened species would be placed at risk of extinction;
- the regional distribution of habitat of a threatened species would not be affected as no significant areas of known habitat would be modified or removed by the modified Project; and
- areas of known habitat were unlikely to become isolated from current interconnecting or proximate areas of habitat for each threatened species.

Several feral species are known to occur in the Project region and/or were recorded during fauna surveys of the Quarry and Rail Siding areas. These species include the House Mouse, European Rabbit, Red Fox, Feral Pig and Feral Cat. Predation and/or competition for resources by these species could impact on the native fauna of the region (eg. predation by the Red Fox is listed in Schedule 3 of the TSC Act as a key threatening process). There is potential for feral animals to be attracted to the Quarry and Rail Siding operational areas due to discarded food scraps and other rubbish.

The proposed modification to the Quarry includes additional land disturbances on previously cleared pastoral land and therefore is not expected to cause any additional potential impacts on fauna beyond those identified in the EIS.

There would be no additional disturbance to the footprint of the Rail Siding, beyond that detailed in the EIS as a result of the Project modification.

Mitigation Measures

The original Development Consent requires the implementation of a Flora and Fauna Management Plan prior to the commencement of construction which would remain applicable to the modified Project.

The mitigation measures proposed in the EIS to manage potential impacts on fauna associated with the approved Quarry include:

- Prior to ground disturbance works, mature trees with hollows would be identified, marked and retained where practicable.
- Mature, hollow-bearing trees identified in the pre-clearance survey that cannot be avoided would be inspected and any animals found would be relocated.
- A clean, rubbish-free environment would be maintained, particularly around administration and contractor areas. This would discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (eg. introduced rodents, birds).
- To reduce the potential for vehicle strike, speed limits would be imposed on vehicles using roads and tracks in the Quarry and Rail Siding areas. Vehicles using public roads would be required to operate within the legal speed limits at all times.
- Employees would undergo an education programme during induction on flora and fauna resources.
- Feral animal control programs and site management strategies would be developed for the Quarry and Rail Siding areas.

No additional mitigation measures to manage potential fauna impacts beyond those detailed in the EIS are proposed for the modified Quarry.

5.2.6 Air Quality

Environmental Review

The potential air quality impacts of the approved Quarry and Rail Siding were assessed in the EIS.

Heggies Australia (2005a) conducted a review of the potential air quality impacts (ie. dust deposition and PM_{10} concentrations) associated with the proposed modifications to the Quarry (Appendix C) based on a proposed increased limestone extraction rate from 560,000 tpa (as assessed in the EIS) to 790,000 tpa and an increase in fugitive dust emissions of approximately 25% (based on an assessment of the likely extraction rate increase effect on dust emission rates from dust emission sources/activities identified in the EIS).

The assessment concluded that the extraction rate increase would result in an increase in the mean annual dust deposition rate of 0.25g/m^2/month for the proposed modification, still well within the NSW DEC criterion for dust deposition.

Table 15 shows the 24-hour PM_{10} concentrations predicted at the nearest residences for the original approved and modified Projects. The Heggies Australia (2005a) assessment concluded that the predicted 6th highest 24-hour PM_{10} levels (for the modified Quarry) would comply with the NEPM goal of 50 $\mu g/m^3$ (the value not to be exceeded more than 5 times per year) assuming the same levels of emission controls would be applied as for the approved Quarry.

Table 15
Predicted 24-hour PM_{10} Concentrations at Nearest Residences

	Approved Project	Modified Project
Residence	**6th Highest Value**	**6th Highest Value Increased by 25%**
Abandoned (east of MLA)	38 μg/m^3	48 μg/m^3
Danganmore	27 μg/m^3	34 μg/m^3
Lesbina	23 μg/m^3	29 μg/m^3
The Troffs	20 μg/m^3	25 μg/m^3
Reas Falls	14 μg/m^3	17 μg/m^3

Source: Heggies Australia, 2005a

Mitigation Measures

A number of air quality safeguards were provided in the EIS to minimise potential impacts from dust deposition and particulate matter generated at the MPF. These safeguards include watering of disturbed areas, road maintenance, prevention of truck overloading and the resulting spillage during loading and hauling, use of dust suppressants or cover crops on soil stockpiles, and progressive rehabilitation of disturbed areas.

No additional mitigation measures to those outlined in the EIS would be required for the modified Project.

5.2.7 Acoustics

Environmental Review

The potential noise impacts of the approved Quarry and Rail Siding were assessed in the EIS.

The EIS assessed the predicted rail transportation noise at the closest residences to the rail line (ie. “Glen Rock” and “Ballenrae”). The EIS results indicated that the predicated noise levels from rail noise were below the recommended DEC criteria. Heggies Australia (2005b) reviewed the proposed modification associated with the Rail Siding and concluded that the noise levels resulting from the daily train movements associated with the modified proposal will also be below the DEC’s recommended train noise assessment criteria at the nearest potentially affected residences (Appendix D).

The potential blasting and noise impacts of the approved Quarry were assessed in the EIS. Table 16 provides the EIS blasting configuration for the approved Quarry.

Table 16
Proposed Blast Design Details Approved Quarry

Blast Design Parameter	Typical Dimension
Number of Holes	168
Number of Rows	6
Hole Diameter	102 mm
Hole Inclination	Vertical
Bench Height	15 m
Burden	2.6 m
Spacing	2.6 m
Subdrill	1.0 m
Stemming Depth	2.8 m (aggregate)
Delay Timing	Nonel (single hole per delay)
Column Explosive	ANFO
Powder Factor	0.85 kg/bcm
Maximum Instantaneous Charge (MIC)	87 kg

Source: Richard Heggie Associates, 2000

The modified proposal involves an increase in the limestone production rate. Based on the EIS blast design details presented in Table 16 and an increased blast frequency from 13 to 19 blasts per year, Heggies Australia (2005b) concluded that blast emissions (ie. ground vibration and airblast overpressure) associated with the modified proposal would not exceed relevant criteria for each blast. This conclusion remains unchanged from that presented in the EIS.

There are no changes proposed to the mobile Quarry plant relative to the operations prescribed in the EIS. The proposed Quarry would however require an increased crushing rate from 200 tph to 250 tph. Conservative assessment of the effect on overall sound power levels of the limestone crusher results in an increased overall sound power level output of 1 dBA (ie. an increase from 118 dBA to 119 dBA) (Heggies Australia, 2005b). Confirmatory modeling conducted by Heggies Australia (2005b) shows that such an increase in the overall sound power level from the crusher would not substantially change the noise levels (ie. less than 1dBA) expected at the nearest residences assessed in the EIS.

The general arrangement of the approved Quarry presented in EIS would also change as a result of the modified proposal. Relevantly, these changes include revised layouts of the waste emplacements which would act as noise bunds (providing resulting noise attenuation) (Heggies Australia, 2005b). Although the extent of the emplacements would change in earlier years of the modified Quarry operation (Figure 7), the same bunding effect would be achieved to the south and southwest of the Quarry pit by selectively locating waste emplacements and topsoil stockpiles (Figure 8) (Heggies Australia, 2005b).

The predicted EIS approved Quarry operating noise emissions for Year 5 are presented in Table 17.

Table 17
EIS Predicted Daytime $L_{Aeq(15minute)}$ Quarry Operating Noise Emissions – Year 5

Location	$L_{Aeq(15minute)}$ Noise Emission	$L_{Aeq(15minute)}$ Noise Criteria
	Calm	Daytime (0700 hrs to 1700 hrs)
Reas Falls	30	37
Moorelands	42	37
Gillenbine	36	37
Lesbina	38	36
Hillsdale	24	37
The Troffs	33	36
Eastbourne	38	36

Source: Richard Heggie Associates, 2000

Based on the proposed modified crusher, unchanged mine fleet and revised design of the waste emplacements, Heggies Australia (2005b) has concluded that the Quarry operating noise levels are expected to be the same as those presented in Table 17.

Mitigation Measures

A number of noise attenuation methods were provided in the EIS to minimise potential impacts from noise and blasting generated at the Quarry and Rail Siding. In accordance with the above assessment, the mitigation methods identified in EIS would remain unchanged for the modified proposal (ie. bunding for the modified Quarry would be required to deliver equivalent attenuation to that described in the EIS).

5.2.8 Aboriginal Heritage

Environmental Review

A search of the NSW NPWS Aboriginal Sites Register found that no sites had previously been recorded in the area of the Quarry or Rail Siding. No sites were identified in these areas during the surveys conducted by Archaeological Surveys and Reports (2000).

While no Aboriginal heritage sites have been identified within the approved Quarry and Rail Siding disturbance areas, there is some potential for individual artefacts occurring buried within the topsoil. However, given the highly disturbed nature of the majority of the approved disturbance areas, this is considered unlikely (Archaeological Surveys and Reports, 2000).

The proposed modifications to the approved Quarry would involve an approximate additional 53 ha of land disturbance and soil stripping on previously cleared pastoral land. There would be no additional disturbance to the footprint of the Rail Siding beyond that described in the EIS.

Mitigation Measures

In accordance with the EIS and Development Consent Condition 3.3, earthmoving operators and contractors employed during construction of the approved Quarry and Rail Siding would be obliged to comply with the *National Parks and Wildlife Act 1974.* If bone or stone artefacts or discrete distributions of shell are unearthed during earthworks, works in the vicinity of the find would cease and the local Aboriginal Land Council and representatives of the National Parks and Wildlife Service (NPWS) would be informed. Works would not recommence in the immediate area until the find had been inspected and permission given for works to proceed.

In the event that it becomes necessary to disturb or destroy any Aboriginal heritage site during the approved Quarry or Rail Siding development, "Consent to Destroy" would be sought from NPWS. Salvage of any such sites would be undertaken by a qualified archaeologist accompanied by a representative of the local Aboriginal community.

The original Development Consent also requires the implementation of an Archaeology and Cultural Management Plan prior to the commencement of construction. The implementation of this plan would remain applicable to the modified Project.

5.2.9 European Heritage

Environmental Review

The Parkes Shire LEP does not list any sites of European heritage significance in the Quarry or Rail Siding areas. No sites of European heritage significance were identified within these areas during the survey conducted by Heritage Management Consultants (2000).

The proposed modifications to the Quarry and Rail Siding are not expected to have any additional potential impacts on European heritage from those assessed in the EIS.

Mitigation Measures

The implementation of an Archaeology and Cultural Management Plan required by the original Development Consent, prior to the commencement of construction, would remain applicable to the modified Project.

5.2.10 Risk Assessment

Environmental Review

A PHA conducted for the EIS identified the following potential hazards which may occur at the Quarry or Rail Siding:

- incidents associated with on-site storage of diesel;
- hazards associated with the transport of materials;
- incidents involving explosives (Quarry); and
- breaches of security.

Hazards associated with the transport of materials are discussed in Section 5.3.

A number of mitigation measures/factors were proposed in the EIS to reduce the potential hazardous risk imposed by the approved Project.

In addition to the EIS mitigation measures, the conditions of the original Development Consent also require a number of management plans and studies to reduce the likelihood and/or consequences of potentially hazardous incidents. The original Development Consent requirements include:

- Emergency Plan (Development Consent condition 5.2bii);
- Safety Management System (Development Consent condition 5.2biii);
- Fire Safety Studies (Development Consent condition 5.2ai);
- Transport of Hazardous Materials Study (Development Consent condition 5.2bi);
- Final Hazard Analysis (Development Consent condition 5.2aiii); and
- HAZOP studies (Development Consent condition 5.2aii).

The mitigation measures outlined in the EIS to minimise hazard risk, and the formulation of hazard management plans and undertaking of hazard mitigation studies would remain applicable to the modified Project.

5.2.11 Socio-Economics

Potential socio-economic impacts due to the modified Project are discussed in Section 5.1.14

5.3 MATERIALS TRANSPORT ROUTE

5.3.1 Transport

Environmental Review

A transport assessment of Project related traffic and transport impacts for the approved Project was undertaken for the EIS by Masson Wilson Twiney (2000). The transport assessment was based on the estimated traffic movements during Project construction and operation of bulk deliveries, employee generated traffic, and other mine traffic. The assessment was also based on an expected workforce of some 371 persons during mine operation and the expected production of approximately 25,000 tpa of nickel and cobalt or 42,000 tonnes of nickel cobalt sulphide precipitate per annum.

Daily material movements modelled for the approved Project assessed in the EIS are outlined in Table 18. The assessment also forecast the total number of vehicle movements per day during the approved Project operation to be in the order of 550, comprising approximately:

- 300 employee vehicle movements per day;
- 150 truck and van raw materials transport vehicle movements per day; and
- 100 other vehicle movements per day.

Table 18
Summary of EIS Materials Movement

Product	Average Daily Truck Movements To or From					Train Movements on Branch Line Per Week
	Rail Siding	Quarry	Young	Local Sources	Sydney	
Sulphur	24	0	0	0	0	4
Caustic Soda	2	0	0	0	0	2
Magnesia	0	0	4	0	0	0
Limestone	0	72	0	0	0	0
Misc Bulk	4	0	0	0	0	0
Other	0	0	0	40	4	0
Fuel/Lubricants	0	0	0	1	0	0
Mine Product*	0	0	0	0	0	0

Source: Masson Wilson Twiney, 2000

Note: Each return trip = two movements, average daily movements are shown

* Backloaded on trucks and general goods trains

The assessment concluded that the existing road system together with road and AUSTROAD standard intersection upgrades and improvements along the materials transport route, together with the construction of the Fifield Bypass would satisfactorily accommodate Project generated traffic.

In 2005, Masson Wilson Twiney conducted a review of transport related impacts resulting from the Project modifications (Appendix E). Table 19 summarises transport related changes resulting from the Project modifications, including changes to the quantity of ore and limestone extracted, quantity of process materials transported to site and workforce employed during approved and modified Project operations.

Table 19
Summary of Key Transport-related Differences

Project Component	Approved Project	Modified Project
Ore Extraction	Extraction of up to 42,000 tpa of mixed sulphide precipitate or up to 25,000 tpa of nickel and cobalt	Extraction of up to 53,000 tpa of mixed sulphide precipitate
Operational Workforce	400 employees	300 employees
Limestone Production and Transport	Extraction of up to 560,000 tpa	Extraction of up to 790,000 tpa
	Limestone-related truck movements of 36 return trips per day	Limestone-related truck movements of 45 return trips per day
Sulphur Demand and Transport	Annual demand of 210,000 tpa	Annual demand of 260,000 tpa
	Two rail trips from Newcastle per week and 12 truck deliveries per day	Three rail trips from Newcastle per week and 15 truck deliveries per day
Caustic Soda Demand and Transport	Annual demand of 10,000 tpa	Annual demand of 100 tpa
	One truck delivery from the Rail Siding every two days	One truck delivery from the Rail Siding every three months
Magnesium Oxide (Magnesia), Extractant, Modifier and Diluent Transport	2 trips per day	Not required

Source: Masson Wilson Twiney, 2005

Table 20 compares road and rail movements of the approved Project with the modified Project.

Table 20
Summary of Materials Movement

Product	Daily Truck Movements										Weekly Train Movements to the Rail Siding(1)	
	Rail Siding		Quarry		Young		Local Sources		Sydney			
	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.
Sulphur	24	30	0	0	0	0	0	0	0	0	4	6
Caustic Soda	2	0	0	0	0	0	0	0	0	0	2	0
Magnesia	0	0	0	0	4	0	0	0	0	0	0	0
Limestone	0	0	72	90	0	0	0	0	0	0	0	0
Misc. Bulk	4	4	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	40	40	4	4	0	0
Fuel/Lubric	0	0	0	0	0	0	1	1	0	0	0	0

Source: Masson Wilson Twiney, 2005
(1) Between Newcastle/Sydney and the Rail Siding
Note: Orig. = Approved Project; Mod. = Modified Project

Transport related impacts resulting from the Project modifications would see an additional 18 truck movements per day between the Quarry and the MPF to meet the increased limestone demand and an additional six truck movements per day between the Rail Siding and the MPF to meet the increased sulphur demand. However, since magnesium oxide would no longer be required under the modified Project, the four truck movements per day required to transport the reagent from Young to the mine site would be eliminated. Further, the reduction in quantity of caustic soda required under the modified Project would see a decrease in the number of truck movements between the Rail Siding and the MPF from 8 movements per week to just 2 movements every three months.

As mentioned previously, under the modified Project the workforce employed during mine operation would be reduced from 400 to 300 employees, resulting in a decrease in employee-related generated traffic. Table 21 compares the expected daily volumes and distribution of employee-related generated traffic assessed in the EIS, and that expected under the modified Project. It is anticipated that the modified Project would reduce employee-related traffic generation to approximately 225 vehicle movements per day.

Table 21
Expected Distribution of Employees and Their Traffic

Location	Employee Distribution	Daily Volume (vehicle movements)	
		Original Project	Modified Project
Parkes	65.5%	192	147
Trundle	2.5%	8	6
Tullamore	2.0%	6	5
Condobolin	29.0%	84	65
Bogan Gate	0.5%	2	1
Ootha	0.5%	2	1
Total		**294**	**225**

Source: Masson Wilson Twiney, 2005

The transport review conducted for the modified Project concluded that although truck movements would increase slightly to cater for the higher annual throughput when compared to traffic assessed in the EIS, the increased truck movements generated under the modified Project would be offset by a significant decrease in light traffic as the workforce would be reduced. The additional truck traffic would amount to only three movements per hour on the most affected road.

Mitigation Measures

The following mitigation measures were proposed in the EIS and required by the original Development Consent, to minimise potential traffic impacts on the local transport network:

- upgrade of the Fifield to Trundle Road;
- upgrade of sections of the Fifield to Wilmatha Road;
- upgrade of sections of the Condobolin to Tullamore Road;
- construction of the Fifield Bypass;
- traffic on the materials transport route would have priority at all intersections apart from at the Fifield to Trundle Road/Tullamore to Bogan Gate Road intersection;
- lighting would be installed at the intersections of the Fifield to Trundle Road/Tullamore to Bogan Gate Road and the Fifield to Trundle Road/Condobolin to Tullamore Road;
- intersections subject to increased traffic would be upgraded in accordance with AUSTROADS guidelines to provide improved signage, sheltered right turn lanes, left turn deceleration lanes and improved left turn radii where appropriate;
- 3 m wide shoulders would be provided for approximately 30 m on either side of all minor roads and property accesses along the materials transport route;
- haulage along the materials transport route would be restricted during operation hours of school buses;
- minor upgrades to the railway level crossing at the access road may be required and would be conducted to the satisfaction of the relevant road and rail authorities; and
- Middle Trundle Road (SR 83) would be sealed with gravel to a heavy vehicle standard.

The transport impact mitigation measures detailed in the EIS relating to road and intersection upgrades, as required by the original Development Consent, would remain applicable to the modified Project.

5.3.2 Air Quality

The proposed modification includes an increase in the number of road truck trips from the Quarry to the MPF and from the Rail Siding to the MPF. The potential dust impacts relating to this increase would be negligible due to the sealed transport route.

5.3.3 Acoustics

Environmental Review

The potential noise impacts of Project related road traffic on the surrounding public road network were assessed in the EIS.

Based on the traffic study for the modified Project (Masson Wilson Twiney, 2005) (Appendix E), the total operational traffic generation of the Project is now forecast to be approximately 469 vehicle movements per day.

Relative to the vehicle movements upon which the EIS noise levels were predicted, there are now 75 fewer employee vehicle movements, 18 more truck movements and 25 fewer other vehicles movements per day under the modified Project.

Heggies Australia (2005b) assessed the traffic noise levels for the modified Project (Appendix D). Table 22 presents the predicted road traffic noise levels for the original approved and modified Projects. Note that the results for Trundle township and school are conservative as 4 magnesia truck trips per day from Young to the MPF have been eliminated for the modified Project.

Table 22
Predicted Approved and Modified Future $L_{Aeq(1hour)}$ Peak Traffic Noise Levels

Receiver	Road	Location	Offset Distance	Peak Traffic Noise Levels $L_{Aeq(1hour)}$ [1]	
				Future (as described in the EIS)	Future (as predicted for the proposed modification)
Fifield Village	Fifield Bypass	-	1100 m	50 dBA	50 dBA
Platina Farm	MR 57 North	North of SR 90	300 m	36 dBA	36 dBA
Gillenbine	SR 64	East of MR 57 North	1100 m	35 dBA	35 dBA
Reas Falls	SR 64	East of MR 57 North	210 m	45 dBA	46 dBA
Glen Rock	MR 350	North of Trundle	750 m	35 dBA	36 dBA
Trundle Township	MR 350	-	20 m	54 dBA	54 dBA
Trundle School	MR 350	-	30 m	50 dBA	50 dBA

Source: Heggies Australia, 2005b

[1] Rounded to the nearest dBA

As with the EIS findings the Heggies Australia (2005b) review of the road traffic level predictions given in Table 22 indicates that all future peak hour noise levels are lower than both the recommended daytime and night-time traffic noise assessment criteria of $L_{Aeq(1hour)}$ 60 dBA and 55 dBA respectively), with a marginal increase of only 1 dBA predicted at “Reas Falls” and “Glen Rock”.

Assuming a conservative 10 dBA attenuation (from outside to inside the building), the predicted traffic noise levels at the Trundle School would also be below the recommended DEC criterion for school rooms (internal $L_{Aeq(1hour)}$ of 45 dBA) described in the EIS.

Mitigation Measures

No mitigation measures additional to the approved Project are expected as a result of the modification. The Development Consent conditions require the implementation of a Traffic Noise Management Plan. This plan would remain applicable to the modified Project.

5.3.4 Risk Assessment

The PHA conducted for the EIS identified potential hazards which may occur along the materials transport route. The potential hazards are not expected to change for the proposed modification. The PHA (including transport related issues) is discussed in Sections 5.1.13 and 5.2.10.

6 ENVIRONMENTAL MONITORING AND MANAGEMENT

6.1 ENVIRONMENTAL MONITORING

The EIS describes monitoring programmes for the approved Project whereby data for key environmental parameters would be collected, analysed and maintained in a database. The Development Consent conditions nominate some specific requirements with respect to the monitoring programmes. The monitoring programmes would be used to regularly gauge the effectiveness of IVP's environmental management strategies and control measures, and to identify where additional control measures maybe required to enable IVP to achieve its environmental management objectives and meet their legislative requirements. A summary of the key components of the monitoring programmes required by the Development Consent is provided below.

The results of the monitoring programmes would be presented annually in the Project Annual Environmental Management Report (AEMR) and would be assessed regularly by Project personnel, regulatory authorities, independent external auditors and specialist consultants for compliance with the Project Development Consent conditions and other Project approvals. It is proposed that the first AEMR would be submitted to relevant authorities within 12 months of any development occurring on the site (see Table 24 below).

Meteorology

IVP is required by Development Consent condition 8.2.1 to undertake meteorological monitoring to record wind, temperature, evaporation, rainfall, etc. The climatic data would be collected for use in interpretation of environmental monitoring data (eg. noise monitoring, dust deposition monitoring, etc.). The meteorological station would be installed in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (*EPA, 2001) and *AS 2922 1987 Ambient Air Guide for Siting of Sampling Units* (Development Consent condition 8.2.2) prior to the commissioning of the MPF. The proposed location of the meteorological station nominated by the EIS is shown on Figure 9. The meteorological monitoring programme described in Development Consent condition 8.2.1 would not require any changes to incorporate the proposed modifications to the Project.

Noise

IVP is required by Development Consent condition 6.3.3 to implement both construction and operational noise monitoring.

Prior to the commencement of construction at the MPF, Quarry and the Rail Siding, monitoring sites would be located at selected external locations surrounding the MPF site, the Quarry and the Rail Siding and monitoring implemented prior to the commencement of construction at each Project component.

An operational noise monitoring programme would be implemented and results provided for the six monthly noise investigations required in accordance with Development Consent condition 6.3.3. Development Consent condition 6.3.1 provides Project specific noise limits for non-Project owned residences located in the vicinity of the MPF site, the Quarry and the Rail Siding ("Brooklyn", "Currajong Park", "Rosehill", "Flemington", "Sunrise", "Wanda Bye", "Glenburn", Fifield township, "Warrawindi", "Slapdown", "Reas Falls", "Moorelands", "Gillenbine", "Lesbina", "Hillsdale", "Eastbourne", "Glen Rock", "Ballenrae", "Spring Park").

In the event that a landowner considers that noise from the Project is in excess of the noise limits provided in Development Consent condition 6.3.1 and the Director-General of DIPNR is satisfied that an investigation is required, IVP would make arrangements for independent noise investigations to be undertaken to quantify the impact and determine the source of the effect. Development Consent condition 6.3.1 also provides noise acquisition criteria for these non-Project owned residences. It should be noted that IVP has options to purchase a number of these properties.

In accordance with Development Consent condition 6.3.3, IVP is required to develop a noise monitoring programme as part of the Project Noise Management Plan. The Plan would identify noise affected properties and the relevant noise limits consistent with the EIS. Figures 9 and 10 show the proposed noise monitoring locations nominated in the EIS. The noise monitoring programme described by Development Consent condition 6.3 would be conducted at approved noise monitoring locations and would not require any changes to incorporate the proposed modifications to the Project.

Blasting

IVP is required by Development Consent condition 6.2.4 to monitor blast overpressure and vibration levels at noise sensitive sites (eg. residences, hospitals, schools, etc.). The EIS nominated a number of blasting monitoring sites in the vicinity of the Quarry (Figure 10). Prior to the commencement of blasting, the blasting monitoring sites for the Project would be selected in consultation with the DEC. The proposed modification to the Project would not necessitate changes to the blasting monitoring programme required by the Development Consent.

Air Quality

Dust Emissions

IVP is required by Development Consent condition 6.1.2 to monitor monthly dust deposition, TSP and PM_{10} levels within the MPF area, Quarry and surrounds. The EIS nominated a number of dust deposition monitoring sites in the vicinity of the MPF (Figure 9), the Quarry and the Rail Siding (Figure 10). Background dust monitoring is required at the nearest affected residences to the MPF and Quarry. All monitoring is required to be carried out in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2001). The locations of background and operational dust deposition, TSP and PM_{10} monitoring sites would be selected in consultation with the DEC. The proposed modification to the Project would not require any changes to the ambient air quality monitoring programme required by the Development Consent.

Gaseous Emissions

The monitoring of gaseous pollutant emissions from the MPF is required to be conducted in accordance with Development Consent condition 6.1.5. Monitoring would commence during commissioning of the MPF at 9 of the emission points provided in Table 4 of the Development Consent (emission points 5, 6, 7, 15 and 16 have been removed with the removal of the refinery section of the processing facility). Air pollutants listed in Table 5 of the Development Consent are required to be monitored (ie. sampling and analysis) quarterly. Pollutants and parameters to be monitored are nominated in Table 5 of the Development Consent.

In addition to quarterly emissions monitoring, IVP is required to conduct continuous monitoring of hydrogen sulphide, sulphur dioxide, opacity, temperature, moisture, volumetric flow rate and oxygen at the emission points nominated in Table 6 of the Development Consent. The proposed modifications to the Project would reduce the number of air emission monitoring points (ie. emission points 5, 6, 7, 15 and 16) due to the removal of the refinery. All other monitoring points would remain unchanged.

Groundwater and Surface Water

Prior to the commencement of operations at the MPF and the Quarry, IVP is required to implement the surface and groundwater monitoring programme described in Development Consent condition 4.3.1. EIS surface water and groundwater monitoring locations for the MPF, Quarry and Rail Siding areas are shown on Figures 9 and 10. Prior to the commencement of operations, IVP shall construct and/or locate final surface water and groundwater monitoring locations in consultation with DIPNR and DMR (in accordance with Development Consent condition 4.3.1(a)). The surface water and groundwater monitoring programme would identify the frequency of sampling, the parameters to be measured, contingency measures, reporting procedures and monitoring cut-off criteria. The programme would be prepared in consultation with DIPNR, DEC and DMR.

At the MPF, water concentrations of arsenic, cadmium, chromium, copper, lead, mercury, selenium, suspended solids, zinc and salt are required to be monitored monthly at the discharge points nominated in Table 2 of the Development Consent. Monitoring of pollutants discharged to waters is required to be conducted in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales* (DEC, 2004) (Development Consent condition 4.3.1(d)).

The proposed Project modification would not necessitate changes to the surface water and groundwater monitoring programme required by the Development Consent.

Other Monitoring Requirements

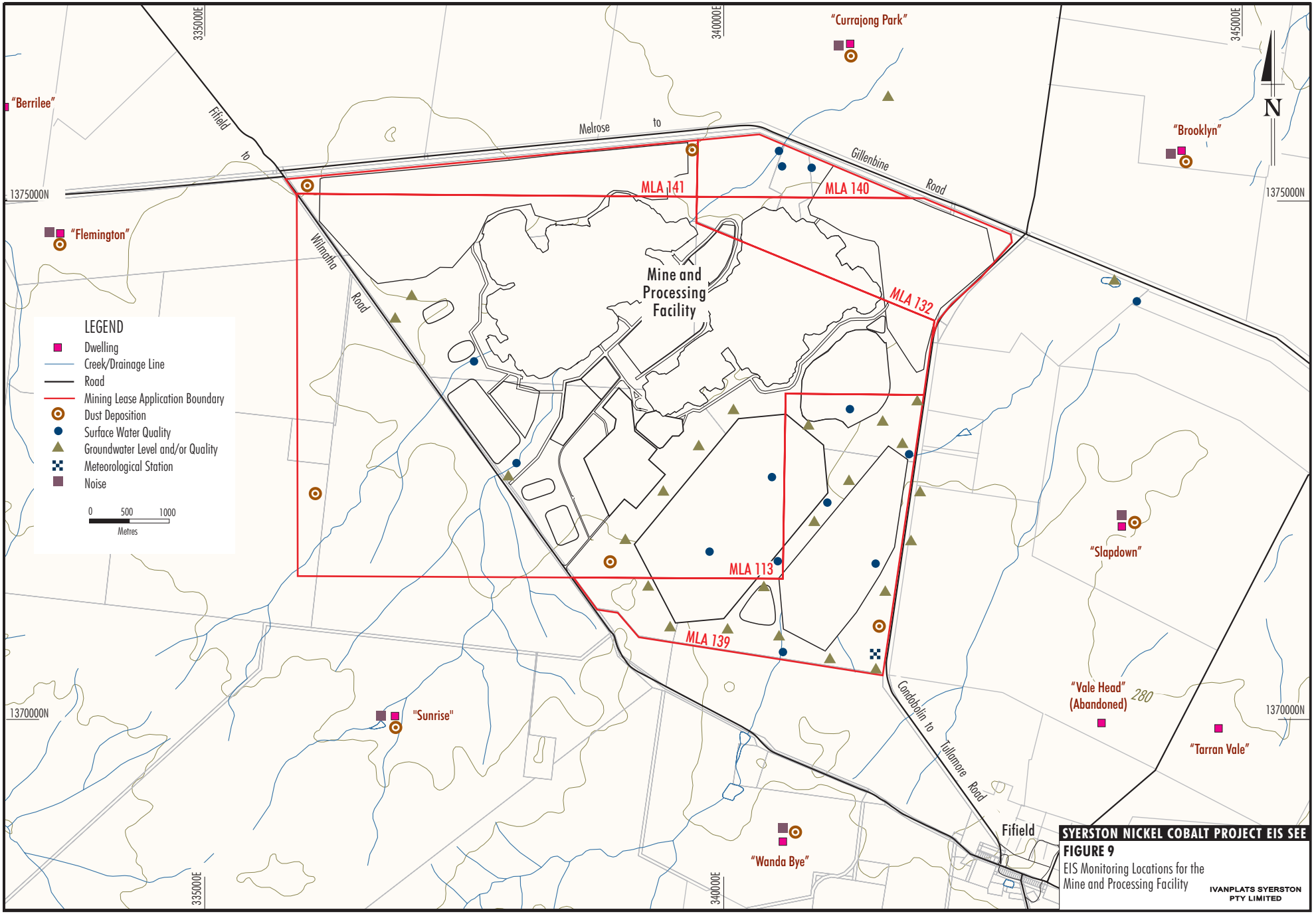
A number of additional monitoring programmes (energy, habitat, landscape, etc.) are required under the Development Consent and are not subject to change as a result of the proposed modification.

6.2 ENVIRONMENTAL MANAGEMENT

6.2.1 Environmental Management Plans

The environmental assessment and subsequent approval for the Project considered the preparation and implementation of numerous environmental management plans, manuals, procedures and environmental initiatives. The EIS and Development Consent set out the aims, objectives and methods that would be used by IVP employees and contractors to manage the environmental impacts of the approved Project.

A description of the environmental management plans that are required by the Development Consent and are to be implemented for the Project is provided in Table 23.



SYERSTON NICKEL COBALT PROJECT EIS SEE

FIGURE 9

EIS Monitoring Locations for the Mine and Processing Facility

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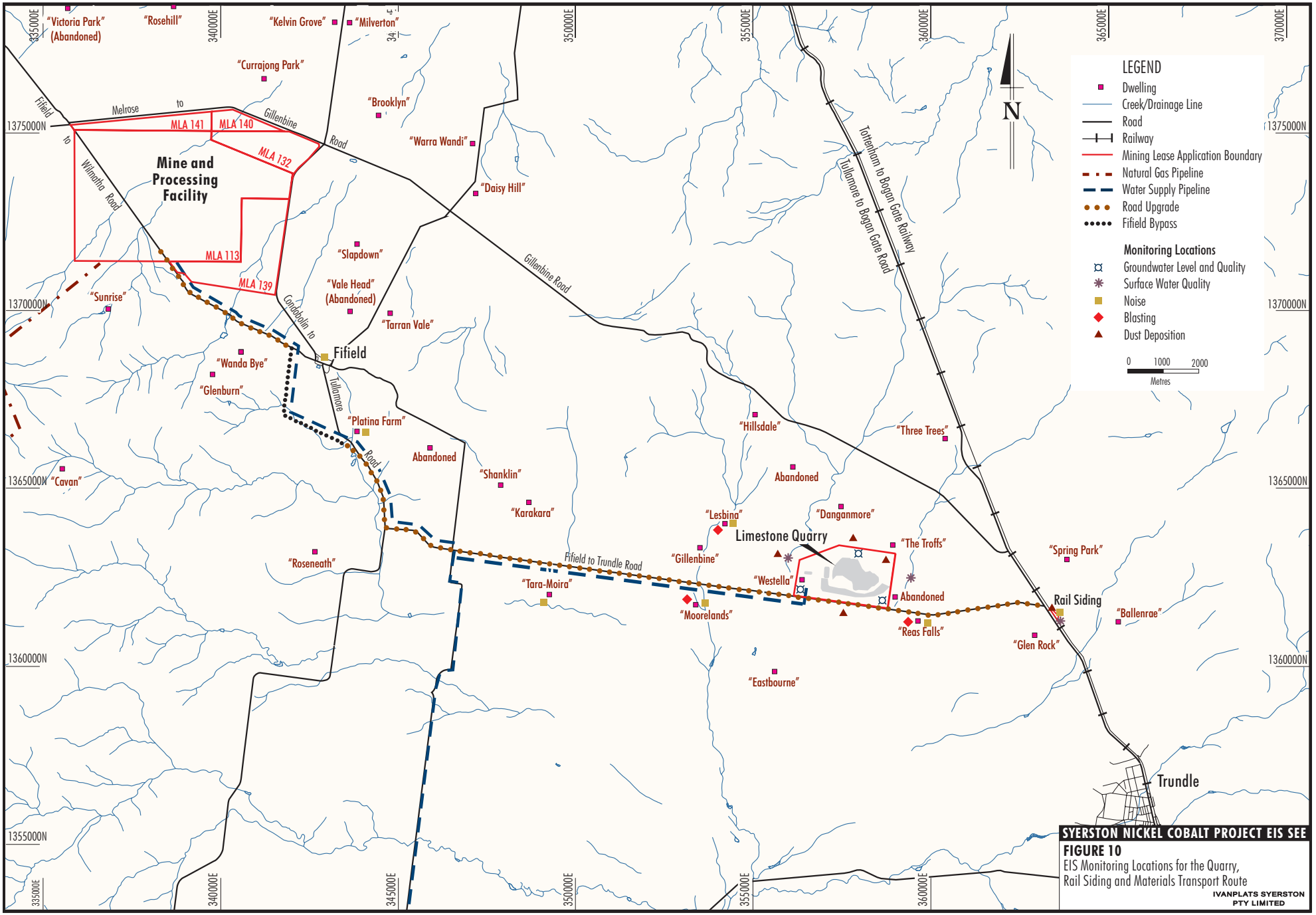
IVP-04-01 SEE_009B



SYERSTON NICKEL COBALT PROJECT EIS SEE

FIGURE 10

EIS Monitoring Locations for the Quarry, Rail Siding and Materials Transport Route

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IVP-04-01 SEE_010B

Table 23
Project Environmental Management Plans

Development Consent Condition	Environmental Management Plan	General Management Plan Description
3.2a	Environmental Management Strategy	To provide a strategic context for the Project's environmental management system, including environmental management plans.
3.3a	Archaeology and Cultural Management Plan	To manage MPF and Quarry areas identified as being of archaeological or Aboriginal heritage significance.
3.4a	Flora and Fauna Management Plan	To manage flora and fauna issues at the MPF and Quarry sites and provide revegetation strategies and monitoring programme.
3.5d	Soil Stripping Management Plan	To manage conservation of topsoil for works involving soil or vegetation disturbance.
3.7	Landscape and Revegetation Management Plan	To minimise the impacts of the Project on local visual amenity and to provide details of, and management procedures for landscaping.
3.8a	Bushfire Management Plan	To manage fire protection for Project components including adequate personnel training.
3.9.1a	Land Management Plan	To effectively manage pastures and remnant vegetation, land degradation, vermin and noxious weeds and feral animals.
3.10	Site Security and Crime Management Plan	To prevent unauthorised access to the Project and minimise the potential for crime at, and in the vicinity of the Project.
3.11	Energy Management Plan	To efficiently use energy at the Project and minimise energy wastage.
4.1a and b	Water Management Plan	To provide details of Project process water systems and to manage and monitor quality and quantity of surface water and groundwater.
4.1.1	Borefields Environmental Management Plan	To manage issues relevant to the Borefields including erosion and sedimentation, heritage, flora/fauna, pests, stock, landscaping bushfire, security and wastes.
4.1.1(l) & (k)	Borefields Impact Mitigation Plan	To demonstrate how the impacts on neighbouring bores will be ameliorated.
4.2	Integrated Erosion and Sediment Control Plan	To manage and report erosion and sediment control measures.
5.4a	Waste Management Plan	To minimise the production of waste and to effectively reuse, recycle, treat and dispose of wastes produced at the Project.
6.1.1	Dust Management Plan	To detail air quality safeguards and procedures for dealing with dust emissions.
6.1.4	Gaseous Emissions Management Plan	To minimise impacts of the Project on local and regional air quality.
6.2.3a	Blasting and Vibration Management Plan	To manage and mitigate impacts of the Project due to blasting activities.
6.3.3a	Noise Management Plan	To manage and mitigate impacts of the Project generated by operational noise.
6.3.3b	Construction Noise Management Plan	To manage and mitigate impacts of the Project resulting from construction related noise.
6.3.3c	Traffic Noise Management Plan	To manage and mitigate impacts of the Project due to Project generated traffic related noise.
7.7	Stock Crossing Management Plan	To ensure adequate and safe crossing for stock and farm machinery when crossing or moving along access roads or stock routes to be used by construction and operational traffic.
7.10	Rail Siding Environmental Management Plan	To manage and minimise issues relevant to the Rail Siding relating to dust, erosion, flora/fauna, water management etc.

The Environmental Management Plans (EMP) would be implemented in accordance with the Development Consent for the Project (except as noted in Section 6.2.2). The aims, objectives and methods to be detailed in the EMPs would not change as a result of the Project modification.

6.2.2 Staged Timing of Environmental Management Measures

As the construction of Project components will be undertaken in a staged manner, it is proposed to align the timing (as specified in the Development Consent conditions) of the implementation of specific environmental management measures with the appropriate stage in the development of the Project. Proposed alternative timings for specific environmental management measures and justification of timing changes are provided in Table 24.

The timing for those environmental management measures not listed in Table 24 would remain as per the requirements of the Development Consent conditions.

Table 24
Modified Timing of Environmental Requirements for Modified Project

Development Consent Condition	Environmental Requirement	Development Consent Timing	Proposed Modification	Justification
3.3a	Archaeology and Cultural Management Plan	Prior to the commencement of construction.	Prior to the commencement of construction of the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for the staging of Project construction. The Borefields Environmental Management Plan (BEMP) and Rail Siding Environmental Management Plan (RSEMP) would each have an archaeology and cultural management component
3.4a	Flora and Fauna Management Plan	Prior to construction.	Prior to the commencement of construction of the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for the staging of Project construction. The BEMP and RSEMP would each have a flora and fauna management component.
3.8a	Bushfire Management Plan	Prior to the commencement of operations.	Prior to the commencement of operation of the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for the staging of Project operation. The BEMP and RSEMP would each have a bushfire management component.
3.9.1a	Land Management Plan	Prior to commencement of operation of the Project components.	Prior to the commencement of operation of the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for the staging of Project operation. The BEMP and RSEMP would each have a land management component.
3.10	Site Security and Crime Management Plan	Prior to the commencement of construction of Project components.	Prior to the commencement of construction of the MPF.	To clarify the timing specified in the Development Consent and allow for the staging of Project operation. The BEMP and RSEMP would each have a security management component.
4.1a	Water Management Plan	Prior to the commencement of construction.	Prior to the commencement of construction of the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for the staging of Project construction. The BEMP and RSEMP would each have a water management component.
5.2aiii	Final Hazard Analysis	At least one month prior to the commencement of the relevant component(s) of the Project.	One month prior to the commencement of construction of the MPF.	To clarify the timing specified in the Development Consent. The MPF would be the Project component predominantly covered by this requirement.
5.2bi	Transport of Hazardous Materials Study	No later than two months prior to the commencement of operation of the relevant component(s) of the Project.	Two months prior to the commencement of operations at the MPF.	To clarify the timing specified in the Development Consent.

Table 24 (Continued)
Modified Timing of Environmental Requirements for Modified Project

Development Consent Condition	Environmental Requirement	Development Consent Timing	Proposed Modification	Justification
5.2bii	Emergency Plan	No later than two months prior to the commencement of operation of the relevant component(s) of the Project.	Two months prior to the commencement of operations at the MPF, Quarry and Rail Siding.	To clarify the timing specified in the Development Consent. Borefields specific procedures and measures relevant to emergency response and control would be implemented before operation of the borefields, and subsequently incorporated into the Project Emergency Plan.
5.2biii	Safety Management System	No later than two months prior to the commencement of operation of the relevant component(s) of the Project.	Two months prior to the commencement of operations at the MPF, Quarry and Rail Siding.	To clarify the timing specified in the Development Consent. Borefields specific procedures and measures relevant to emergency response and control would be implemented before operation of the borefields, and subsequently incorporated into the Project Safety Management System.
5.4a	Waste Management Plan	Prior to the commencement of construction of any component of the Project.	Prior to the commencement of construction of the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for staging of Project construction. The BEMP and RSEMP would each have a waste management component.
6.1.7	Manufacturer's Performance Guarantees Report	Prior to the construction of the processing facility.	Prior to the commencement of construction of each MPF component.	To allow for staging of MPF construction. MPF construction would commence prior to the selection and procurement of all of the equipment for the facility.
6.3.3c	Traffic Noise Management Plan	Prior to hauling material along the haulage route from the Rail Siding/Quarry to the mine site.	Prior to commissioning of the MPF.	To clarify the timing specified in the Development Consent. The Traffic Noise Management Plan would apply to the haulage of operational materials.
7.2a	Road Construction Programme	Prior to the commencement of construction.	Prior to the commencement of road works.	To clarify the timing specified in the Development Consent.
7.5b	Road Maintenance Agreement	Prior to the commencement of construction.	Prior to the commencement of construction of the MPF.	To clarify the timing specified in the Development Consent and allow for staging of Project construction.
7.6	Railway Level Crossing Audit	Prior to construction.	Prior to the commencement of construction of the MPF.	To clarify the timing specified in the Development Consent and allow for staging of Project construction.
7.7	Stock Crossing Management Plan	Prior to the commencement of construction.	Prior to the commencement of operations at the MPF and Quarry.	To clarify the timing specified in the Development Consent and allow for staging of Project construction. The BEMP and RSEMP would each have a stock management component if relevant.
7.8	Protection and Relocation of Service Consultation	Prior to construction.	Prior to the commencement of construction of Project components.	To allow for the staging of Project construction of MPF, Quarry and Rail Siding.
7.10a	Rail Siding Environmental Management Plan	Prior to construction commencing.	Prior to the commencement of construction of the Rail Siding.	To clarify the timing specified in the Development Consent.
9.2.1(b)(iii)	Annual Environmental Management Report (AEMR)	Ensure that the first report is completed and submitted within twelve months of this consent.	Ensure that the first report is completed and submitted within twelve months of any construction occurring for the Project.	IVP has been advised by DIPNR that there is little value in receiving an AEMR prior to the commencement of any development.
10.2aii	Complaints Reporting	Every six months throughout the life of the Project.	Every 6 months throughout the life of the Project. Reporting would commence 6 months following the commencement of Project construction.	To clarify timing specified in the Development Consent.

Table 24 (Continued)
Modified Timing of Environmental Requirements for Modified Project

Development Consent Condition	Environmental Requirement	Development Consent Timing	Proposed Modification	Justification
13.2	Structural Adequacy Certification	Prior to the commencement of construction works.	Prior to the commencement of construction Project components.	To clarify the timing specified in the Development Consent and allow for the staging of Project construction.
13.3a	Construction Compliance Certificate	Upon completion of building works and prior to the issue of an occupation certificate.	Prior to the commencement of operations of Project components.	To clarify the timing specified in the Development Consent and allow for the staging of Project operation.

The proposed modifications to stage the implementation of environmental management measures, would not require any changes to the content of management plans or monitoring programmes required under the Development Consent. The environmental management measures required for the modified Project would be the same as those for the approved Project.

7 CONCLUSION

This SEE supports an application lodged by IVP with DIPNR to modify the Project Development Consent under Section 96(2) of the EP&A Act.

Environmental reviews have been conducted to evaluate the Project modification proposal and the conclusions are as follows:

- From an operational noise perspective, a specialist review has concluded that the proposed modification to the Quarry design would result in no additional significant noise impacts beyond those assessed in the EIS.
- From an air quality perspective, a specialist review has concluded as a result of the proposed Project modifications at the MPF and Quarry, no residences are likely to experience dust deposition or gaseous emission concentration levels above the current DEC assessment criteria.
- From a traffic perspective, a specialist review has concluded that the management measures detailed in the EIS and Development Consent would remain unchanged and applicable to the modified Project.
- The proposed modification would involve an approximate additional 53 ha of land disturbance at the Quarry. IVP is required to implement management procedures for stripping, stockpiling and re-using soil resources in its progressive rehabilitation programme as part of the original Project Development Consent.
- The additional material to be placed on the Quarry waste emplacement would have similar geological and geochemical characteristics to the waste rock generated by the approved Project, and is therefore not predicted to alter the potential impacts described in the EIS.
- Due to the screening effect of local ridgelines and vegetation screens, the number of publicly accessible roads and privately owned residences from which views of the Quarry would be available would remain substantially the same as those described in the EIS. For the privately owned residences which do have views of the Quarry, the visual impact of the proposed modification is predicted to be substantially the same as documented in the EIS due to the distances involved, screening effects of the local topography, and implementation of management measures required by the Development Consent.
- From a flora perspective, through the application of Eight Part Tests of Significance, no threatened flora species, populations, ecological communities, or their habitats would be significantly affected by the proposal to the extent that the viability of a species, population, ecological community, or their habitats would be undermined.
- From a fauna perspective, through the application of Eight Part Tests of Significance, no threatened fauna species, populations, ecological communities, or their habitats would be significantly affected by the proposal to the extent of undermining the viability of a species, population, ecological community, or their habitats.
- Potential surface water and groundwater impacts are expected to be similar to those predicted for the approved Project.
- Based on the findings of previous surveys and assessments of European heritage in the Project area for EIS, no significant European heritage sites have been identified within the modified Project areas.

- Based on the findings of the archaeological surveys conducted in 2000 for the EIS within the Project area, the likelihood of identifying significant Aboriginal sites in the vicinity of the modified footprint of the Quarry is considered to be remote. IVP would obtain relevant permits and consents pursuant to the *National Parks and Wildlife Act 1979* prior to any land disturbance.
- It is considered that the proposed modifications to the Project design would not increase the existing potential risks identified in the risk assessment study and PHA for the EIS.

The environmental reviews conducted for this SEE provide justification for the conclusion that the modified Project would remain substantially the same development as for the original Project Development Consent (ie. the application of Section 96(2) of the EP&A Act is justified).

The reviews have also demonstrated that with the implementation of the environmental monitoring and management programmes required by the Development Consent, and the proposed modifications (staging the implementation of management measures) there would be minimal additional environmental impacts as a result of the proposal.

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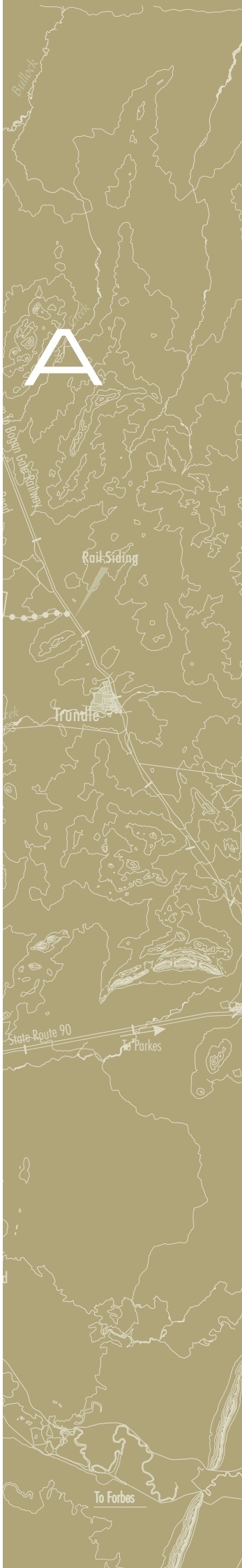
Appendix A

Syerston Nickel Cobalt Project
Development Consent



ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

INTEGRATED STATE SIGNIFICANT DEVELOPMENT

DETERMINATION OF DEVELOPMENT APPLICATION PURSUANT TO SECTIONS 76(A)9 & 80

I, the Minister for Urban Affairs and Planning, pursuant to Sections 76(A)9 & 80 of the Environmental Planning and Assessment Act, 1979 ("the Act") determine the development application ("the application") referred to in Schedule 1 by granting consent to the application subject to the conditions set out in Schedule 2.

The reasons for the imposition of the conditions are to:

(i) minimise the adverse impact the development may cause through water, noise and air pollution, and disturbance to archaeological sites, flora and fauna and the visual environment;

(ii) provide for environmental monitoring and reporting; and

(iii) set requirements for project infrastructure provision.

Andrew Refshauge MP
Minister for Urban Affairs and Planning,

SYDNEY, 23 MAY 2001 **FILE NO.S98/01078**

Schedule 1

Application made by:	Black Range Minerals Limited. ('the Applicant").
To:	The Minister for Urban Affairs and Planning ("the Minister").
In respect of:	Land described in Appendix 1.
For the following:	Establishment and operation of the: • Nickel cobalt mine and processing facility; • Limestone quarry and processing operations; • Rail loading and unloading facility; • Natural gas pipeline, two borefields, and two water supply pipelines; • Associated transport and infrastructure.
BCA Classifications	Class 3 Construction camp

Class 5	Mine, administration, construction, processing, contractor, engineering and control room offices.
Class 7	Carpark(s)
Class 8	Laboratory. Process plant.
Class 9	Mine medical centre.
Class 10	Process plant, workshop(s), store(s), change house(s), water and process storage dam(s), fuel storage(s), pump house(s) and compound(s), sore(s), communication tower(s), explosive storage(s).

Note:

1) To ascertain the date upon which the consent becomes effective, refer to Section 83 of the Act.
2) To ascertain the date upon which the consent is liable to lapse, refer to Section 95 of the Act.
3) Section 97 of the Act confers on an Applicant who is dissatisfied with the determination of a consent authority a right of appeal to the Land and Environment Court exercisable within 12 months after receipt of the notice.

APPENDIX 1
LAND SUBJECT TO DEVELOPMENT APPLICATION FOR THE SYERSTON NICKEL COBALT PROJECT

Site	Land Description
Mine and Processing Facility	Lots 4, 5, 6, 7, 8, 9, 10 DP 754021 Part Lot 13 DP 754021
Fifield Bypass Road	Lots 8 and 28 DP 752111 Crown Road
Limestone Quarry	Lots 11, 12 and 24 DP 752089 Lot 352 DP 629402 Lot 281 DP 610057
Rail Siding	Part Lot 39 DP 752117
Gas Pipeline	Lots 10 and 17 DP 752086 Lots 4, 5, 27 and 28 DP 752087 Lots 1 and 2 DP 580284
Water bores/pipelines	Lot 5 and 6 DP 598735 Lots 85, 95, 96, 99, and 100 DP 752106

And all Crown road reserves, crown land, road reserves, main roads, rail corridors, and travelling stock routes within the development application area.

SCHEDULE 2

Development Consent for the Syerston Nickel Cobalt Mine and Associated Infrastructure

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DEFINITIONS

The Act	Environmental Planning and Assessment Act 1979, as amended.
AEMR	Annual Environmental Management Report
Commencement of construction	Commencement of any site works including clearing, trenching, earthworks, development of borrow pits and tailings dams, road works, and intersections; or location of earthmoving plant, buildings (portable or fixed) on the Project site; or commencement of construction of the limestone processing facility.; the construction of gas and water pipelines from the Moomba to Sydney natural gas pipeline, and borefields respectively.
Commencement of operations	Commencement of the removal of soil, overburden, waste rock for ore/limestone recovery; or operation of the nickel/cobalt processing facility or limestone processing facility respectively , including commissioning; the supply of gas and water from the Moomba to Sydney natural gas pipeline, and borefields, respectively; or transport of material off the Project site.
CCC	Community Consultative Committee
DA	Development Application
The Director-General	Director-General of the Department of Urban Affairs and Planning or delegate.
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management Strategy
EPA Licence	means a licence under the Protection of the Environment Operations Act 1997.
GTA	GTA under the EP& A Act

Mine site haulage route	Part of Fifield to Wilmatha Road (SR34), Fifield Bypass, and Fifield to Trundle Road (SR64) as shown in Figure B1-1 of the EIS.
IESCP	Integrated Erosion and Sediment Control Plan
$L_{A10(15\ minute)}$	is the sound pressure level that is exceeded for 10% of the time when measured over a 15 minute period.
LA_{eq}	Equivalent continuous sound pressure level with "A" weighted scale.
Limestone Processing facility	Crushing and screening operations for the preparation of limestone at the limestone quarry prior to use in the nickel/cobalt processing facility, exclusive of all quarrying activities.
Limestone products	Crushed and screened limestone produced at the limestone quarry for use at the nickel/cobalt processing facility.
MPG	Manufacturer's Performance Guarantee
Nickel/cobalt processing facility	Processes required for and related to the conversion of nickel/cobalt ore to saleable product(s), exclusive of all mining activity.
Premises	The premises includes the area defined by MLA 113, 132, 139 140, and 141, and as shown in Figure ES-3 of the EIS
Processing	the act of physically or chemically altering a material, exclusive of all mining activities.
Project Components	(1) Nickel cobalt mine and processing facility, (2) Limestone quarry and processing operation, (3) Rail loading and unloading facility (4) Natural gas pipeline (5) Borefields and water pipeline (6) Associated transport and infrastructure
Project Site	Land described in Appendix 1 which comprise the project components in the Forbes, Lachlan and Parkes Local Government Areas
Saleable Product(s)	All materials produced at the nickel/cobalt processing facility for sale, including nickel and cobalt metals, nickel and cobalt sulphides and cobalt hydroxide, and limestone for use at the nickel/cobalt processing facility.
TSF	Tailings storage facility
TSP	Total Suspended Particulates.
Works	Any structure, earthwork, plant or equipment authorised under an approval to be granted by the DLWC, as defined in section 5 and 105 of the *Water Act 1912*.

GOVERNMENT AUTHORITIES

DSC	Dam Safety Committee
DLWC	Department of Land and Water Conservation
DMR	Department of Mineral Resources
The Department	the Department of Urban Affairs and Planning
EPA	Environment Protection Authority

FSC	Forbes Shire Council
LSC	Lachlan Shire Council
Ministry of Energy	The Ministry of Energy and Utilities
PSC	Parkes Shire Council
NPWS	National Parks and Wildlife Service
NSW Agriculture	New South Wales Agriculture
RTA	Roads and Traffic Authority

1. General

There is an obligation on the Applicant to prevent and minimise harm to the environment throughout the life of the project. The Applicant shall take all practicable measures to prevent or minimise harm that may result from the construction, operation and rehabilitation on the subject site.

1.1 Adherence to Terms of DA, EIS, etc.

(a) Development shall be carried out generally in accordance with:

(i) DA No. 374-11-00; and
(ii) the Environmental Impact Statement prepared by Resource Strategies Pty Ltd. and dated October 2000.
(iii) additional noise, air quality and water management information requested by the EPA and supplied by Resource Strategies Pty Ltd with a letter dated 4 December 2000, and additional groundwater management information supplied by Black Range Minerals Limited with a letter on 12 January 2001.

unless otherwise modified by the Conditions in this Consent.

(b) If at any time, the Director-General is made aware of the occurrence of any environmental impacts from the Project Site that pose serious environmental and/or amenity concerns, due to the failure of environmental measures required by the Conditions of Consent to ameliorate the impacts, the Director-General may order the Applicant to cease the activities causing those impacts until those concerns have been addressed to the satisfaction of the Director-General.

(c) If any licence conditions are breached the Applicant shall comply with any modification to the work as specified by the relevant agency.

1.2 Period of Approval/Project Commencement

(a) The approval for the Project is for a period of 21 years from the date of granting a mining lease.

(b) At least one month prior to the commencement of construction and operation of project components respectively, or within such period as agreed by the Director-General, the Applicant shall submit for the approval of the Director-General a Compliance Report detailing compliance with all relevant conditions that apply prior to the commencement of construction and operations respectively.

(c) The date of commencement of construction and operation of the project components is to be notified in writing to the Director-General and LSC, PSC and

FSC at least two weeks prior to commencement of construction and operations of project components, respectively.

(d) The Applicant shall ensure that all contractors and sub-contractors are aware of, and comply with, the Conditions of this Consent.

1.3 Dispute Resolution

In the event that the Applicant, LSC, PSC or FSC or a Government authority other than the Department, cannot agree on the specification or requirements applicable under this Consent, the matter shall be referred by either party to the Director-General whose determination of the disagreement shall be final and binding on the parties.

1.4 Security Deposits and Bonds

Security deposits and bonds will be paid as required by the DMR under mining lease approval conditions.

2. Mine Management

2.1 Mine Management Plan, Operations and Methods

(a) No mining/quarrying operations shall occur until the Applicant has submitted and had accepted by the DMR, a Mining Operations Plan (MOP) for the mine and quarry respectively in accordance with current guide lines issued by DMR. The Plan covers mining operations for a period of up to seven years.

(b) The MOP shall:
- (i) be prepared in accordance with DMR Guidelines for the Preparation of Mining Operations Plans (Document 08060002.GUI or its most recent equivalent) and in consultation with DMR;
- (ii) demonstrate consistency with the conditions of this consent and any other statutory approvals;
- (iii) demonstrate consistency with the Environmental Management Plans for the project site;
- (iv) provide the basis for implementing operations, environmental management, and ongoing monitoring; and
- (v) identify a schedule of development for the project for the period covered by the plan and include:
  - the area proposed to be impacted by mining activity and resource recovery mining methods and remediation measures
  - areas of environmental, heritage or archaeological sensitivity and mechanisms for appropriately minimising impact
  - water management, and
  - proposals to appropriately minimise surface impacts.

(c) In preparing the Mine Operations Plan, the Applicant shall consult with affected service authorities and make arrangements satisfactory to those authorities for the protection or relocation of those services.

(d) A copy of the MOP, excluding commercial in confidence information, shall be forwarded to LSC, PSC, FSC and the Director-General within 14 days of acceptance by DMR.

2.2 Limits on Production

(a) The autoclave feed rate of nickel/cobalt ore shall not exceed 2.3 million tonnes of ore per annum unless otherwise agreed by the Director-General.

(b) Production of limestone from the quarry shall not exceed 600,000 tonnes per annum unless otherwise agreed by the Director-General. The limestone product is only to be quarried for use at the nickel/cobalt processing facility.

(c) The Nickel / Cobalt Processing Facility shall not process extractive materials, being nickel/ cobalt ore or limestone, from any source other than those the subject of this consent unless otherwise agreed by the Director-General.

(d) The Nickel/ Cobalt Processing Facility shall not exceed the production levels specified in the Table 1 unless otherwise agreed by the Director-General.

Table 1. Maximum production levels for the Nickel Cobalt processing facility

Product	Annual Production (tonnes per annum)
Total nickel and Cobalt metal	25,000
Total nickel and cobalt sulphides	42,000
Cobalt hydroxide	11,000

3. Land and Site Environmental Management

3.1 Appointment of Environmental Officer

(a) The Applicant shall engage an Environmental Officer(s) for the life of the Project, whose appointment is to receive prior approval by the Director-General. The Officer(s) will:
   (i) be responsible for the preparation of the environmental management plans (refer Condition 3.2);
   (ii) be responsible for considering and advising on matters specified in the conditions of this consent and compliance with such matters;
   (iii) be responsible for receiving and responding to complaints in accordance with Condition 10.2(a);
   (iv) facilitate an induction and training program for all persons involved in construction, operations and remedial activities; and
   (v) have the authority and independence to require reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts and failing the effectiveness of such steps, to stop work immediately if an adverse impact on the environment is likely to occur.

(b) The Applicant shall notify the Director-General, DMR,NPWS, EPA, DLWC, LSC, PSC, FSC and the CCC of the name and contact details of the Environmental Officer(s) upon engagement and any changes to that appointment.

3.2 Environmental Management Strategies and Plans

(a) The Applicant shall prepare an Environmental Management Strategy (EMS) providing a strategic context for the environmental management plans for the project components [refer condition 3.2(d)]. The Environmental Management Strategy shall be prepared in consultation with the relevant authorities and the CCC (refer condition 10.1) and to the satisfaction of the Director-General, prior to commencement of construction of the project components. The Strategy shall be

provided to the Director-General no later than the time the first Environmental Plan (EMP) under sub-clause (d) below is submitted.

(b) The Environmental Management Strategy shall include, but not be limited to:

i. statutory and other obligations which the Applicant is required to fulfil during construction, commissioning and operation of the project components, including all approvals and consultations and agreements required from authorities and other stakeholders, and key legislation and policies;
ii. definition of the role, responsibility, authority, accountability and reporting of personnel relevant to environmental management, including the Environmental Officer(s);
iii. during construction, operation and decommissioning of the project components, for each of the key environmental elements for which management plans are required under this consent;
iv. overall ecological and community objectives for the project, and a strategy for the restoration and management of the areas affected by operations, including elements such as creek lines and drainage channels, within the context of those objectives;
v. identification of cumulative environmental impacts and procedures for dealing with these at each stage of the development;
vi. steps to be taken to ensure that all approvals, plans, and procedures are being complied with;
vii. processes for conflict resolution in relation to the environmental management of the project; and
viii. documentation of the results of consultations undertaken in the development of the Environmental Management Strategy.

(c) The Applicant shall make copies of the Environmental Management Strategy available to LSC, PSC, FSC, DLWC, NPWS, DMR, EPA and CCC within fourteen days of approval by the Director-General.

(d) The Applicant shall prepare the following Environmental Management Plans. These plans must be consistent with other plans prepared for other stakeholders.

i. Archaeology and cultural management plan (refer Condition 3.3(a))
ii. Flora and fauna management plan (refer Condition 3.4(a))
iii. Integrated erosion and sediment control plan (refer Condition 4.2(b)
iv. Soil stripping management plan (refer Condition 3.5(f))
v. Landscape and rehabilitation management plan (refer Condition 3.7)
vi. Bushfire management plan (refer Condition 3.8)
vii. Land management plan (refer Condition 3.9.2(a))
viii. Site security and crime management plan(refer condition 3.10)
ix. Energy management plan (refer to condition 3.11)
x. Water management plan (refer Condition 4.1)
xi. Borefields environmental management plan (refer Condition 4.1.1)
xii. Bore impact mitigation plan (4.1.1(l))
xiii. Waste Management plan (refer conditions 5.4.1).
xiv. Dust management plan (refer Condition 6.1.1)
xv. Gaseous emissions management plan (refer condition 6.1.4)
xvi. Blasting/vibration management plan(refer Condition 6.2.3(a))
xvii. Noise management plan(refer Condition 6.3.3)
xviii. Construction noise management plan (refer Condition 6.3.3 (b))
xix. Traffic noise management plan(refer Condition 6.3.3(c))
xx. Traffic Code of Conduct (refer Condition 7.1(a))

xxi. Stock Crossing Management Plan (refer Condition 7.8)
xxii. Rail Siding environmental management plan (refer to Condition 7.10)

(e) The management plans are to be revised, and updated as necessary, at least every 5 years or otherwise as directed by the Director-General in consultation with the relevant government agencies. They will reflect changing environmental requirements or changes in technology/operational practices. Changes shall be made and approved in the same manner as the initial environmental management plan. The plans shall also be made publicly available at LSC, PSC and FSC within fourteen (14) days of approval of the relevant government authority.

3.3 Heritage Assessment, Management and Monitoring

Assessment and Management

The Applicant shall prior to the commencement of construction;

(a) prepare an Archaeology and Cultural Management Plan for the nickel and cobalt mine and limestone quarry sites to address Aboriginal cultural and European heritage issues. The Plan shall be prepared in consultation with the Condobolin Local Aboriginal Land Council, Wiradjuri Branch of the NSW Aboriginal Land Council, DMR, NPWS and NSW Heritage, and to the satisfaction of the Director-General. The Plan shall include but not be limited to:

(i) identification and management of all areas of conservation within the mine/quarry areas,
(ii) details of protective measures for the following sites as identified in the EIS :
- Syerston 2 – open scatter and possible knapping floor
- Syerston 3 – isolated flake of brown/red vitreous volcanic material
- Scarred tree beside the Fifield to Wilmatha Road;

(iii). management procedures for the conservation of pastoral out station on the western boundary of the mine site and illustrated in Figure 5 in Appendix M of the EIS. This site should be retained in the new development if practicable and feasible. If this site cannot be retained in part or in total, those areas and structures impacted by the development should be recorded by plan, text and photographs before disturbance, and this information, lodged in a public repository.
(iv) identification of any future salvage, excavation and monitoring of any heritage/archaeological sites within the DA area, prior to and during development;
(v). details of consultation undertaken with NPWS, Condobolin Local Aboriginal Land Council and the Wiradjuri Branch of the NSW Aboriginal Land Council in the preparation of this Plan.

(b). [1]The Condobolin Local Aboriginal Council or the Wiradjuri Branch of the NSW Aboriginal land Council be invited to collect the artefacts identified as Syerston 1 in the EIS prior to the commencing of construction of the mine/quarry.

(c). If, during the course of construction of any project components , the Applicant becomes aware of any heritage or archaeological material not previously identified, all work likely to affect the material shall cease immediately and the relevant authorities consulted about an appropriate course of action prior to recommencement of work.

[1] NPWS GTAs

The relevant authorities may include NPWS, the NSW Heritage Office, and the relevant the local Aboriginal community. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work in the relevant area.

(d). The Applicant is to consult regularly with the Wiradjuri Branch of the NSW Aboriginal Land Council using consultation principles and strategies consistent with those outlined in the *"Guidelines for best practice community consultation in the NSW Mining and Extractive Industries"*. The results of these consultations shall be documented in the AEMR.

Notes No Aboriginal archaeological sites that have been identified, shall be destroyed without the approval of the Director-General of NPWS, under section 90 of the *National Parks and Wildlife Act 1974*, prior to any disturbance of the identified sites by mining operations.

Monitoring

(e). The Applicant shall monitor the effectiveness of the measures outlined in the Archaeology and Cultural Management Plan [Condition 3.3(a)]. A summary of monitoring results shall be included in the AEMR.

3.4 Flora and Fauna Assessment, Management and Monitoring

Assessment and Management

(a) The Applicant shall prior to construction prepare and implement a Flora and Fauna Management Plan for the management of flora and fauna issues for the nickel and cobalt mine and limestone quarry area. The Plan shall be prepared in consultation with NPWS, DMR and to the satisfaction of the Director-General. The Plan shall be prepared by an appropriately qualified and experienced ecologist to the satisfaction of the Director-General. The ecologist shall be responsible for providing advice to minimise potential impacts upon threatened and protected fauna species that may utilise the sites and to provide expert advice on the regeneration and reconstruction of flora and fauna habitat on mined/quarried areas.

The Plan shall include but not be limited to:

1. Preservation of vegetation

i. Details of areas of existing vegetation which will be preserved where possible. Specific attention must be paid to Box woodland remnants on the mine site which do not need to be disturbed for development of the Project. These areas should be managed to maintain and enhance the biodiversity of the mine site area and region.
ii. Measures for the protection of individual trees or areas so as to ensure areas not to be disturbed are to be preserved and protected where possible to enhance succession to the rehabilitated areas. This could involve reducing the level of grazing, or fencing areas out from grazing, to allow them to regenerate.
iii. Management procedures to ensure that land clearance and soil/mine waste stripping is progressive and in accordance with the soil stripping plan.
iv. Development of a protocol for identifying and managing significant impacts on any threatened flora species not identified in the EIS, during development through construction or operation of the mine/quarry.
v. details of the methods for salvaging and relocating hollow bearing limbs/stags, that have been identified, to areas regenerated with native vegetation or

existing areas of native vegetation, to augment and reconstruct faunal habitat. The limbs and trunks are not to be burnt.

vi. Details of a weed control programme coordinated with surrounding landholder programmes.

2.Protection of Fauna and habitat

(i) details of pre-clearance inspections, including the identification and inspection of trees containing tree hollows, stags and roosting bats prior to clearing of any vegetation. This shall be undertaken by an appropriately qualified and experienced ecologist for the presence of any threatened fauna utilising those hollows;

(ii) a description of appropriate methods for the removal / translocation of any threatened species to suitable areas at the discretion of the ecologist, should any threatened fauna be detected during any clearing;

(iii) provision of a number of artificial roosts (bat houses) at strategic locations in the mine site and surrounds as a strategy to replace any roosts that may be lost.

(iv) guidelines which in recognition of the habitat value of extant areas of native vegetation, specify that the removal of native vegetation is to be undertaken where possible, in late autumn or winter to minimise disturbance of potential breeding activities.

(v) Measures to ensure a clean rubbish free environment is maintained to reduce the potential for an increase in the population or concentration of feral animals.

(vi) provisions to allow for the daily inspection of the tailings storage facility, evaporation ponds and surge dam as a precautionary measure during the course of normal daily maintenance inspections. If the storages become a focus for avifauna, additional hazing techniques should be considered to minimise bird usage of the storages.

(vii) development of a protocol for identifying and managing significant impacts on any threatened fauna species not identified in the EIS, during development through construction or operation of the mine/quarry; particularly the :

- Yellow-bellied Sheathtail Bat
- Little Pied Bat
- Greater Long eared bat
- Barking Owl
- Pied Honey eater
- Major Mitchell's Cockatoo
- Superb Parrot

(viii) stipulation of speed limits to be imposed on vehicles using roads and tracks on the mine/quarry to reduce the potential for vehicle strike

(ix) details of feral animal control program and site management strategies as coordinated with adjacent land holders.

3. Reconstruction of native bushland – Post mining fauna habitat

(i) the establishment of long-term post-mining and post-quarrying land use objectives for the site;

(ii) details of the principal goal to replace each native community type that currently exists on site that will be removed or reduced in area, with communities of same or similar dominant species composition,

(iii) measures to maximise opportunities for the creation of habitat continuos with existing preserved woodland;
(iv) scheduling of the rehabilitation of mine site/quarry landforms so that such mitigative measures are progressive and conducted in accordance with approved plans
(v) strategies for the preparation of the site for habitat rehabilitation, as part of the revegetation plan, including the exclusion of stock feeding on bushland reconstruction areas;
(vi) methods of revegetation; including specifications that the stability of newly prepared landforms prior to the establishment of long term vegetation is to be protected via the construction of moisture-retaining passive drainage systems, water holding structures and where appropriate, the use of authorised hybrid cover crops to provide initial erosion protection.
(vii) details of the habitat monitoring program (refer to subclause (f) below).

(b) The Applicant shall revegetate a minimum of 2 ha for every 1 ha of native vegetation cleared by the mine/quarry and in accordance with clause (ii) providing for the reconstruction of native bushland. The revegetated area shall be protected from grazing by native fauna and domestic stock. The revegetation program shall also aim to extend and re-establish existing native vegetation on and adjacent to the site. Where possible, revegetated landforms are to form an expansion of and be continuos with existing woodland areas.

(c) All natural drainage patterns shall be re-established as far as practical.

(d) The Applicant shall implement strategies to manage the impact of surface water management, erosion and sediment control measures, on flora and fauna, including the impact of heavy machinery.

(e) As well as the requirements under subclause (g), the efforts and progress of the Flora and Fauna Management Plan shall be documented in the Annual Environmental Management Report.

Monitoring

(f) The regeneration works shall be monitored by an appropriately qualified and experienced ecologist approved by the Director-General. The results of the monitoring and the effectiveness of the reafforestation shall be publicly reported annually as part of the Annual Environmental Management Report.

(g) The Applicant shall prepare a detailed monitoring program of habitat areas on land within the development application area, during the development and for a period after the completion of the development to be determined by the Director-General in consultation with NPWS. The monitoring program shall be included in the Flora and Fauna Management Plan (Condition 3.4(a)) and a summary of the results shall be provided in the AEMR. The program shall:
(i) monitor impacts attributable to the development and include monitoring of the success of any restoration or reconstruction works. The Applicant shall carry out any further works required by the Director-General as a result of the monitoring;
(ii) establish an ongoing monitoring program of the existing and proposed revegetated areas to assess their floristics and structure and to propose contingency measures for improvements to revegetation if required; and
(iii) establish an ongoing monitoring program of fauna species diversity and abundance and the effectiveness of reconstructed ecosystems in providing

fauna habitat and contingency measures should impacts be identified as occurring.

(h) The information obtained from the monitoring shall be used to guide future revegetation efforts on the mine/quarry site.

3.5. Soil Management

(a) [2]All works involving soil or vegetation disturbance are to be undertaken with adequate measures to prevent soil erosion and the entry of sediments into any river, lake, waterbody and wetland or groundwater system.

(b) The Applicant shall, in consultation with DLWC, ensure that all soil and/or vegetation material to be removed from the area of operation is disposed of on an appropriate site where it will not be swept back into watercourses.

(c) [3] The Applicant shall ensure that its operations are consistent with the EPA's operating conditions within the environment protection license for the premises to regulate stormwater and sediment. The operating conditions will be consistent with the IESCP required by Condition 4.2 and ensure that all relevant sections of the IESCP are appropriately implemented and that operations comply with any additional requirements stipulated by the EPA in its license.

(d) The Applicant shall also prepare a Soil Stripping Management Plan to the requirements of DMR and DLWC that shall include, but not be limited to:

(i) [4]Methods for the management and conservation of topsoil, excavated and stockpiled from areas to be disturbed, for later use in progressive rehabilitation. The management of topsoil stockpiles, their erosion protection and long term viability (where immediate use is not possible) is to be carried out to the satisfaction of the DLWC and DMR;

(ii) A program for reporting on the effectiveness of the soil stripping methods and performance against objectives contained in the soil stripping management plan, and EIS.

3.6 Site Rehabilitation and Management

(a) The Applicant shall carry out rehabilitation of all nickel and cobalt mine and limestone quarry areas in accordance with the requirements of any Mining Lease granted by the Minister for Mineral Resources and ensure the progressive rehabilitation of the area is also to the satisfaction of DLWC.

(b) Immediately upon mining/quarry finishing on any disturbed area, the site must be restored to an environmentally stable, safe and revegetated condition with minimal visual impacts.

3.7 Visual Amenity and Landscaping

[2] DLWC GTAs
[3] EPA GTAs

[4] DLWC GTAs

The Applicant shall, prior to the commencement of operations on the nickel and cobalt mine and limestone quarry sites, submit for the approval of the Director-General, in consultation with LSC and PSC, a detailed Landscape and Revegetation Management Plan, prepared by a suitably qualified person, detailing measures to minimise the impacts of the development on local visual amenity and to provide details of, and management procedures for, landscaping the development. The plan shall include, but not be limited to:

i. details of the phasing of construction, design, and rehabilitation materials to be used on the waste emplacement areas, for the purposes of maintaining satisfactory visual amenity, ecological functioning, and habitat provision;

ii. details of the establishment of vegetation and the progressive rehabilitation of the mine/quarry operations, waste emplacement areas, and associated works including details of all landscaping to be undertaken including flora species, location of grassed areas, garden beds and other vegetated areas, and mature height and width measurements of all flora species;

iii. use of indigenous species;

iv. details of the visual appearance of all buildings, structures, facilities or works (including paint colours, architectural features and finishes of all external surfaces). Buildings and structures shall be designed and constructed so as to blend as far as possible with the surrounding landscape;

v. measures to prevent vehicle encroachment onto landscaped areas

vi. a review of final land use options including the use of void water on the nickel and cobalt mine and limestone quarry sites;

vii. details, specifications and staged work programs to be undertaken, including a maintenance program of all landscape works, building materials and cladding; and

viii. details of annual performance outcomes in relation to the implementation of the plan and a monitoring program to ensure the development is maintained to a standard comparable to the intended and designed appearance of the development. Details shall be provided in the AEMR.

3.8 Bushfire and other Fire Controls

The Applicant shall:

a) prior to commencement of operations prepare a Bushfire Management Plan for all its holdings contained in the DA area, to the satisfaction of, and as relevant, LSC,PSC and FSC, and

b) provide adequate fire protection for the project components, including at least one emergency fire fighting unit on the mine site.

c) provide that all workers at the project site undergo training in bushfire prevention and management.

3.9 Land Management

3.9.1 Land Management Plan

(a) The Applicant shall, prior to commencement of operation of the project components prepare a Land Management Plan for the project site in

consultation with DLWC, LSC, PSC and FSC, DMR and to the satisfaction of the Director-General, to provide for proper land management. The plan shall include, but not be limited to:

i. pastures and remnant vegetation management;

ii. prevention and rehabilitation of land degradation;

iii. eradication of vermin and noxious weeds as required by the Rural Lands Protection Authority, the Prickly Pear Authority and other relevant authorities; and,

iv. feral animal control.

(b) The destruction of trees or native vegetation is to be restricted to the minimum necessary to complete the works. Any clearance must be restricted to the areas occupied by mine /quarry activities, processing plant, waste emplacement, pipelines and those areas necessary for fire control.

3.9.2 Adjoining Properties

The Applicant shall regularly consult with adjoining property owners to ensure property management issues including maintenance of common fences, site weed control measures and bushfire management are coordinated. Details of consultation are to be reported in the AEMR.

3.10 Site Security and Crime Management

Site Security and Crime Management Plan

(a) Prior to the commencement of construction of project components, the Applicant shall prepare a Site Security and Crime Management Plan detailing measures to prevent unauthorised access to the Project and minimise the potential for crime at, and in the vicinity of the Project. The Plan shall be updated to reflect process and management changes at the Project or as required by the Director-General. The Plan shall address the requirements of LSC, FSC, and PSC. The Plan shall include, but not necessarily be limited to:

i) details of fencing and security arrangements for all project components to prevent unauthorised access of humans or livestock to any project components;
ii) policies and procedures for addressing security issues;
iii) specific design features of project components intended to discourage the incidence of crime at, and along the perimeter of, each project component;
iv) lighting considerations, including light intensity, direction and hours of operation at, and along the perimeter of, each project component, with the aim of minimising areas that may encourage crime;
v) policies and procedures for the management and removal of graffiti and amelioration of vandalism, should it occur at, and along the perimeter of, each project component; and
vi) policies and procedures for the management and removal of illegal or inappropriate bill-posting and illegally dumped materials, should it occur at, and along the perimeter of, each project component.

3.11 Energy Management

a) The Applicant shall prepare an Energy Management Plan detailing measures to minimise and to efficiently use energy at the Project. The Plan shall be updated to

reflect process and management changes at the Project or as required by the Director-General. The Plan shall include, but not necessarily be limited to:

i) details of the design features of all buildings aimed at utilising natural ventilation and lighting, hence reducing energy consumption for heating, cooling and lighting;
ii) details of procedures and methods for monitoring energy consumption by the development;
iii) management procedures and policies for the minimisation of energy consumption in offices and internal working environments;
iv) a protocol for monitoring the efficiency of the co-generation plant and heat recovery steam generators, including procedures for maintenance of these systems;
v) a protocol for monitoring heat exchanger efficiency and fouling, including procedures for cleaning and maintenance of all heat exchangers;
vi) a protocol for monitoring the efficiency of pumps and all other electrically-driven process equipment, including procedures for maintenance of these items;
vii) consideration of the insulation requirements of all pipes and vessels containing process fluids other than at ambient temperatures, and procedures for the maintenance of such insulation;
viii) consideration of the insulation/ refractory requirements of the sulphuric acid plant furnace, and procedures for the maintenance of such insulation/ refractory material;
ix) consideration of electrowinning cell parameters, including solution concentration/ quality, solution temperature and electrode cleanliness, that may affect energy consumption through the cells, and procedures for addressing such issues.

4. WATER MANAGEMENT AND MONITORING

4.1 Surface & Ground Water Management Plans

a. Prior to the commencement of construction, the Applicant shall prepare a Water Management Plan for the nickel and cobalt mine and limestone quarry sites in consultation with DLWC and DMR and to the satisfaction of the Director-General and DLWC, which shall include, but not be limited to, the following matters:

i. management of the quality and quantity of surface and groundwater within the areas covered by the water management plan, including details of measures to ensure that materials associated with the Nickel/ Cobalt Processing Facility, but not including tailings (refer Condition 5.3), do not permeate the soil below the Facility and affect groundwater quality;
ii. management of stormwater and general surface runoff diversion to ensure separate and effective management of clean and dirty water and measures to segregate and treat, where appropriate, drainage water of varying qualities;
iii. details and results of consultation with local landholders;
iv. [5]measures to ensure that all surface water discharges from the sites to the Lachlan catchment do not limit the ability of receiving waters to meet relevant water quality objectives as described in the *Water Quality and River Flow Interim Environmental Objectives – Guidelines for River, Groundwater and Water Management Committees – Lachlan River Catchment;*

[5] EPA GTAs

v. [6]Managing the diversion channels to ensure that discharges from the mine site do not affect the ability of downstream waters to meet water quality objectives. Consideration should be given to possible inputs to the channels including runoff and dust from haul roads, the reuse of contaminated process water for dust suppression and runoff and/or leaching of contaminated water from stockpiles into the diversion drains. Consideration should also be given to possible dissolved as well as suspended contaminants.

vi. measures to be implemented to protect or maintain the quality of surface water which existed prior to project operation.

vii. details of design and maintenance of all storages, diversions, transmission channels and sedimentation basins for the site

viii. measures for assessing water quality impacts of the operations above and below the mine/quarry area;

ix. projection of potential groundwater changes during operations (short term) and post-mining/quarrying (long term) with particular attention given to the effect of changes to groundwater quality;

x. contingency plans for managing adverse impacts of the development on surface and groundwater quality/quantity, and an outline of source of potential alternate water supplies to landowners in the event of adverse impacts.

xi. a program for reporting on the effectiveness of the water management systems and performance against objectives contained in the approved site water management plan, and EIS,

xii. procedures and protocols for the beneficial reuse of water from the mine/quarry component of the Project, subject to EPA requirements and/ or approval;

xiii. water management to and from the tailings dam, evaporation and surge dams

(b). The Applicant must also include details of process water systems as follows :

i. details of major process water systems associated with the Nickel/ Cobalt Processing Facility, including water quality, water source and water treatment/ disposal routes;

ii. measures to be employed at the Nickel/ Cobalt Processing Facility to minimise the consumption of water, and reduce the consumption of water over time, where feasible;

iii. consideration of opportunities to integrate process water systems in the context of overall water cycle management;

iv. details of any process water system and discharge monitoring to be undertaken;

(c). [7.]Prior to construction of the processing facility, the Applicant must undertake such studies and investigations as necessary to determine the potential for tailings decant liquor to be beneficially reused within the premises. A report outlining these findings of the investigations and studies, including any recommendations must be submitted to the EPA prior to the construction of the processing facility.

(d). [8] The Applicant shall ensure that the operation complies with any requirement for waster water management as provided by the EPA. The EPA intends to include conditions within the environmental protection license for the premises to regulate waste water management. The conditions will be consistent with the sewage

[6] EPA GTAs

[7.] EPA GTAs

[8] EPA GTAs

management proposal required by condition 7.8.1 and will ensure that the sewage management proposal is appropriately implemented.

(e). **Tailings Water Reuse Program**

i. The occupier must reuse recovered tailings water where feasible and environmentally acceptable.

ii. The occupier must triennually, from commencement of operation of the processing facility, review the feasibility of increasing the reuse of recovered tailings water at the facility. The results of the review must be included in the Annual Environmental Management Report.

(f) [9]Due care is to be exercised by the Applicant to control leakage into any underground aquifer from all works

(g) In the event that the mine/quarry operationally adversely affects existing or licensed groundwater users, the Applicant shall, to the satisfaction of the DLWC, liaise with the users to provide a replacement water supply of similar quality and quantity to that affected, until such time as the development ceases to impact on the users' water supply.

(h) The Applicant must consult with the DLWC and DMR in relation to any dam construction proposed at the site.

(i)[10] The applicant must, prior to construction, obtain approval from the NSW Dams Safety Committee for the construction of all dams and embankments, which fall within the provisions of the Dams Safety Act.

(j)[11] All licensed works that are referrable under the NSW Dams Safety Act are to be constructed and maintained in accordance with the provisions of that Act.

4.1.1. Borefields Environmental Management Plan

(a) Prior to commencement of construction , the Applicant shall prepare a Borefields Environmental Management Plan (BEMP) to the satisfaction of the DLWC and Director-General, in consultation with FSC. The BEMP shall include but not be limited to:

(i) Erosion control measures during construction including details of temporary sediment and erosion control systems to be used during construction, topsoil management, and measures for the protection of watercourses.(refer Conditions 3.5 and 4.2)
(ii) Water management proposals during construction including separation of clean and dirty water runoff, and contingency plans for managing adverse impacts on surface and groundwater during construction.
(iii) Details of rehabilitation proposals for disturbed areas (refer Condition 3.6).
(iv) Proposals for on-going maintenance of fences and pastures and control of weeds, vermin, and feral animals.

[9] DLWC GTAs
[10] DLWC GTAS
[11] DLWC GTAS

(v) Measures for the control of dust during construction.
(vi) Details of landscaping and measures to blend surface structures with the surrounding landscape.
(vii) Preparation of a Flora and Fauna Management Plan for construction consistent with the requirements of Condition (3.4).
(viii) Preparation of an Archaeological and Cultural Management Plan for construction consistent with the requirements of Condition (3.3).
(ix) Evidence that the Applicant has consulted with affected service authorities and made arrangements satisfactory to those authorities for the protection or relocation of services affected or crossed by the pipelines.
(x) Measures for minimising noise during construction including:

- construction hours,
- compliance standards;
- community consultation;
- complaints handling monitoring/system;
- site contact person to follow up complaints;
- mitigation measures;
- the design/orientation of the proposed mitigation methods demonstrating best practice;
- contingency measures where noise complaints are received;
- monitoring methods and program.

(b) A copy of the BEMP shall be forwarded to FSC, LSC and PSC within 14 days of acceptance by the Director-General and DLWC.

(c) [12]The Applicant shall install to the satisfaction of the DLWC, in respect of location, form, type and construction, an appliance to measure the quantity of water extracted from the works. The appliance is to consist of a meter with automatic recording device, or such other means of measurement as may be approved by the DLWC. The appliance is to be maintained in good working order and condition. A record of all water extracted from the works is to be kept and supplied to the DLWC on request. The Applicant, when requested, must supply a test certificate as to the accuracy of the appliance furnished by the manufacturer, or by some person duly qualified to do so.

(d) [13]The Applicant shall furnish to the DLWC each July a return showing the meter reading of the hours pumped, the extraction rate and the volume of water pumped for each month during the previous twelve months.

(e) [14]Within two months after the works are completed, the DLWC shall be provided with an accurate plan of the location of the works and notified of the results of any pumping tests, water analysis, and other details as are specified in the approval from the DLWC.

(f) [15]The works shall be located at least:

- 200 metres from any boundary of the property, except when specifically authorised by DLWC.

[12] DLWC GTAs
[13] DLWC GTAs

[14] DLWC GTAs

[15] DLWC GTAs

- 400 metres from any irrigation bore on any adjoining property
- 500 metres from any town water supply bore
- 400 metres from any DLWC observation bore
- 40 metres from the nearest bank of any river or creek

(g) [16]The Applicant shall allow the DLWC or any person authorised by it, full access to the works, either during or after construction, for the purpose of carrying out inspections or tests of the works and its fittings. The Applicant is to carry out work or alterations deemed necessary by the DLWC for the protection or proper maintenance of the works, or the control of water extracted and for the protection of the quality and the prevention from pollution or contamination of sub-surface water.

(h) [17]All works shall be constructed and maintained to properly control the water extracted to prevent wastage or any reduction in quality of the sub-surface water. The DLWC may direct that any necessary repairs or alterations be undertaken to maintain the works in good working order.

(i) [18]If a bore ceases to be productively used, the DLWC must be notified and the aquifer must be sealed by a method acceptable to the DLWC.

(j) [19]Any water extracted by the works must not be discharged into any watercourse or groundwater if there is a likelihood of pollution of that water.

(k) [20]Upon issue of the bore licences the holder will be authorised to extract groundwater under the following provisions:

- The total volume extracted from the borefield must not exceed 6307 megalitres (= 200 litres/second) in any 12 month period commencing 1 July.
- The rate of extraction will be limited to 100 litres/second until the licence holder provides the DLWC with an approved Bore Impact Mitigation Plan (BIMP) that demonstrates, to the satisfaction of DLWC, how the impact on neighbouring bores will be ameliorated. Upon supply of an approved BIMP**,** the rate of extraction will be increased to 200 litres/second.
- The total allocation and rates of extraction will be subject to the applicant proving to the satisfaction of the DLWC that the borefield is capable of sustainably extracting the allocated volume.

(l) The BIMP is to be prepared by the Applicant in consultation with the DLWC, and to the satisfaction of DLWC and the Director-General, prior to commencement of borefield construction. The Plan is to include, but not necessarily be limited to:

- a detailed monitoring programme,
- trigger levels for commencement of action,
- remedial action, including, but not limited to, mitigation/compensatory measures generally providing for:
  - an outline of the process and consultations undertaken in preparing the Plan
  - bore/well reconditioning
  - alternative water supplies

[16] DLWC GTAs
[17] DLWC GTAs
[18] DLWC GTAs
[19] DLWC GTAs
[20] DLWC GTA

- additional energy costs incurred
- loss of land due to inability to irrigate from loss of water due to mine water extraction
- business development education and/or retraining
- private agreements between Applicant and landholders

- an independent dispute resolution process for proposed mitigation measures (refer also sub-clause (p) below), and
- groundwater sustainability.

(m) Prior to the finalisation of any agreement with respect to any mitigation measure proposed, the DLWC is to be consulted to ensure that its statutory and natural resource management responsibilities have been complied with.

(n) [21]If required by the Director-General, the Applicant shall fund an independent review of the draft BIMP to be undertaken by an independent expert appointed by the Director General in consultation with DLWC and Applicant. Any such review shall be considered by the Director General and DLWC prior to any approval of the BIMP.

(o) The Bore Licence is to be advertised in accordance with *Part 5* of the *Water Act, 1912*. As the BIMP is a condition of the Licence, copies are to be made available for comment at DLWC Offices and the Council Offices for the Forbes, Parkes and Lachlan Shires. The applicant is to provide notice of the advertising and a copy of the BIMP to landholders within a 10km radius of the Borefield.

(p) In any impact mitigation process undertaken under the BIMP, the quantity, quality and security of the water supplied as a result of that process is to be at least of the same standard as the water supplied from the bore before it was affected by the Applicant's borefield, or as otherwise agreed to by the landholder and the Applicant. In the case that agreement on proposed mitigation measures cannot be reached by the relevant parties, the independent dispute resolution process detailed in the BIMP is to be followed. The independent dispute resolution process is to consider and incorporate in the resulting decision any relevant DLWC statutory and natural resource management responsibility where relevant. The decision resulting from the independent dispute resolution process is final.

(q) In the event that the development adversely affects groundwater users the Applicant shall, to the satisfaction of the DLWC, initiate the provisions of the Borefield Impact Mitigation Plan.

4.1.2. Pollution of Waters

[22]Except as may be expressly provided by a license under the protection of the Environment Operations Act 1997 in relation to the development, section 120 of the Protection of the Environment Operations Act 1997 must be complied with in and in connection with the carrying out of the development.

4.2. Erosion and Sediment Control

[21] DLWC GTA

[22] EPA GTA

(a)[23] Prior to construction commencing, on the nickel and cobalt mine and limestone quarry the Applicant shall prepare an Integrated Erosion and Sediment Control Plan (IESCP) for the proposed operations in consultation with the DLWC,DMR and EPA, and to the satisfaction of DLWC, EPA and the Director-General. The Plan shall be prepared, approved, and implemented prior to the commencement of construction.

(b) The IESCP shall include but not be limited to:

i. details of temporary and permanent sediment and erosion control systems to be used during construction and operation, including for any earthworks specifically associated with rehabilitation and landscaping;

ii. details of the proposed measures to maximise the retrieval of topsoil for subsequent use in the rehabilitation program;

iii. consideration and management of erosion and sedimentation of surface watercourses/waterbodies, including all creeklines within the mine/quarry areas,

iv. [24.]measures that will be employed to minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction activities. The IESCP should be prepared in accordance with the requirements for such plans outlined in *Managing Urban Stormwater: Soils and Construction*, or its later version (available from the Department of Housing);

v. [25]measures to construct banks, channels and similar works to divert stormwater away from disturbed land surfaces such as mine workings, haul roads, overburden disposal areas, ore handling and waste water treatment facilities.. All diversion banks, channels and points of discharge must be constructed or stabilised so as to minimise erosion and scouring;

vi. [26]the construction of sedimentation dams to contain or treat surface water runoff from all mining areas and areas disturbed by mining including overburden dumps, topsoil stockpiles, unsealed roads and areas cleared of vegetation. Collection drains, diversion drains and culverts to control runoff from roads – must be directed to sediment control structures.

vii. a program for reporting on the effectiveness of the sediment and erosion control systems and performance against objectives contained in the approved IESCP and EIS;

viii. consideration of the DLWC "*Draft Guideline for Establishment of Stable Drainage Areas on Rehabilitated Minesites,*" or its latest version.

4.3 Surface And Groundwater Monitoring

4.3.1. Mine/quarry

The Applicant shall:

[23] EPA GTA
[24.] EPA GTA
[25] EPA GTA
[26] EPA GTA

(a) construct and/or locate surface and groundwater monitoring positions, as identified in the Water Management Plan (Condition 4.1) in consultation with DLWC and DMR, and to the satisfaction of the Director-General and the EPA, prior to the commencement of operations;

(b) [27]prepare a detailed monitoring program in respect of ground and surface water quality and quantity, including water in and around the nickel and cobalt mine and limestone quarry during the operations in consultation with DLWC, DMR and the EPA, and to the satisfaction of EPA and the Director-General. The monitoring program shall identify frequency of sampling, the parameters to be measured, the need for any contingency plans, the reporting procedure and determination of appropriate cut-off criteria for monitoring purposes determined in consultation with DLWC, DMR and EPA. The monitoring program should include (but not necessarily be limited to) the following:

i. [28]ensuring the monitoring program provides sufficient information to demonstrate that surface water discharges from the site do not limit the ability of receiving waters to meet relevant water quality objectives and revising the current monitoring sites to achieve this;
ii. [29]incorporates rapid biological monitoring and event monitoring to account for the ephemeral nature of receiving waters;
iii. incorporates details of the frequency of sampling for turbidity and/or suspended solids, TDS, major cations, alkalinity, hardness and a suite of metals;
iv. incorporating sediment/soil monitoring, as downstream impacts may not be restricted to surface water quality
v. increasing the frequency of monitoring referred to the in the EIS, particularly in the first 3 to 4 years of operation and for the Northern diversion channel

(c). Water - Load Based Licensing

The Applicant shall monitor the concentration of each pollutant listed in Table 2 at the corresponding Point number, as indicated in the adjacent column. This monitoring is to be undertaken by sampling and obtaining results by analysis of the concentration of each pollutant. The monitoring must be conducted using the specified sampling methods and at the frequency as provided in Table x.

Table 2

Pollutant	Point number	Sampling type	Frequency
Arsenic	18	Grab	Monthly
Cadmium	18	Grab	Monthly
Chromium	18	Grab	Monthly
Copper	18	Grab	Monthly
Lead	18	Grab	Monthly
Mercury	18	Grab	Monthly
Selenium	18	Grab	Monthly
Suspended Solids	17,18	Grab	Monthly
Zinc	18	Grab	Monthly

[27] EPA GTAs
[28] EPA GTAs
[29] EPA GTAs

Salt	17	Grab	Monthly

(d). Testing methods - concentration limits for water pollutants

Monitoring for the concentration of pollutants discharged to waters must be done in accordance with the Approved Methods Publication of the EPA. If there is no methodology required by the Approved Methods Publication; by the General Terms of Approval; or in the licence under the Protection of the Environment Operations Act 1997 describing the relevant load calculation protocol, a method must be approved by the EPA, in writing, before any tests are conducted,

Note : The EPA advises that it proposes to set surface water and ground water monitoring requirements for this project which will be consistent with Condition

4.3.2. Borefields

The Applicant shall:

(a) construct and/or locate groundwater monitoring positions in consultation with DLWC and EPA, and to the satisfaction of the Director-General, prior to the commencement of construction of the borefields;

(b) prepare a detailed monitoring program in respect of ground water quality and quantity, including water in and around the borefields during the operations in consultation with DLWC and to the satisfaction of the Director-General. The monitoring program shall include, but not necessarily be limited to:

i. a bore census (including collation of all relevant quality, quantity, yield, depth and usage data) of all bores within a 10km radius of the project borefields;
ii. daily rainfall at the borefields;
iii. continuous ground water level monitoring in production bores and in standby bores;
iv. quarterly monitoring of pH, redox potential, CO_2, bicarbonate and temperature at the well head;
v. monthly ground water level monitoring and bore usage in observation piezometers including PB-W1, PB-W2 and PB-E1 refer (Figures C3-1 and C3-3 in the EIS)and in selected regional bores within a 10km radius of the borefields;
vi. the need for any contingency plans;
vii. annual monitoring in 10 bores within a 10km radius of the borefields of water quality from each production bore. Parameters to be monitored may include, but not necessarily be restricted to the following:
   - pH, electrical conductivity, redox potential, temperature and dissolved CO_2 at the time of sampling;
   - total dissolved solids, total alkalinity and methyl orange alkalinity;
   - major cations (Ca, Mg, Na, K) and major anions (Cl, SO_4, F, NO_3);
   - metals including Fe^{2+}, Fe^{3+}, and Mn on filtered and acid preserved samples; and
   - annual groundwater usage and level monitoring in selected regional bores within a 20km radius of the borefields, providing the information is publicly available.

(c) The monitoring programs shall be prepared prior to commencement of operations of the borefield. The results of the monitoring programs shall be reported to DLWC and be made available to affected landholders determined in consultation with DLWC. The monitoring program for post-decommisioning shall be prepared two years prior to the cessation of operations.

(d) The results and interpretation of surface and groundwater monitoring are to be reported and interpreted in the AEMR.

5. Hazardous Materials and Waste Management

(a) [30]The Applicant must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997.

This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if it requires an environment protection license under the Protection of the Environment Operations Act 1997

(b) [31]Bund(s) must be installed around areas in which fuels, oils and chemicals are stored. Bunds must:
(i) have walls and floors constructed of impervious materials;
(ii) be of sufficient capacity to contain 110% of the volume of any tank (or 110% volume of the largest tank where a group of tanks are installed);
(iii) have walls not less than 250 millimetres high;
(iv) have floors graded to a collection sump; and
(v) not have a drain valve incorporated in the bund structure.

(c) [32]A waste water treatment facility with oil separator and sediment trap must be installed to treat drainage from any hardstand, vehicle servicing, and general workshop areas,

(d) [33]Waste water from the mining process must not be discharged onto adjoining roads, crown land or other persons land, or into any river as defined under the Water Act.

(e) The applicant is required to store all oils and grease from equipment maintenance in leak proof containers within a bunded area until collected by a licensed recycling contractor.

(f) All activities must be undertaken in a manner which ensures efficient use of water and which maximises reuse of water.

(g) No waste from site facilities shall be disposed of in the waste emplacement areas;

[30] EPA GTAs
[31] EPA GTAs

[32] EPA GTAs
[33] DLWC GTAs

(h) Explosives (including detonators, ANFO and initiating products) shall be stored in dedicated magazines in accordance with AS 2187 "*Explosives – Storage, Transport and Use*" (or its most recent version).

5.1. Hazards and risk management

(a) Class 1 dangerous goods (explosives) shall not be transported to any part of the Project other than the Limestone quarry. The transport of such materials shall be undertaken strictly in accordance with Australian Standards and any relevant legislative requirements.

(b) Notwithstanding condition a) above, the Applicant may seek the approval of the Director-General to employ explosives during the construction of natural gas and/ or water pipelines and/or the Nickel Cobalt processing facility. In seeking the Director-General's approval for such blasting, the Applicant shall supply the following information:

i) an assessment of the risk impacts of the transport and use of explosive materials, prepared in accordance with the Department's publication *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis*;
ii) details of the impacts of blasting with respect to noise and dust emissions, and mitigation measures proposed to address these impacts;
iii) the specific requirements of LSC, PSC, FSC and the EPA in relation to the proposed blasting and how these requirements will be met.

(c) The Director-General may require the Applicant to undertake any measure to minimise the impacts of blasting as part of any approval granted under this condition.

(d) Bulk storage of hydrogen sulphide (H_2S) and sulphur dioxide (SO_2) at the Nickel/ Cobalt Processing Facility shall not be permitted, other than to ensure process continuity in the event of a process upset, start-up or shut-down.

(e) Emergency Services Cooperation Agreement

Prior to the commencement of operation of the Nickel/ Cobalt Processing Facility, the Applicant shall develop an Emergency Services Cooperation Agreement in consultation with State Emergency Services at Trundle and Condobolin and bushfire fighting services in the Fifield/Trundle areas. The Agreement shall provide, but not necessarily be limited to:

i) policies and procedures for the ongoing supply of hazards information related to the Project to the State Emergency Services and bushfire fighting services (including quantities and locations of dangerous goods inventories and possible hazardous events at associated with the development);
ii) policies and procedures for communication with the State Emergency Services and bushfire fighting services and notification in the event of an emergency;
iii) details of any agreement for the provision of firefighting/emergency response equipment from the project in the event of a bushfire or emergency;

iv) details of any agreement for access to water stores at the development in the event of a bushfire; and
v) details of any agreement for the provision of suitably qualified employees from the project in the event of a bushfire or emergency.

The Applicant shall supply a copy of the Emergency Services Cooperation Agreement to the Director-General within 14 days of the Agreement being reached.

5.2. Hazards studies

Note : The development consent conditions under 5.2 are related to offsite risk to people and the biophysical environment. The safety of all persons and operations on site is the responsibility of DMR under the Mines Inspection Act and Dangerous Goods Act. The consent conditions under 5.2 are exclusive in scope of any mining activity which is the statutory responsibility of DMR under the Mining Act, 1992. Consideration of such mining activities may be included in the required reports for completeness, although these activities shall not be the subject of approval by the Director-General.

a. Pre-Construction Hazards Studies

At least one month prior to the commencement of construction of the relevant component(s) of the Project, or within such further period as the Director-General may agree, the Applicant shall prepare and submit for the approval of the Director-General the studies set out under (i) to (iv) below. Construction of the relevant component shall not commence until approval has been given by the Director-General and, with respect to the Fire Safety Study, approval has also been given by the Commissioner of the NSW Fire Brigades. In the event that a study applies to more than one component of the Project, the Applicant may seek the Director-General's approval to stage the submission of that study.

i). *Fire Safety Study*

The Fire Safety Study shall cover all aspects detailed in the Department's publication *Hazardous Industry Planning Advisory paper No. 2 - Fire Safety Study* and the New South Wales Government's *Best Practice Guidelines for Contaminated Water Retention and Treatment Systems*. The Study shall also be submitted for approval to the NSW Fire Brigades. The Study shall consider all components of the Project, exclusive of those components that are underground.

ii). *Hazard and Operability Study*

The Hazard and Operability Study shall be chaired by an independent, qualified person approved by the Director-General prior to the commencement of the Study. The Study shall be carried out in accordance with the Department's publication *Hazardous Industry Planning Advisory Paper No. 8 - HAZOP Guidelines*. The Study shall consider the Nickel/ Cobalt Processing Facility and Limestone Processing Facility.

iii). *Final Hazard Analysis*

The Final Hazard Analysis shall be prepared in accordance with the Department's publication *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis*. The Analysis shall consider all components of the Project.

iv). *Construction Safety Study*

The Construction Safety Study shall be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 7 - Construction Safety Study Guidelines*. In the event that the construction period exceeds six months, the commissioning portion

of the Construction Safety Study may be submitted two months prior to the commencement of commissioning of the Nickel Cobalt processing facility. The Study shall consider all components of the Project.

b. Pre-Commissioning Hazards Studies

No later than two months prior to the commencement of operation of the relevant component(s) of the Project, or within such further period as the Director-General may agree, the Applicant shall prepare and submit for the approval of the Director-General the studies set out under i) to iii) below. Operation of the relevant components shall not commence until approval has been given by the Director-General. In the event that a study applies to more than one component of the Project, the Applicant may seek the Director-General's Approval to stage the submission of that study.

i) *Transport of Hazardous Materials Study*

Arrangements covering the transport of hazardous materials including details of routes to be used for the movement of vehicles carrying hazardous materials to or from the Project. The Study shall be carried out in accordance with the Department's draft *Route Selection* guidelines. Suitable routes identified in the Study shall be used except where departures are necessary for local deliveries or emergencies.

ii) *Emergency Plan*

A comprehensive Emergency Plan and detailed emergency procedures shall be prepared in accordance with the Department's publication *Hazardous Industry Planning Advisory Paper No. 1 - Industry Emergency Planning Guidelines*. The Plan shall include detailed procedures for the safety of all people outside the Project who may be at risk from the development. The Plan shall consider all components of the Project.

iii) *Safety Management System*

A Safety Management System shall be prepared in accordance with the Department's publication *Hazardous Industry Planning Advisory Paper No. 9 - Safety Management*. The System shall cover all operations on-site and associated transport activities involving hazardous materials. All safety-related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to procedures, shall be clearly specified in the System. Records shall be kept on-site and shall be available for inspection by the Director-General upon request. The System shall consider all components of the Project.

5.3 Tailings Emplacement and management

The Applicant shall:

(a) construct the tailings dams to the requirements of DMR, EPA and DSC and in consultation with DLWC;

(b) [34.] The Tailings Storage Facility, Evaporation Basin and Surge Dam must be designed and operated to ensure that:

- any seepage of tailings water from the Tailings Storage Facility, Evaporation Basin and Surge Dam to the groundwater is contained within the boundary of the premises.
- The seepage of tailings water through the side walls and of The Tailings Storage Facility, Evaporation Basin and Surge Dam is minimised

[34.] EPA GTA

(c). [35]The Tailings Storage Facility, Evaporation Basin and Surge Dam must be designed and operated to minimise seepage of tailings water though the base and side walls. This design must incorporate:

- a base liner of either 900 mm of clay or modified soil with a permeability of no more than 1 x 10^{-9} m/s (or equivalent) or a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1 x 10^{-14} m/s (or equivalent) across the whole area of the Tailings Storage Facility, Evaporation Basin and Surge Dam.
- a decant system to recover water from the Tailings Storage Facility.

(d). [36]The liner and tailings water recovery system must be designed and installed with appropriate quality control measures to ensure that seepage and discharge of tailings water is minimised consistently over the period in which the Tailings Storage Facility, Evaporation Basin and Surge Dam will be operational.

(e). [37]The Tailings Storage Facility, Evaporation Basin and Surge Dam must not be commissioned until a report has been first obtained from an independent, suitably qualified and competent person, approved by the EPA, DMR and DSC, certifying that:

- A low permeability liner has been installed in accordance with condition 5.3 (c);
- The low permeability liner installed for the Tailings Storage Facility, Evaporation Basin and Surge Dam has a permeability which meets the permeability design criteria at any point in the liner agreed in consultation with the EPA and DMR when tested with liquor similar of characteristics as the proposed tailings decant liquor; and
- The structures are constructed in such a manner so as to remain structurally sound throughout their design life.

If necessary following receipt of the Report, the applicant must:

- Conduct or cause to be conducted, such works as are necessary to ensure all matters specified above have been satisfied; and
- Supply or caused to be supplied to the EPA, particulars certified by the approval holder that each of the matters specified above have been satisfied.

(f) install a series of monitoring bores around the TSF. These bores will be used to monitor the chemical quality of the groundwater and to confirm that actual TSF seepage complies with the seepage model predictions on licence criteria. If the predicted behaviour of TSF seepage front becomes unacceptable, that is too close to the surface or a risk to beneficial users is identified, then seepage interception measures will be implemented.

(g) [38]Monitoring of groundwater at the boundary of the premises and between the Tailings Storage Facility and Evaporation Basin and the boundary of the facility

(h) [39]The placement of groundwater monitoring points to ensure the presence of tailings water of any contamination of groundwater from tailings water will be

[35] EPA GTAs
[36] EPA GTAs
[37]EPA GTAs
[38] EPA GTAs

detected, particularly at any preferential flow paths such as paleochannels, recharge areas or fracture zones.

(i) [40]Prior to raising the perimeter embankment around the Tailings Storage Facility, the Applicant must provide the EPA with an independent certification which demonstrates that the in situ tailings have suitable engineering properties to allow them to be used as construction material in perimeter embankment.

5.4 Waste Management

(a) Waste Management Plan

Prior to the commencement of construction of any component of the Project, the Applicant shall prepare a Waste Management Plan detailing measures to minimise the production of waste and to effectively reuse, recycle, treat and dispose of wastes produced at the Project. The Plan shall be updated to reflect process and management changes at the Project or as required by the Director-General. The Plan shall address the requirements of LSC, FSC and PSC. The Plan shall include, but not necessarily be limited to:

i) identification of all types and quantities of waste materials produced at the Project during construction and operation;
ii) programs aimed at minimising the production of waste at the Project through the implementation of operational and management measures;
iii) details of potential reuse and recycling avenues for waste materials produced at the Project, including collection and handling procedures;
iv) details of appropriate disposal routes in the event that reuse and recycling avenues are not available or are not practicable;
v) programs for involving and encouraging employees and contractors to minimise waste production at the Project and reuse/ recycle where appropriate.

(b). General non-mining waste

[41]Any non-mining waste from facility construction, operation or closure must be handled in accordance with the waste hierarchy of; avoid, reuse, recycling and disposal. Any waste remaining for disposal must be disposed of at a facility appropriately licensed by the EPA or than can otherwise lawfully receive the waste.

(c). Laboratory waste

[42]All wastes generated by the laboratory must be assessed and classified in accordance with the "*Environmental Guidelines: Assessment, Classification and Management of Liquid and Non Liquid Wastes"* and must be disposed of at a facility appropriately licensed by the EPA or that can otherwise lawfully receive the wastes.

(d). Hazardous and industrial waste

[39] EPA GTA
[40] EPA GTA
[41] EPA GTA
[42] EPA GTA

Hazardous or industrial waste must be stored and disposed of in a manner to minimise its impact on the environment including appropriate segregation for storage and separate disposal by a waste transporter licensed by the EPA.

6. AIR QUALITY, BLAST, NOISE AND LIGHT MANAGEMENT AND MONITORING

6.1 Air Quality Management and Monitoring

6.1.1 Dust Management Plan

The Applicant shall, prior to the commencement of the mine/quarry operations, prepare a Dust Management Plan detailing air quality safeguards and procedures for dealing with dust emissions to the satisfaction of the Director-General. The Plan shall be updated as required by the Director-General. The Plan shall include, but not be limited to, details of:

(i) an identification of all potential sources of particulate matter (PM_{10}, TSP and deposited matter);
(ii). the identification of dust affected properties and the relevant dust limits consistent with EPA criteria;
(iii.) specifications for the procedures for the dust monitoring program for the purpose of undertaking independent dust investigations;
(iv.) outline the procedure to notify property owners and occupiers likely to be affected by dust from the operations;
(v.) the establishment of a protocol for handling dust complaints that include recording, reporting and acting on complaints;
(vi.) appropriate mechanisms for community consultation;
(vii) outlining mitigation measures to be employed to minimise dust emissions from all sources (including drilling, blasting, disturbed areas, haul roads, etc);
(viii) equipment to be available and used to control dust generation;
(ix) methods to determine when and how the operations are to be modified to minimise the potential for dust emissions, particularly from blasting and surface activities if the relevant criteria are exceeded;
(x). identification of longer term strategies directed towards mitigating dust levels that exceed the relevant EPA dust amenity criteria;
(xi). details of locations for dust monitoring and deposition gauges at the nearest residences and frequency of monitoring, as agreed with the EPA (refer also to Condition 6.1.2.
(xii). a program to continue baseline monitoring undertaken prior to development consent.

6.1.2 Dust Monitoring

(a) The Applicant shall:

i. undertake monitoring at locations described in the Dust Management Plan (Condition 6.1.1));
ii. establish dust deposition, Total Suspended Particulate (TSP) and PM_{10} monitoring locations for the mine/quarry operations and locations as may be determined to be necessary by the Director-General and in accordance with the Dust Management Plan referred to in Condition 6.1.1;
iii. detail monitoring methodologies and standards to be adhered to;

[43] EPA GTA

iv. provide a detailed monitoring cycle and duration of the monitoring cycle; and

v. provide all results and analysis of air quality monitoring in the AEMR including a determination of the dust deposition rate in g/m^2/month for deposited dust and µg/m^3 for TSP and PM_{10} which shall be plotted in the AEMR.

(b) [44]The applicant shall undertake sampling and analysis of ambient air pollutants strictly in accordance with the methods and the frequencies detailed in Table 3. As a minimum requirement, monitoring of ambient air pollutants must be undertaken at the locations identified in the table. Ambient air pollutant sampling equipment must be sited in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Table 3.

Pollutant	**[1]Location**	**Method[1]**	**Frequency**
Particulate matter (PM_{10})	Nearest affected residence (nickel mine and limestone quarry) and background	AM-1,AM-18	As per AM-18
Particulate matter (TSP)	Nearest affected residence (nickel mine and limestone quarry) and background	AM-1,AM-15	As per AM-15
Particulates (Deposited Matter)	As identified in EIS	AM-1,AM-19	As per AM-19

Note : 1. [45]All methods are specified in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* and all monitoring must be conducted strictly in accordance with the requirements outlined in this document.

2. [46]The EPA considers that suspended and deposited particulate are critical parameters in determining amenity air impacts. However Particulate Matter (PM_{10}) monitoring will not be required as a condition of licence if the applicant is able to demonstrate through the extrapolation of Total Suspended Particulate monitoring collected during the operation of the mine and processing facility that PM_{10} is not causing an unacceptable impact at any potentially effected receiver.

3.[47] Should access to the nearest affected residence not be possible, the EPA will consider varying the monitoring location.

(c) Sampling and analysis of ambient air pollutants shall commence a minimum of 12 months prior to commissioning of the processing plant and nickel mine to establish background levels of air pollutants.

(d) [48]All monitoring must be conducted strictly in accordance with the requirements of the methods which are specified in the most current version of the EPA's *Approved Methods for the Sampling and Analysis of Air Pollutants in New South.*

(e) Monitoring of dust deposition and the concentration of total suspended particulate matter in ambient air must be carried out at locations agreed to in consultation with the EPA.

(f) In the event that a landowner or occupier considers that dust from the project at their dwelling, or over more than 25% of their vacant land is in excess of the relevant EPA

[44] EPA GTA
[45] EPA GTA
[46] EPA GTA
[47] EPA GTA
[48] EPA GTA

dust amenity criteria, and the Director-General is satisfied that an investigation is required, the Applicant shall upon the receipt of a written request:

i. consult with the landowner or occupants affected to determine their concerns;
ii. make arrangements for appropriate independent dust investigations in accordance with the Dust Management Plan, and to the satisfaction of the Director-General, to quantify the impact and determine the source of the effect;
iii. modify the activities in accordance with the Dust Management Plan if exceedences are demonstrated to result from the site activities. This shall include:

- introduction of additional controls, either of dust generation from individual sources on the mine/quarry site or on site operations or modify operations, to ensure that the dust criteria are achieved; and/or,
- enter into an agreement with the landowner or provide such forms of benefit or amelioration as may be agreed between the parties as providing acceptable amelioration or benefit for the dust levels experienced.

iv. conduct follow up investigations to the satisfaction of the Director-General, where necessary.

Note: Vacant land in this condition means the whole of the lot in a current plan registered at the Land Titles Office as at the date of this consent that does not have a dwelling situated on the lot and is permitted to have a dwelling on that lot.

(g) If the independent dust investigations in sub-clause f(ii) above confirm that dust limits are in excess of the relevant EPA dust amenity criteria, the Applicant shall at the written request of the owner acquire the relevant property. Acquisition shall be in accordance with the procedures set out in Condition 11.

(h) Further independent investigations shall cease if the Director-General is satisfied that the relevant consent limits or relevant EPA dust amenity criteria are not being exceeded and are unlikely to be exceeded in the future.

6.1.3 Dust Suppression and Control

(a) [49.] Activities occurring at the mine/quarry must be carried out in a manner that will minimise emissions of dust from the site.

(b) [50.] Air pollution control equipment must be fitted to the drilling rig(s) to minimise fines generated during drilling being discharged to the atmosphere.

(c) A mobile water tanker equipped with a pump and sprays must be provided to suppress dust from unsealed roads when in use.

(d) Haul roads must be surfaced in selected hard, non-friable material.

[49.] EPA GTA
[50.] EPA GTA

6.1.4. Gaseous emissions management

(a). Gaseous Emissions Management Plan

Prior to the commencement of operation of the Nickel/ Cobalt Processing Facility, the Applicant shall prepare a Gaseous Emissions Management Plan detailing measures to minimise impacts of the Project on local and regional air quality. The Plan shall be updated to reflect process and management changes at the development or as required by the Director-General. The Plan shall include, but not necessarily be limited to:

i) details of the sources of all polluting gaseous emissions from the Nickel/ Cobalt Processing Facility, being both point-source and diffuse emissions, including identification of the major components and quantities of these emissions;
ii) details of monitoring for gaseous emissions from the Nickel/ Cobalt Processing Facility, in accordance with the EPA's requirements;
iii) policies and procedures for the minimisation of gaseous emissions from the Nickel/ Cobalt Processing Facility, and reduction in emissions over time, where feasible;
iv) process philosophies and protocols for the efficient use of materials indirectly contributing to gaseous emissions, including elemental sulphur and natural gas, and a program for the consideration and introduction of more efficient process technology, should such technology be available, feasible and appropriate to the Project (refer to condition 3.11);
v) protocols for regular maintenance of process equipment to minimise the potential for leaks and fugitive emissions; and
vi) details of any appropriate measures to be employed to compensate for the negative environmental impacts of gaseous emissions from the Nickel/ Cobalt Processing Facility.

(b) Offensive odours

[51]The Applicant must not cause or permit the emission of offensive odours from the premises, as defined under section 129 of the Protection of the Environment Operations Act 1997.

(c) Concentration limits

[52]For each monitoring/discharge point or utilisation area specified in the tables below (by point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

Point 1 - Acid Pressure Leach Scrubber.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	MPG*	dry, 273 K, 101.3 kPa
Sulfuric acid mist (H_2SO_4) or sulfur trioxide (SO_3) or both (as SO_3 equivalent)	g/m^3	0.1	dry, 273 K, 101.3 kPa
Type I and Type II substances (Sb, As, Be, Cd, Cr, Co, Pb, Mn, Hg, Ni, Se, Sn or V)	mg/m^3	5.0	dry, 273 K, 101.3 kPa

[51] EPA GTA
[52] EPA GTA

Solid particles	mg/m^3	100	dry, 273 K, 101.3 kPa

*Note: Volumetric flow rates to be specified in Manufacturer's Performance Guarantees (MPG).

Point 4 - Vent from Extraction Fan Over Sulfide Filter.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	4.2	dry, 273 K, 101.3 kPa
Hydrogen sulfide (H_2S)	g/m^3	0.0002*	dry, 273 K, 101.3 kPa

Note *Emission concentration limit based on the information presented in the EIS and meeting a design ground-level concentration for Hydrogen Sulfide of 0.14 $\mu g/m^3$ at the nearest sensitive receptor.

Point 5 - Sulfide Leach Vent.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	MPG*	dry, 273 K, 101.3 kPa
Sulfuric acid mist (H_2SO_4) or sulfur trioxide (SO_3) or both (as SO_3 equivalent)	g/m^3	0.1	dry, 273 K, 101.3 kPa

Note *Volumetric flow rates to be specified in Manufacturer's Performance Guarantees. MPG.

Point 6 - Nitric Vent Fan.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	0.25	dry, 273 K, 101.3 kPa
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	g/m^3	2.0	dry, 273 K, 101.3 kPa

Point 8 - Sulfuric Acid Plant.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	17.0	dry, 273 K, 101.3 kPa
Sulfuric acid mist (H_2SO_4) or sulfur trioxide (SO_3) or both (as SO_3 equivalent)	g/m^3	0.1	dry, 273 K, 101.3 kPa
Sulfur dioxide (SO_2)	g/m^3	1.5*	dry, 273 K, 101.3 kPa

Note *Emission concentration limit based on the emission rate presented in the EIS.

Point 10 - Flare Stack.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	0.52	dry, 273 K, 101.3 kPa
Hydrogen sulfide (H_2S)	g/m^3	0.005	dry, 273 K, 101.3 kPa
Sulfur dioxide (SO_2)	g/m^3	46.7*	dry, 273 K, 101.3 kPa
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	g/m^3	2.0	dry, 273 K, 101.3 kPa, 7 % O_2

Note *Emission concentration limit based on the emission rate presented in the EIS.

Point 11 - Hydrogen Reformer Stack.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	1.23	dry, 273 K, 101.3 kPa
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	g/m^3	2.0	dry, 273 K, 101.3 kPa, 7 % O_2

Point 12 - Power Plant and HRSG.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	23.8	dry, 273 K, 101.3 kPa
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	g/m^3	0.07	dry, 273 K, 101.3 kPa, 15 % O_2

Point 13 - Auxiliary Boiler.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	MPG*	dry, 273 K, 101.3 kPa
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	g/m^3	0.35	dry, 273 K, 101.3 kPa, 7 % O_2

Note * Volumetric flow rates to be specified in Manufacturer's Performance Guarantees. MPG.

Point 14 - Diesel Generators.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm^3/s	MPG*	dry, 273 K, 101.3 kPa
Sulfuric acid mist (H_2SO_4) or sulfur trioxide (SO_3) or both (as SO_3 equivalent)	g/m^3	0.1	dry, 273 K, 101.3 kPa
Sulfur dioxide (SO_2)	g/m^3	0.13**	dry, 273 K, 101.3 kPa
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	g/m^3	2.0	dry, 273 K, 101.3 kPa, 7 % O_2
Solid particles	mg/m^3	100	dry, 273 K, 101.3 kPa

Note * Volumetric flow rates to be specified in Manufacturer's Performance Guarantees. MPG.

** Emission concentration limit based on the emission rate presented in the EIS.

(d). The hydrogen sulfide flare (point 10) must be operated to ensure no visible emissions.

6.1.5. Emissions monitoring

(a). Testing methods - concentration limits for air quality monitoring

[53.] Monitoring for the concentration of a pollutant emitted to the air required to be conducted by the EPA's general terms of approval, or a licence under the Protection

[53.] EPA GTAs

of the Environment Operations Act 1997, in relation to the development or in order to comply with a relevant local calculation protocol must be done in accordance with:

- The "Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales"; or
- any methodology which is required by or under the POEO Act 1997 to be used for the testing of the concentration of the pollutant; or
- if no such requirement is imposed by or under the POEO Act 1997, any methodology which the general terms of approval or a condition of the licence or the protocol (as the case may be) requires to be used for that testing; or
- if no such requirement is imposed by or under the POEO Act 1997 or by the general terms of approval or a condition of the licence or the protocol (as the case may be), any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

(b).[54] The following points referred to in tables 4 and 5 are identified for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Table 4

EPA identification point	**Type of monitoring point**	**Type of discharge point**	**Description of location**
1	Air emission concentration monitoring point	Air emission concentration discharge point	Acid Pressure Leach Scrubber
2		"	Tailings Neutralisation Vent Stack
3		"	Leach Liquor Neutralisation Tank Vents
4	Air emission concentration monitoring point	"	Vent From Extraction Fan Over Sulfide Filter
5	"	"	Sulfide Leach Vent
6	"	"	Nitric Vent Fan
7		"	Nickel Electrowinning Tank House Vents
8	"	"	Sulfuric Acid Plant
9		"	Limestone Wet Scrubber
10	Air emission concentration monitoring point	"	Flare Stack
11	"	"	Hydrogen Reformer Stack
12	"	"	Power Plant & HRSG
13	"	"	Auxiliary Boiler
14	"	"	Diesel Generators
15		"	Cobalt Electrowinning Wet Scrubber
16		"	Cobalt Degassing (Vacuum Degassing Furnace)

[54] EPA GTA

(c). [55]For each monitoring/discharge point or utilisation area specified below (by point number), the applicant must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The applicant must use the sampling method, units of measure and sample at the frequency, specified opposite in the other columns:

Note : Section 58 of the protection of the Environment Operations Act 1997 allows the EPA to vary a condition of a licence issues in respect to the carrying on of a scheduled activity. The EPA will consider varying the monitoring frequency in 6.1.5(c) on application by the holder of the licence. Any application made by the licence holder must justify the amendment based on statutory environmental and technical basis.

Table 5[56]Source Emissions Sampling and Analysis Requirements.

Pollutant	**EPA Identification Point**	**Method[1]**	**Frequency**
Sulfuric acid mist (H_2SO_4) or sulfur trioxide (SO_3) or both (as SO_3 equivalent)	1,5,8,14	TM-3	Post commissioning, quarterly
Sulphur dioxide (SO_2)	14	TM-4	Post commissioning, quarterly
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both (as NO_2 equivalent)	6,10,11,12,13,14	TM-11	Post commissioning, quarterly
Type I and Type II substances (Sb, As, Be, Cd, Cr, Co, Pb, Mn, Hg, Ni, Se, Sn or V)	1	TM-12,13,14	Post commissioning, quarterly
Solid particles	1, 14	TM-15	Post commissioning, quarterly

Parameter	***EPA Identification Point***	**Method[1]**	**Frequency**
Velocity	1,4,5,6,8,10,11,12,13,14	TM-2	Post commissioning, quarterly
Volumetric flow rate	1,4,5,6,8,10,11,12,13,14	TM-2	Post commissioning, quarterly
Temperature	1,4,5,6,8,10,11,12,13,14	TM-2	Post commissioning, quarterly
Moisture	1,4,5,6,8,10,11,12,13,14	TM-22	Post commissioning, quarterly
Dry gas density/molecular weight of stack gases	1,4,5,6,8,10,11,12,13,14	TM-23	Post commissioning, quarterly
Carbon dioxide in stack gases	1,4,5,6,8,10,11,12,13,14	TM-24	Post commissioning, quarterly
Oxygen	1,4,5,6,8,10,11,12,13,14	TM-25	Post commissioning, quarterly

Other	**EPA Identification Point**	**Method[1]**	**Frequency**

[55] EPA GTA
[56] EPA GTA

Selection of sampling positions	1,4,5,6,8,10,11,12,13,14	TM-1	-

d. [57]Continuous monitoring of air pollutants and parameters from each discharge point identified in the Table 6 below shall be carried out strictly in accordance with the methods specified in the table. Sampling points shall be located strictly in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Table 6 : Continuous Source Emissions Monitoring Requirements.

Pollutant	Point number	Method	Frequency
Hydrogen sulfide	4,10	CEM-7	Continuous
Sulphur dioxide (SO_2)	8,10	CEM-2	Continuous
Opacity	10	CEM-1	Continuous

Parameter	Point number	Method	Frequency
Temperature	4,8,10	Method approved by the EPA in writing	Continuous
Moisture	4,8,10	Method approved by the EPA in writing	Continuous
Volumetric flow rate	4,8,10	CEM-6	Continuous
Oxygen	4,8,10	CEM-3	Continuous

Note:

a. All methods are specified in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* and all monitoring must be conducted strictly in accordance with the requirements outlined in this document.

b. If the applicant considers that continuous monitoring for a particular discharge point is not possible, the applicant may nominate which sources they consider measurement impractical. For those sources he applicant must submit an alternative sampling method and frequency to the Chief Scientists of the EPA and have that method and frequency approved in writing. The approved method and frequency will replace the Method and Frequency currently listed in Table 5.

6.1.6. Emissions control - plant and equipment design parameters

(a).[58]The design parameters for the discharge points specified in Table 7 must meet the requirements specified in the table.

Table 7. Plant and Equipment - Design Parameters.

EPA Identification Point	Parameter	Units of Measure	Minimum
10	Hydrogen sulfide destruction efficiency	%	100

(b). [59]The design parameters for the discharge points specified in Table 8 must meet the requirements specified in the table. All stacks shall be designed in

[57] EPA GTA

[58]. EPA GTA

accordance with good engineering practice in order to minimise the effects of stack tip downwash and building wake effects on ground-level air pollutant concentrations.

Table 8. Plant and Equipment – Design Parameters.

EPA Identification Point	Description	Minimum Stack Height (m)	Stack Diameter (m)
4	Vent From Extraction Fan Over Sulfide Filter	15	0.56
6	Nitric Vent Fan	10	0.15
8	Sulfuric Acid Plant	80	1.17
10	Flare Stack	80	0.5
11	Hydrogen Reformer Stack	36	0.43
12	Power Plant and HRSG	25	1.55

Note : Section 58 of the Protection of the Environment Operations 1997 allows the EPA to vary a condition of a licence in respect of carrying on of a scheduled activity. The EPA will consider varying the minimum stack height and stack diameter listed in Table 8 on application by the holder of the license. Any application made by the license holder must demonstrate that air quality impact assessment caused as a result of the proposed stack heights and diameters will not exceed the impact predicted

(c). [60]The stack diameters and heights for the discharge points specified in Table 9 shall be designed in such a manner which ensures that the design ground-level concentration criteria (GLC) specified in the table are not exceeded at any location at or beyond the boundary of the premises.

Table 9. Plant and Equipment – Stack Height Design GLC Criteria.

EPA Identifcation Point	Pollutant	Design Ground-Level Concentration Criteria ($\mu g/m^3$)	Averaging Time	Percentile
1,5,14	Sulfuric Acid	33	3 minute	99.9
14	Sulfur Dioxide	500	10 minute	99.9
13,14	Nitrogen Dioxide	246	1 hour	99.9
1	Nickel or Compounds Containing Nickel	0.004	Annual	100
1,14	Solid Particles	330	3 minute	99.9

(d). Prior to commissioning the processing facility, the applicant shall carry out dispersion modelling and prepare a report to the satisfaction of the EPA that demonstrates that the stack diameters and heights for the discharge points identified in the table have been designed in an acceptable manner.

6.1.7. Manufacturer's Performance Guarantees

[59] EPA GTA
[60] EPA GTA

(a). [61]Prior to construction of the processing facility, the applicant shall provide manufacturer's performance guarantees for all plant and equipment, demonstrating to the satisfaction of the EPA that emissions of air pollutants from all sources will comply with:

- The Clean Air (Plant and Equipment) Regulation 1997;
- The emission concentration limits proposed by the applicant and included for EPA identification points 1,4,5,6,8,10,11,12,13,14; and where relevant
- The plant and equipment design parameters specified in Table 1.

(b). [62]The manufacturer's performance guarantees shall specify the volumetric flow rate for all air discharge points and in particular for the sources included for EPA identification points 1,4,5,6,8,10,11,12,13,14 for which a volumetric flow rate has not been specified.

6.2. Blast Management And Monitoring

6.2.1 Blast Management

Overpressure

[63]The overpressure level from blasting operations on the premises must not:

(i) exceed 115dB (Linear Peak) for more than 5% of the total number of blasts over a period of 12 months; and
(ii) exceed 120dB (Linear Peak) at any time.

when measured at any point that is located at least 3.5m from any building or structure at any nearby residential property or other noise sensitive location such as a school or hospital.

Ground Vibration

[64]Ground vibration peak particle velocity from the blasting operations must not:

(i) exceed 5mm/s for more than 5% of the total number of blasts over a period of 12 months; and
(ii) exceed 10mm/s at any time.

when measured at any point within the grounds of noise sensitive locations and within 30m of any residence or other noise sensitive location such as a school or hospital.

6.2.2 Time and Frequency of Blasting

(a)[65] Blasting operations may only take place between 9 am and 5 pm Monday to Friday inclusive.

[61] EPA GTA
[62] EPA GTA

[63] EPA GTA
[64] EPA GTA
[65] EPA GTA

(b) [66]The hours of operation for blasting operations specified in this condition may be varied if the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.

6.2.3 Blast Management Plan

(a) The Applicant shall prepare and implement a Blasting and Vibration Management Plan for the limestone quarry site, to the satisfaction of the Director-General prior to the commencement of any blasting. The plan must include, but need not be limited to, the following matters:

I. compliance standards;
ii. mitigation measures;
iii. remedial action;
iv. monitoring methods and program;
v. monitoring program for flyrock distribution;
vi. measures to protect any underground utilities, native fauna, and livestock nearby;
vii. procedures for the notification of neighbours prior to detonation of each blast; and
viii. measures to ensure no damage by flyrock to people, property, livestock and powerlines

(b) The Applicant shall advise residents within two (2) kilometres of the site of future blasting events on a monthly basis, and of any changes to monthly programs.

(c) Upon written request of the owner of any dwellings located within two (2) kilometre of the site, the Applicant shall arrange at its own costs, for the inspection by a technically qualified person agreed to by both parties, to record the material condition of any structure on such property within 14 days of receipt of the request. The Applicant shall supply a copy of any inspection report, certified by the person who undertook the inspection, to the relevant property owner within fourteen (14) days of receipt of the report;

6.2.4 Blast Monitoring

(a) [67]The Applicant must monitor ground vibration and overpressure of all quarry blasts.

(b) [68]For the purpose of blast monitoring, the ground vibration or the overpressure must be measured at noise sensitive sites (eg. residences, hospitals, schools etc), selected in consultation with the EPA.

(c) The Applicant shall provide the Director-General with results of the blast monitoring on a quarterly basis, unless otherwise agreed by the Director-General, and in the AEMR (Condition 9.2)

6.3. Noise Management And Monitoring

[66] EPA GTA
[67] EPA GTA
[68] EPA GTA

6.3.1 Noise Level Criteria

Mine and processing facility

[69]The Applicant shall ensure that the noise emission from the operation of the mine and associated activities shall not exceed the noise limits in Table 10 at all non-project related residences.

Table 10 – Project specific noise limits for the non-project related residences for the mine and processing facility

Location	Period	Project Specific Noise Limits
		Intrusive Criteria L_{eq} (15 minute) dB(A)
Brooklyn	• Day • Evening • Night	40 35 35
Currajong Park	• Day • Evening • Night	40 35 35
Rosehill	• Day • Evening • Night	40 35 35
Flemington	• Day • Evening • Night	36 39 35
Sunrise	• Day • Evening • Night	40 40 35
Wanda Bye	• Day • Evening • Night	39 41 35
Glenburn	• Day • Evening • Night	39 41 35
Fifield	• Day • Evening • Night	36 35 35
Warrawindi	• Day • Evening • Night	36 39 35
Slapdown	• Day • Evening • Night	36 39 35

Note : Daytime (between the hours of 7am and 6pm); evening (between 6pm and 10pm) and night time (between 10 pm and 7 am). Noise emission limits apply for winds up to 3m/sec and Pascall stability classes A,B,C, D and F.

Limestone quarry

[69] EPA GTA

The Applicant shall ensure that the noise emission from the operation of the limestone quarry and associated activities shall not exceed the noise limits in Table 11 at all non-project related residences.

Table 11 – Project specific noise limits for the non-project related residences for the limestone quarry

Location		**Project Specific Noise Limits Daytime Intrusive Criteria ($L_{eq(15\ minute)}$) dB(A)**
Reas Falls	• Day • Evening • Night	37 35 35
Moorelands	• Day • Evening • Night	37 35 35
Gillenbine	• Day • Evening • Night	37 35 35
Lesbina	• Day • Evening • Night	36 35 35
Hillsdale	• Day • Evening • Night	37 35 35
The Troffs	• Day • Evening • Night	36 35 35
Eastbourne	• Day • Evening • Night	36 35 35

Rail Siding

The applicant shall ensure that the noise emissions from the operation of the rail siding and associated activities shall not exceed the limits specified in Table 12 at the residence nominated.

Table 12. Project specific noise limits for the non-project related residences for the rail siding

Location	**Period**	**Project Specific Noise Limits Daytime Intrusive Criteria ($L_{eq(15\ minute)}$) dB(A)**
Glen Rock	• Day • Evening • Night	37 35 35
Ballenrae	• Day • Evening • Night	37 35 35
Spring Park	• Day • Evening	37 35

	• Night	35

The noise emission limits above apply for winds up to 3 metres per second and Pascall Stability Classes of A, B,.C, D, E, and F.

Note: (i) [70]For the purpose of noise measurement for condition 6.3.1 above, the L_{Aeq} noise limit must be measured or computed at the most affected area within 30 metres of the residence or at the boundary, if the boundary is closer than 30 metres to the residence, over a period/s of 15 minutes using "FAST" response on the sound level meter.

(ii).[71] For the purpose of the noise measurements referred to in condition 6.3.1 above, 5dB must be added to the measured level if the noise is substantially tonal or impulsive in character.

Noise aquisition criteria

Mine and processing facility

(a) The noise acquisition zone during the operations of the mine and processing facility is defined by demonstrated exceedances of noise limits (at non Company owned dwellings)shown in Table 13 below.

Table 13: Noise Acquisition zone for non-project related residence for the Mine and processing facility.

Location	Period	Noise affectation limits
		Intrusive Criteria L_{eq} (15 minute) dB(A)
Brooklyn	• Day • Evening • Night	>45 >40 >40
Currajong Park	• Day • Evening • Night	>45 >40 >40
Rosehill	• Day • Evening • Night	>45 >40 >40
Flemington	• Day • Evening • Night	>41 >44 >39
Sunrise	• Day • Evening • Night	>45 >45 >40
Wanda Bye	• Day • Evening • Night	>44 >46 >40
Glenburn	• Day • Evening	>44 >46

[70] EPA GTA
[71] EPA GTA

	• Night	>40
Fifield	• Day • Evening • Night	>41 >40 >40
Warrawindi	• Day • Evening • Night	>41 >44 >39
Slapdown	• Day • Evening • Night	>41 >44 >40

These noise limits apply for winds up to 3 metres per second and/or Pascill Stability Classes of A,B,C,D, E and F.

Limestone quarry

The noise acquisition zone during the operations of the limestone quarry is defined by demonstrated exceedances of noise limits (at non Company owned dwellings shown in Table 14 below.

Table 14

Location	**Noise affectation limits Day**	**Noise affectation limits Evening and Night**
Reas Falls	42	40
Moorelands	42	40
Gillenbine	42	40
Lesbina	41	40
Hillsdale	42	40
The Troffs	41	40
Eastbourne	41	40

The noise emission limits above apply for winds up to 3 metres per second and Pascall Stability Classes of A, B,.C, D, E, and F.

(b) The noise acquisition zone during the operation of the rail siding is defined by demonstrated exceedances of noise limits (at non Company owned dwellings shown in Table 15 below.

Table 15

Location	**Noise affectation limits Day**	**Noise affectation limits Evening and Night**
Glen Rock	42	40
Ballenrae	42	40
Spring Park	42	40

The noise emission limits above apply for winds up to 3 metres per second and Pascall Stability Classes of A, B,.C, D, E, and F.

(c) In the event that a landowner or occupier considers that noise from the project component at their dwelling is in excess of the noise limits given in Tables 9, 10 or 11, or that a landowner considers that the noise limits are being exceeded over more than 25% of their vacant land and the Director-General is satisfied that an investigation is required, the Applicant shall upon the receipt of a written request:

i. consult with the landowner or occupants affected to determine their concerns;

ii. make arrangements for appropriate independent noise investigations in accordance with the Noise Management Plan (refer Condition 6.3.3), and to the satisfaction of the Director-General, to quantify the impact and determine the source of the effect;

iii. modify the activities in accordance with a noise reduction plan prepared as part of the Noise Management Plan, if exceedences are demonstrated to result from the site activities. This shall include:

- introduction of additional controls, either on noise emission from individual sources on the site or on site operations or modify operations, to ensure that the criteria above are achieved;
- with the agreement of the landowner, undertaking of noise control at the dwelling to achieve acceptable internal noise levels;
- enter into an agreement with the landowner or provide such other forms of benefit or amelioration as may be agreed between the parties as providing acceptable benefit or amelioration for the noise levels experienced;

iv. conduct follow up investigations to the satisfaction of the Director-General, where necessary.

Note: Vacant land in this condition means the whole of the lot in a current plan registered at the Land Titles Office as at the date of this consent that does not have a dwelling situated on the lot and is permitted to have a dwelling on that lot.

(d) If the independent noise investigations in sub-clause b(ii) above confirm that noise acquisition criterion in Tables 13, 14, or 15 is being exceeded, the Applicant shall at the written request of the owner acquire the relevant property. Acquisition shall be in accordance with the procedures set out in Condition 11.1.

(e) If continued complaints and noise investigations confirm that the noise limits in Table 10, 11, or 12 are being exceeded, but are less than the noise levels in Table 13, 14 or 15, the Applicant shall continue to negotiate with the landowner until an acceptable resolution is reached.

(f) Further independent investigations shall cease if the Director-General is satisfied that the relevant consent limits are not being exceeded and are unlikely to be exceeded in the future.

6.3.2 Hours of Operation

Table 16.

Phase	**Location**	**Operating Hours (hrs)**
Construction Phase	Main Project site – maintenance, process, plant construction and testing	24 hours (Monday to Sunday)
	Main project site – construction earthworks	0700-1800 (Monday to Sunday)
	Haul Road (Route 64)	Daytime (0700-1800 Monday to

		Sunday)
	Limestone quarry	0700-1700 (Monday to Sunday)
	Rail siding	0700-1800 (Monday to Sunday)
	Gas and water pipelines	0700-1800 (Monday to Sunday)
Operating phase	Main Project site	24 hours (Monday to Sunday)
	Haul road (Route 64)	24 hours (Monday to Sunday)
	Limestone quarry	0700-1700 (Monday to Sunday) (Truck loading is 24 hours if necessary)
	Rail siding	24 hours (Monday to Sunday)

(a) [72]Condition 6.3.2 does not apply to the delivery of material outside the hours of operation permitted if police or other authorities for safety reasons require the delivery; and/or the operation of personnel or equipment are endangered. In such circumstances, prior notification is provided to the EPA and affected residents as soon as possible, or within a reasonable period in the case of emergency.

(b) [73]The hours of operation specified in this Condition may be varied with the written consent of the EPA, if the EPA is satisfied that the amenity of residents in the locality will not be adversely affected. The Director-General and the Community Consultative Committee is to be advised of any changes to hours of operation approved by the EPA.

6.3.3 Noise Management and Monitoring Plan

(a) The Applicant shall prior to commencement of the mine/quarry/rail siding operations, develop a Noise Management Plan for the mine/quarry and rail siding to the satisfaction of the Director-General. The Plan shall:
   (i) include details of the conduct of noise investigations at six monthly intervals (unless otherwise agreed by the Director-General) to evaluate, assess and report the $L_{Aeq\ (15\ minute)}$ noise emission levels due to normal operations;
   (ii) include details of the proposed methodologies including establishing the mine/quarry's operating configuration; determining survey intervals; weather conditions and seasonal variations; selecting variations, locations, periods and times of measurements;
   (iii) outline the design of any noise modelling or other studies including the means for determining the noise levels emitted by the activities;
   (iv) identify noise affected properties and the relevant noise limits consistent with the EIS,
   (v) specify the procedures for a noise monitoring program for the purpose of undertaking independent noise investigations;

[72] EPA GTA
[73] EPA GTA

(vi) outline the procedure to notify property owners and occupiers likely to be affected by noise from the operations;
(vii) establish a protocol for handling noise complaints that include recording, reporting and acting on complaints;
(viii) record appropriate mechanisms for community consultation;
(ix) outline mitigation measures to be employed on the site to limit noise emissions;
(x) identify longer term strategies directed towards mitigating noise levels that exceed the target noise criteria listed in Tables 10,11 & 12 under adverse meteorological conditions;
(xi) outline measures to be used to reduce the impact of intermittent, low frequency and tonal noise (including truck reversing alarms);
(xii) specify measures to be taken to document any higher level of impacts or patterns of temperature inversions, and detail actions to quantify and ameliorate enhanced impacts if they lead to exceedence of the relevant noise criteria; and,
(xiii) survey and investigate noise reduction measures from plant and equipment annually and report in the AEMR at the conclusion of the first 12 months of site operations and set targets for noise reduction taking into consideration valid noise complaints in the previous year. The Report shall also include remedial measures to achieve compliance with the specified noise goals.

(b) Prior to construction commencing on the mine/quarry and rail siding respectively, the applicant must prepare, and subsequently implement, a Construction Noise Management Plan. The plan must include, but need not be limited to, the following matters:
(i) compliance standards;
(ii) community consultation;
(iii) complaints handling monitoring/system;
(iv) site contact person to follow up complaints;
(v) mitigation measures;
(vi) the design/orientation of the proposed mitigation methods demonstrating best practice;
(vii) construction times;
(viii) contingency measures where noise complaints are received;
(ix). monitoring methods and program.

(c) [74]The Applicant shall, prior to hauling material along the haulage route from the rail siding/quarry to the mine site, prepare and submit to the EPA, a Traffic Noise Management Plan for the mine/quarry and rail siding to the satisfaction of the Director-General for traffic associated with the proposal. The plan shall consider but is not necessarily limited to:

- mitigation measures to be employed to reduce truck noise emissions and meet the relevant EPA criteria set out in the EPA's *Environmental Criteria for Road Traffic Noise*. These may include:

i. limiting usage of exhaust brakes
ii. consideration of the type of road surface
iii. reducing speed limits for trucks
iv. using quiet trucks and/or truck with air bag suspension

[74] EPA GTA

v. strategies for mitigating truck noise emissions that exceed the relevant EPA criteria and describe appropriate actions to be undertaken to reduce noise impacts in the event of complaints being received from residences;
vi. procedures for the ongoing assessment of truck noise impacts on private dwellings and identify procedures for the implementation of reasonable mitigation works on private dwellings adversely impacted by road noise from the operations;
vii. details of monitoring that will be undertaken;
viii. methods for educating drivers in the reduction of truck noise impacts;
ix. scheduling truck movements outside critical time periods
x. details of ongoing community liaison to monitor complaints
xi. phasing in the increased road use

(d) The applicant shall also include a summary of all noise monitoring results in the AEMP.

6.4 ***Light Emissions***

Impact from night lighting will be minimised by :
i. screening or directing all on-site lighting away from residences and roadways to the satisfaction of LSC, PSC, and FSC, and
ii. only lighting where specifically required**.**

7. Transport and Utilities

7.1 Road Transport

(a). The Applicant shall prepare a Traffic Code of Conduct for all haulage vehicles associated with the Syerston Project operating within the Lachlan, Parkes and Forbes Shires prior to commencement of construction and to the satisfaction of LSC, PSC, FSC respectively, in consultation with the Director-General, requiring these haulage vehicles to comply with the Code. The Code shall include, but not be limited to:
- operators conforming to designated haulage routes, including clear stipulation that MR 354 shall not be used by haulage vehicles travelling to/from the Project site, and that any contracts with hauliers have this prohibition clearly stated in the contract;
- hours of operation;
- speed limits;
- vehicle maintenance;
- load coverage;
- behavioural requirements;
- noise; and
- protocols with school bus operations.

The Code of Conduct shall also include measures that will be undertaken by the Applicant in the event it is established that haulage vehicles have not complied with the Code.

(b). The Applicant is to include reports of violations of this condition in its AEMR and to observe any requirements of the Director General regarding the implementation of this condition.

(c). The route to be taken by all restricted access vehicles such as B Doubles type and Road Train type shall conform to the designated routes as prescribed under the Roads Act 1993, and cited as "General Notice for the Operation of B Doubles 1996" (or its latest version), and General Notice for the Operation of Road Trains 1996" (or its latest version).

(d).The Applicant shall provide radio communications between all school buses and haulage operators operating on the materials haulage route between the rail siding and mine site.

7.2 Road Works to be undertaken

(a) The Applicant shall prepare a road construction program detailing the timing and scheduling of road construction required by these conditions to reflect the level of project construction and operation activity and associated road usage. The program shall be prepared in consultation with LSC and PSC and to the satisfaction of the Director-General, prior to commencement of construction.

(b) All works to be undertaken on public roads as detailed in the EIS shall be at the expense of the Applicant. This includes:

- (i) road upgrades as shown on Figure B1-1 of the EIS, including the construction of the Fifield by-pass;
- (ii) the sealing of sections of the Mellrose to Gillenbine Road and Fifield to Wilmartha Road in Lachlan Shire as described in the EIS (refer also subclause 7.2 (e) below);
- (iii) upgrade of intersections subject to increased traffic as identified in Appendix C, section 6.2 of the EIS;
- (iv) all necessary lighting and signage associated with subclauses (i)-(ii) above.

(c) The Applicant shall seal the gravel sections of the Middle Trundle Road (SR 83) in Parkes Shire to a heavy vehicle standard in accordance with AUSTROADS specifications, and also contribute $300,000 (indexed according to the Consumer Price Index (CPI) at the time of payment) to PSC for the upgrade of the remainder of SR 83 to the same heavy vehicle standard. The contribution shall be made immediately prior to commencement of the road upgrade works. The Applicant shall ensure, as far as possible, that all the Middle Trundle Road upgrade works occur concurrently.

(d) Any upgrades to MR 350 between the junctions of SR 83 and SR 171 shall be negotiated as part of the PSC Road Maintenance Agreement (refer condition 7.5) except for those portions of MR 350 between the junctions of SR 83 and SR 171 that may require upgrading for safety reasons, to a 7.5m seal with a 0.5m shoulder, unless otherwise agreed by the Director-General. The portions of road that require upgrading for safety reasons shall be determined by an independent surveyor/engineer mutually agreed to and funded equally by the Applicant and PSC, and the works carried out at the expense of the Applicant.

(e) Condition 7.2(b) (ii) above does not apply if the Applicant and LSC mutually agree to construct Route E as shown in Appendix 2 of LSCs submission to DUAP dated 23 January 2001, subject to any necessary approvals.

In the event that Route E is constructed, the Applicant shall <u>as a minimum</u> contribute funds for the road construction which would equate to the sealing SR 34 and SR 44 as detailed in the EIS. Any additional contribution towards the road upgrade shall be agreed between the Applicant and LSC as part of the

mutual agreement to construct Route E, and may be based on predicted/actual traffic usage of the route by mine traffic (refer also condition 7.5 (b));

(f) Any upgrades to the Springvale Road (SR 60) shall be negotiated as part of the LSC Road Maintenance Agreement (refer condition 7.5) except for those portions of SR 60 that may require upgrading for safety reasons, unless otherwise agreed by the Director-General. The portions of road that require upgrading for safety reasons shall be determined by an independent surveyor/engineer mutually agreed to and funded equally by the Applicant and LSC, and the works carried out at the Applicant's expense.

(g) All road works undertaken at the Applicant's expense on public roads within the Lachlan, Parkes and Forbes Shires as applicable shall be subject to a 12 month defects liability period where all defects shall be repaired at full cost to the Applicant. The 12 month period commences from completion of the relevant road work. A security deposit or bank guarantee of 10% of agreed road work costs shall be lodged with LSC, PSC and LSC as applicable prior to commencement of road works, reducing to 5% on issue of the compliance certificate (refer condition 7.3 (i) below). LSC, PSC, and FSC as relevant shall use the security to make good any roadwork defects if required. Any unspent part of the security will be refunded to the Applicant on expiry of the 12 month defects liability period.

7.3 Submission of Engineering Plans for Roadworks

a) [75]Prior to any work commencing within a public road reserve located within the Lachlan, Parkes or Forbes Shires, the Applicant shall submit for the approval of LSC, PSC or FSC respectively detailed engineering design drawings of intended works. The drawings are to be accompanied by associated sediment control plans, environmental management plans, work method statements and traffic control plans.

b) [76]Environmental management plans shall take into consideration the implications of the "Parkes Shire Roadside Management Plan", Parkes Shire Council 1997, for works to be undertaken in Parkes Shire, particularly identification and treatment of high value roadside vegetation.

c) [77]Road and intersection designs are to be in accordance with the RTA's "Road Design Guide" 1999 (or its latest version) and/or AUSTROADS – Guide to Traffic Engineering Practice series.

d) [78]Intersections shall be designed in accordance with AUSTROADS – Guide to Traffic Engineering Practice Part 5. In adopting intersection configurations as per AUSTROADS, the curve returns, storage lengths and taper distances should reflect the maximum size vehicle expected to use the facility, and the design should accommodate

[75] LSC, PSC, FSC General Terms of Approval

[76] PSC General Terms of Approval

[77] LSC, PSC, FSC General Terms of Approval

[78] LSC, PSC, FSC General Terms of Approval

the sweep path generated by such vehicles.

e) [79]Detailed engineering drawings and specifications shall be in accordance with LSC, PSC and FSC requirements as applicable, and/or AUSTROAD Specifications.

f) [80]Traffic Control Plans are to be in accordance with Australian Standard 1742.3 and/or the RTA's Mannual "Traffic Control at Work Sites", 1998 (or its latest version).

g)[81.] All required road signs, guide posts and other road-side furniture shall be designed and installed by the Applicant in accordance with Australian Standard 1742 and Australian Standard 1743 (or their latest versions).

h)[82.] Suitably located bus stops along the materials haulage route between the rail siding and mine site shall be constructed and sealed by the Applicant. The dimensions of these laybys shall be commensurate with figure 3.4-1 of the RTA's Road Design Guide Issue 1 dated June 1999 (or its latest version), and be provided with a pavement se al. Pavement marking at the layby shall consist of a continuation of the edgeline past the facility.

i) [83]The Applicant is required to obtain a "compliance certificate" from LSC, PSC and FSC, as applicable, certifying that all road, intersection, drainage and pipeline infrastructure within the road reserves in the Lachlan, Parkes and Forbes Shires, as applicable, has been constructed and completed to the satisfaction of LSC, PSC and FSC as relevant. The Applicant shall consult with LSC, PSC and FSC, as applicable, to determine when inspections of works are required and the costs associated with obtaining a compliance certificate.

j) [84]A scaled "works as executed plan" showing the layout of works shall be submitted to LSC, PSC and FSC, as applicable, by the Applicant for approval prior to the issue of a compliance certificate. "Works as executed" plans shall be prepared in accordance with the requirements of LSC, PSC and FSC respectively, and/or AUSTROADS specifications.

k)[85]Prior to commencement of operation of the haul road, all public road intersections within the Lachlan and Parkes Shires as applicable on the haulage route, where turning movements will occur by heavy vehicles servicing the Syerston Project are to be adequately lit in accordance with the requirements of LSC, PSC and RTA respectively. The Applicant shall submit intersection lighting plans for the approval of LSC and PSC, as relevant, prior to installation.

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[79] LSC, PSC, FSC General Terms of Approval

[80] LSC, PSC, FSC General Terms of Approval

[81.] LSC, PSC, FSC General Terms of Approval

[82] LSC, PSC, FSC General Terms of Approval

[83] LSC, PSC, FSC General Terms of Approval

[84] LSC, PSC, FSC General Terms of Approval

[85] LSC, PSC, FSC General Terms of Approval

l)[86.] Roadwork contractors engaged by the Applicant must meet LSC, PSC and FSC's "Contractor Prequalification" requirements prior to undertaking any works in Lachlan, Parkes, or Forbes Shires respectively.

[86.] LSC, PSC, FSC General Terms of Approval

7.4 Road Construction

(a). [87.] The Applicant shall construct the materials transport route sections identified by Fig B1-1 and Fig B2-3 of the EIS (which includes part Lachlan Shire Road Nos. 64, 34, Main Road No.57, proposed Fifield bypass, and part Parkes Shire Road No. 171, and Main Rd No.350), to an 8.5 metre wide two lane sealed carriageway in accordance with AUSTROADS Specifications.

(b). [88.] The Applicant shall provide a minimum three (3) metre wide shoulder, in addition to the 8.5 metre sealed pavement required by sub-clause (a) above, for a minimum of 30 metres on either side of all minor roads along the haulage route. Property access roads shall be appropriately prepared and sealed 3.5 metres wide.

(c). [89.] The priority at the intersection of Parkes Shire Rd No.171 and Main Rd No. 350 shall remain with the main road and to comprise the installation of stop signs. Observance of such signs is to be written into the Code of Conduct (refer condition 7.1(a)).

(d). [90.] The intersections of Parkes Shire Road No. 83 with State Route No. 90 and Main Road No.350 respectively shall be upgraded by the Applicant to a Type C AUSTROADS Specification, prior to construction and to the satisfaction of Parkes Shire Council or RTA as relevant.

7.5 Road Maintenance

(a) The Applicant shall enter into a Road Maintenance Agreement for the rail siding to mine site haulage route with LSC and PSC prior to completion of the rail siding to mine site road upgrade. The Agreement shall include a requirement for a joint inspection every six months, or as agreed by LSC and PSC as relevant, following completion of the road upgrade, to determine and assess as to whether maintenance is required, and to stipulate that should maintenance be required and not be carried out within one month of the inspection, the LSC and/or PSC as applicable, will be entitled to carry out such maintenance work at the Applicant's cost.

(b) Notwithstanding sub clause 7.5 (a) above, the Applicant shall also enter into a Road Maintenance Agreement with LSC, PSC and FSC prior to commencement of construction, for other roads within the relevant Shires which are likely to be used by traffic to the Project site. The Agreement shall include: the requirement for a traffic monitoring and reporting process to be developed and implemented at the Applicant's expense, to identify the use of roads by mine traffic; and mechanisms to calculate contributions for road maintenance commensurate with mine/quarry traffic use as identified by traffic monitoring.

7.6 Railway Level Crossings

[87.] LSC, PSC General Terms of Approval

[88.] LSC, PSC General Terms of Approval

[89.] PSC General Terms of Approval

[90.] PSC General Terms of Approval

The rail crossing on Main Road No. 350 located between the junctions of Shire Road No 83 (Middle Trundle Road) and Shire Road No. 171; and the rail crossing on Shire Road No. 171 located adjacent to the proposed rail siding, shall be audited by the Applicant prior to construction, to determine the level of compliance with Section 6 of the RTA's Traffic Engineering manual and requisite adjustments made as required to the satisfaction of PSC.

7.7 Stock Crossing Management Plan

The applicant shall prepare a Stock Crossing Management Plan which details measures to be undertaken to ensure adequate and safe crossing for stock and farm machinery when crossing or moving along access roads or stock routes to be used by construction and operational traffic. The plan is to be prepared in consultation with FSC, LSC, PSC, the Rural Lands Protection Board, and the CCC and to the satisfaction of the Director-General prior to the commencement of construction.

7.8. Provision of utility services

Prior to the construction the Applicant shall consult with affected service authorities and make arrangements satisfactory to those authorities for the protection or relocation of services (such as transmission lines, pipelines, optic cables etc) prior to the commencement of project construction. This shall include consultation with the Ministry of Energy and Utilities in regard to the construction of the proposed gas pipeline.

7.8.1. Sewage Treatment plant

a. The applicant must :

- assess and consider the reuse of treated effluent from the sewage treatment plants, including the monitoring of land and potential receiving water;

- [91]provide sufficient design and engineering detail in relation to the on-site sewage treatment system and effluent reuse/disposal to allow the EPA to be in a position to issue the required Environment Protection Licence. The information referenced above must be provided to the EPA with an application for an Environment Protection Licence being made by the applicant.

b. The design of the effluent management system should include (but not necessarily be limited to) consideration of the following:
    - The measures that will be employed to ensure any effluent discharges do not limit the ability of receiving waters to meet relevant water quality objectives as described in *Water Quality and River Flow Interim Environmental Objectives – Guidelines for River, Groundwater and Water Management Committees – Macquarie River Catchment*.
    - The reuse of treated effluent from the sewage treatment plant. The design of the system should consider the EPA's draft guideline "Utilisation of Treated Effluent by Irrigation". Monitoring of land and potential receiving waters to determine the impact of waste water application may be required by the EPA.

[91] EPA GTA

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7.9 *Pipelines Construction and Operation*

The Applicant shall construct and operate the gas and water pipelines in accordance with the requirements of any pipeline permit/licence granted by the Minister for Energy under the Pipelines Act.

7.10 Rail Siding Environmental Management Plan

(a) Prior to construction commencing, the Applicant shall prepare a Rail Siding Environmental Management Plan (RSEMP) to the satisfaction of Director General and in consultation with the DLWC, LSC and PSC.

(b) The RSEMP shall include but not be limited to:

(i) demonstrating consistency with the conditions of this consent and any other statutory approvals;

(ii) providing the basis for implementing operations, environmental management, and ongoing monitoring; and

(iii) identifying a schedule of development for the project for the period covered by the plan and include:

- the area proposed to be impacted by the rail loading/unloading activities and remediation measures
- areas of environmental, heritage or archaeological sensitivity and mechanisms for appropriately minimising impact

(iv) Erosion control measures during construction including details of temporary sediment and erosion control systems to be used during construction, topsoil management and measures for the protection of watercourses.(refer Condition 3.5)

(v) Water management proposals during construction including separation of clean and dirty water runoff, and contingency plans for managing adverse impacts on surface and groundwater during construction.

(vi). Details of rehabilitation proposals for disturbed areas (refer Condition 3.6).

(vii). Proposals for on-going maintenance of fences and pastures and control of weeds, vermin, and feral animals.

(viii). Measures for the control of dust during construction.

(ix). Details of landscaping and measures to blend surface structures with the surrounding landscape.

(x) Measures for minimising noise during construction including:

- Construction hours,
- compliance standards;
- community consultation;
- complaints handling monitoring/system;
- site contact person to follow up complaints;
- mitigation measures;
- the design/orientation of the proposed mitigation methods demonstrating best practice;
- contingency measures where noise complaints are received;
- monitoring methods and program.

A copy of the RSEMP, shall be forwarded to , LSC and PSC within 14 days of approval by the Director-General, EPA and DLWC.

8. Monitoring/Auditing

(a) In addition to the requirements contained elsewhere in this consent, the Director-General may, at any time in consultation with the relevant government authorities and Applicant, require the monitoring programs in Conditions 3,4 and 6 to be revised/updated to reflect changing environmental requirements or changes in technology/operational practices. Changes shall be made and approved in the same manner as the initial monitoring programs. All monitoring programs shall also be made publicly available at LSC, PSC and FSC within two weeks of approval of the relevant government authority.

(b) All sampling strategies and protocols undertaken as part of any monitoring program shall include a quality assurance/quality control plan and shall require approval from the relevant regulatory agencies to ensure the effectiveness and quality of the monitoring program. Only accredited laboratories shall be used for laboratory analysis.

(c) Where agreement cannot be reached between the Applicant and a landholder alternative arrangements are to be agreed with the Director General and/or relevant regulatory authority.

(d) The Applicant shall obtain land holder agreement for monitoring on private property.

8.1 Third Party Monitoring/Auditing for the project

Independent Environmental Audit

(a) Every three years from the commencement of construction of the nickel/cobalt mine, or as otherwise directed by the Director-General, the Applicant shall conduct an *Independent Environmental Audit* of the project components in accordance with *ISO 14010 – Guidelines and General Principles for Environmental Auditing and ISO 14011 – Procedures for Environmental Auditing* (or the current versions) and in accordance with any specifications of the Director-General. Copies of the report shall be submitted by the Applicant to the Director-General, LSC, PSC FSC, EPA, DLWC, DMR, NPWS and the CCC within two weeks of the report's completion for comment

(b) The audit shall:

i. assess compliance with the requirements of this Consent, licence and approvals;
ii. assess the development against predictions in the EIS;
iii. review the effectiveness of the environmental management of the development, including any mitigation works;
iv. be carried out at the Applicant's expense; and
v. be conducted by a duly qualified independent person or team approved by the Director-General.

(c) The Director-General may, after considering an audit report and any submissions made by the EPA, DLWC, PSC, LSC and FSC on the report, notify the Applicant of any reasonable requirements for compliance with this Consent. The Applicant shall comply with those requirements within such time as the Director-General may direct.

Hazard Audit

Twelve months after the commencement of operation of the Nickel/ Cobalt Processing Facility, or within such further period as the Director-General may agree, the Applicant shall carry out a comprehensive Hazard Audit of the Project and within one month of the Audit submit a report to the Director-General. The Audit shall be carried out at the Applicant's expense by a duly qualified independent person or team approved by the Director-General prior to the commencement of the Audit. Further Audits shall be carried out every three years, or as required by the Director-General. Hazard Audits shall be carried out in accordance with the Department's publication *Hazardous Industry Planning Advisory paper No. 5 - Hazard Audit Guidelines*. The Hazard Audit shall include a review of the site Safety Management System and a review of all entries made in the incident register since the previous Audit. The Applicant shall comply with the reasonable requirements of the Director-General in response to the findings and recommendations of the Audit.

8.2 Meteorological

8.2.1.Meteorological monitoring

(a). [92]Prior to commissioning of the processing facility the applicant must undertake the following works to the satisfaction of the EPA:

(i) A campaign of upper-level meteorological monitoring at the project site which is sufficient to validate the dispersion modelling studies prepared for the EIS. In particular, the applicant should demonstrate that the stack top wind speeds estimated from the on-site surface-level meteorological measurements are consistent with upper-level measurements;
(ii) Carry out additional dispersion modelling using on-site upper-level meteorological monitoring data;
(iii) Prepare a report detailing the results of the above study and the implications with respect to dispersion of pollutants from the premises; and

The applicant should ensure that all meteorological monitoring conducted for the project is undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

(b). [93]The Applicant shall undertake sampling and analysis of the meteorological parameters specified in the following Table. Sampling and analysis of meteorological parameters must be undertaken strictly in accordance with the methods and the frequencies specified in the table. Meteorological monitoring equipment must be sited in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Table 17. Requirements for Monitoring of Surface Meteorology.

Parameter	Units of measure	Averaging Period	Method[1]	Frequency
Wind Speed @ 10 m	m/s	1 hour	AM2 & AM-4	Continuous
Wind Direction @ 10 m	°	1 hour	AM-2 & AM-4	Continuous
Sigma Theta @ 10 m	°	1 hour	AM-2 & AM-4	Continuous
Temperature @ 10 m	°K	1 hour	AM-4	Continuous
Temperature @ 2 m	°K	1 hour	AM-4	Continuous
Solar radiation	W/m^2	1 hour	AM-4	Continuous
Rainfall	mm	24 hours	AM-4	Continuous
Additional requirements		Method[1]		

[92] EPA GTA
[93] EPA GTA

Siting	AM-1 & AM-4
Measurement	AM-2 & AM-4

Note [94]All methods are specified in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* and all monitoring must be conducted strictly in accordance with the requirements outlined in this document.

8.2.2 Meteorological station

The proponent must install a meteorological station at the mine in accordance with the requirements of AS 2922 1987 "Ambient Air Guide for Siting of Sampling Units". The Meteorological station must be capable of recording wind direction and speed, temperature and sigma theta and be operated in accordance with the requirements of AS 2923-1987 "Ambient Air Guide Horizontal Wind for Air Quality Application".

9. Reporting

9.1 Reports on Operations

The Applicant shall report on mine/quarry operations in accordance with the Mine operations Plan (Condition 2.1).

9.2. *Incident reporting and recording*

(a) Within 24 hours of any incident or potential incident with actual or potential significant off-site impacts on people or the biophysical environment, a report shall be supplied to the Department outlining the basic facts. A further detailed report shall be prepared and submitted following investigations of the causes and identification of necessary additional preventative measures. That report must be submitted to the Director-General no later than 14 days after the incident or potential incident.

(b) The Applicant shall maintain a register of accidents, incidents and potential incidents. The register shall be made available for inspection by the Director-General at any time.

9.2 Environmental Reporting

9.2.1 Annual Environmental Management Report (AEMR)

a. The Applicant shall, throughout the life of the project and for a period of at least three years after the completion of mining or processing operations, whichever occurs the later, prepare and submit an Annual Environmental Management Report (AEMR) to the satisfaction of the Director-General. The AEMR shall review the performance of the operations against the Environmental Management Strategy, the conditions of this consent, and other licences and approvals relating to the operations. To enable ready comparison with the EIS's predictions, diagrams and tables, the report shall include, but not be limited to, the following matters:

i. an annual compliance audit of the performance of the project against conditions of this consent and statutory approvals;

ii. a review of the effectiveness of the environmental management of the mine/quarry/rail siding in terms of EPA, DLWC, DMR , LSC, PSC and FSC requirements;

[94] EPA GTA

iii. results of all environmental monitoring required under this consent or other approvals, including interpretations and discussion by a suitably qualified person;
iv. identify trends in monitoring results over the life of the project;
v. an assessment of any changes to agricultural land suitability resulting from the project, including cumulative changes;
vi. a listing of any variations obtained to approvals applicable to the subject area during the previous year;
vii. rehabilitation report; and
viii. environmental management targets and strategies for the next year, taking into account identified trends in monitoring results.

(b) In preparing the AEMR, the Applicant shall:
i. respond to any requests made by the Director-General or DMR for any additional requirements;
ii. comply with any requirements of the Director-General, DMR or other relevant government agency; and
iii. ensure that the first report is completed and submitted within twelve months of this consent, or at a date determined by the Director-General in consultation with the LSC, PSC, FSC and the EPA.

(c) The Applicant shall ensure that copies of each AEMR are submitted at the same time to DUAP, EPA, DMR, DLWC, LSC, FSC and PSC, and made available for public information at LSC, PSC & FSC within fourteen days of submission to these authorities. A copy of the AEMR shall be made available to the Community Consultative Committee.

9.3 Recording and Reporting Requirements

9.3.1. Reporting conditions

a. [95]The applicant must provide an annual return to the EPA in relation to the development as required by any licence under the Protection of the Environment Operations Act 1997 in relation to the development. In the return the applicant must report on the annual monitoring undertaken (where the activity results in pollutant discharges), provide a summary of complaints relating to the development, report on compliance with licence conditions and provide a calculation of licence fees (administrative fees and, where relevant, load based fees) that are payable. If load based fees apply to the activity the applicant will be required to submit load-based fee calculation worksheets with the return.

b. The results of any monitoring required to be conducted by the EPA's general terms of approval, or a licence under the Protection of the Environment Operations Act 1997, in relation to the development or in order to comply with the load calculation protocol must be recorded and retained as set out in conditions 9.3.1(c) and 9.1.3 (d)

c. All records required to be kept by the licence must be:
- in a legible form, or in a form that can readily be reduced to a legible form;
- kept for at least 4 years after the monitoring or event to which they relate took place; and

[95] EPA GTA

- produced in a legible form to any authorised officer of the EPA who asks to see them.

d. The following records must be kept in respect of any samples required to be collected: the date(s) on which the sample was taken;
   - the time(s) at which the sample was collected;
   - the point at which the sample was taken; and
   - the name of the person who collected the sample.

9.3.2. General conditions

[96]The applicant must nominate at least two persons (and their telephone numbers) who will be available to the EPA on a 24 hours basis, and who have authority to provide information and to implement such measures as may be necessary from time to time to address a pollution incident or to prevent pollution from continuing as directed by an authorised officer of the EPA.

10. Community Consultation/Obligations

10.1 Community Consultative Committee

(a) establish a Community Consultative Committee and ensure that the first meeting is held prior to submission of the Environmental Management Strategy (Condition 3.2). Selection of representatives shall be to the satisfaction of the Director-General in consultation with the Applicant, LSC, PSC, and FSC. The Committee shall be chaired by an independent chairperson appointed by the Director-General. The Committee shall comprise two (2) representatives of the Applicant (including the Environmental Officer), the Chairperson, one (1) representative from each Council and four (4) community representatives ((two (2) from Lachlan Shire, one (1) from Forbes Shire and one (1) from Parkes Shire)).

Representatives from relevant government agencies or other individuals may be invited to attend meetings as required by the Chairperson. The Committee may make comments and recommendations about the implementation of the development and environmental management plans, monitor compliance with conditions of this consent and other matters relevant to the operations during the term of the consent. The Applicant shall ensure that the Committee has access to the necessary plans for such purposes. The Applicant shall consider the recommendations and comments of the Committee and provide a response to the Committee and Director-General.

(b) The Applicant shall, at its own expense:
   i. nominate two (2) representatives to attend all meetings of the Committee;
   ii. provide to the Committee regular information on the progress of work and monitoring results;
   iii. promptly provide to the Committee such other information as the Chair of the Committee may reasonably request concerning the environmental performance of the development;
   iv. provide access for site inspections by the Committee; and

[96] EPA GTA

v. provide meeting facilities for the Committee, and take minutes of Committee meetings. These minutes shall be available for public inspection at PSC, FSC & LSC within 14 days of the meeting.

(c) The Applicant shall establish a trust fund or other funding arrangement to be managed by the Chair of the Committee to facilitate the functioning of the Committee, and pay $2000 per annum to the fund for the duration of operations on the Project Site, or as otherwise directed by the Director-General. The monies are to be used only if required for the engagement of consultants to interpret technical information and the like. The annual payment shall be indexed according to the Consumer Price Index (CPI) at the time of payment. The first payment shall be made by the date of the first Committee meeting. A record of the finances of the trust or other funding arrangement during each year shall be provided to the Director-General and Applicant by the Chair on each anniversary of the first payment. Any unspent monies shall be returned to the Applicant each year.

10.2 Complaints

(a) The Environmental Officer (refer Condition 3.1) shall be responsible:

i. for recording complaints with respect to the operations on a dedicated and publicly advertised telephone line, 24 hours a day, 7 days a week, entering complaints or comments in an up-to-date log book, or other suitable data base, and ensuring that a response is provided to the complainant within 24 hours;

ii. providing a report of complaints received every six months throughout the life of the project to the Director-General, EPA, DLWC, DMR , PSC, LSC and FSC or as otherwise agreed by the Director-General. A summary of this report shall be included in the AEMR (Condition 9.2.1).

11. Land acquisition relating to area of affectation

Note: In Condition 11 (a)-(h) "land" means the whole of a lot in a current plan registered at the Land Titles Office as at the date of this consent.

(a) The owner of any dwelling, or vacant land located in areas that exceed noise acquisition and/or air quality criteria established in accordance with this consent, and at any time after the granting of development consent, may request the Applicant in writing to purchase the whole of that property.

(b) The Applicant shall negotiate and purchase a property, as identified in sub-clause (a) above, within six (6) months of a written request from the affected land owner.

(c) In respect of a request to purchase land arising under this condition, the Applicant shall pay the owner the acquisition price which shall take into account and provide payment for:

i. a sum not less than the current market value of the owner's interest in the land at the date of this consent as if the land was not affected by the operations, having regard to:

- the existing use and permissible use of the land in accordance with the applicable planning instruments at the date of the written request; and
- the presence of improvements on the land and/or any PSC approved building or structure which although substantially commenced at the date of request is completed subsequent to that date.

ii the owner's reasonable compensation for disturbance allowance and relocation costs within the Parkes, Lachlan or Forbes Local Government Areas, or within such other location as may be determined by the Director-General in exceptional circumstances;

iii. the owner's reasonable costs for obtaining legal advice and expert witnesses for the purposes of determining the acquisition price of the land and the terms upon which it is to be acquired.

(d) Notwithstanding any other condition of this consent, the landowner and the Applicant may, upon request of the landowner, acquire any property affected by the project during the course of this consent on terms agreed to between the Applicant and the landowner.

(e) In the event that the Applicant and any owner referred to in this condition cannot agree within the time limit upon the acquisition price of the land and/or the terms upon which it is to be acquired, then:

(i) either party may refer the matter to the Director-General, who shall request the President of the Australian Institute of Valuers and Land Economists to appoint a qualified independent valuer or Fellow of the Institute, who shall determine, after consideration of any submissions from the owners, a fair and reasonable acquisition price for the land as described in sub-clause (c) and/or terms upon which it is to be acquired;

(ii) in the event of a dispute regarding outstanding matters that cannot be resolved, the independent valuer shall refer the matter to the Director-General, recommending the appointment of a qualified panel. The Director-General, if satisfied that there is need for a qualified panel, shall arrange for the constitution of the panel. The panel shall consist of:

- the appointed independent valuer,
- the Director-General or nominee, and
- the President of the Law Society of NSW or nominee.

(f) The qualified panel shall determine a fair and reasonable acquisition price as described in sub-clause (c) above and/or the terms upon which the property is to be acquired.

(g) The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Director-General and the costs of determination referred to in sub clauses (c) and (d).

(h) Upon receipt of a determination pursuant to sub-clauses (c) and (d), the Applicant shall, within 14 days, offer in writing to acquire the relevant land at a price not less than the determination. Should the Applicant's offer to acquire not be accepted by the owner within six (6) months of the date of such offer, the Applicant's obligations to purchase the property shall cease, unless otherwise agreed by the Director-General.

(i). In the event that only part of the land is to be transferred to the Applicant, the Applicant shall pay all reasonable costs associated with obtaining PSC approval to any plan of subdivision and registration of the plan at the Office of the Registrar-General.

12. Financial contributions for community enhancement

i. Prior to the commencement of construction, the applicant shall obtain the approval of the Director-General, for a community enhancement plan to provide for the social and associated implications of the proposed development.

ii. The community enhancement plan shall be prepared by an independent person/organisation approved by the Director-General and paid for by the applicant. The plan shall be prepared in consultation with LSC, PSC and FSC.

iii. The community enhancement plan shall specify the nature, type and amount of contribution, both financial and in kind, to mitigate and/or manage the social and associated community infrastructure requirements emanating as the result of the operation of the development, including on housing, water and sewerage, recreational and other factors, with recognition of the more disadvantaged areas in the region, particularly within the Lachlan Shire.

iv. The community enhancement plan shall also specify the distribution of the financial and/or other inkind contributions between LSC, PSC and FSC generally in proportion to the impacts or as determined by the Director General in liaison with the Councils.

v. The community enhancement plan shall be reviewed every three years or at any other time as otherwise determined by the Director-General in consultation with the Councils. The review shall be undertaken by an independent person/organisation appointed by the Director-General and paid for by the applicant. The review shall reflect experience with operation impacts and the outcome shall be approved by the Director General.

vi. The community enhancement plan (referred to in Condition 11.2 (i) above) shall provide as a minimum for a financial contribution from the Applicant of $300,000 per year for the first fifteen years of the project following commencement of construction. The first payment shall be made on commencement of construction and subsequent payments made on each anniversary thereafter. The payments shall be indexed according to the Consumer Price Index (CPI) at the time of payment. Any additional contribution, financial or in kind, shall be agreed between the proponent and the Councils, and be generally in accordance with the provisions of the plan.

13. Further Approvals and Agreements

13.1 Statutory Requirements

The Applicant shall ensure that all statutory requirements including but not restricted to those set down by the Local Government Act 1993, Protection of the Environment Administration Act 1991, Protection of the Environment Operations Act 1997, Rivers and Foreshores Improvement Act 1948, Water Act 1912, National Parks and Wildlife Act 1974, and all other relevant legislation, Regulations, Australian Standards, Codes, Guidelines and Notices, Conditions, Directions, Notices and Requirements issued pursuant to statutory powers by the LSC, PSC, FSC, EPA, DMR, NPWS, DLWC, RTA, NSW Agriculture, Ministry of Energy, and NSW Fisheries, are fully met.

[97]Except as may be expressly provided by a licence under the Protection of the Environment Operations Act 1997 in relation of the development, Section 120 of the Protection of the Environment Operations Act 1997 must be complied with in and in connection with the carrying out of the development.

13.2 Structural Adequacy

Detailed plans and specifications relating to the design and construction of all structural elements associated with the proposed development are to be submitted to the Principal Certifying Authority prior to the commencement of construction works. Such plans and specifications must be accompanied by certification provided by a practicing professional structural engineer or an accredited certifier certifying the structural adequacy of the proposed building design and compliance with the Building Code of Australia.

13.3 Verification of Construction

(a) Upon completion of building works and prior to the issue of an occupation certificate, a certificate/s prepared by a suitably qualified person or a compliance certificate/s issued by an accredited certifier, is to be submitted to the Principal Certifying Authority certifying that the following building components, where relevant, have been completed in accordance with approved plans and specifications:

i. footings;
ii. concrete structures, including ground floor and any subsequent floors, retaining walls and columns;
iii. framing and roof structure;
iv. fire protection coverings to building elements required to comply with the Building Code of Australia; and
v. mechanical ventilation.

(b) The certificate/s shall demonstrate at what stage of construction inspections were undertaken.

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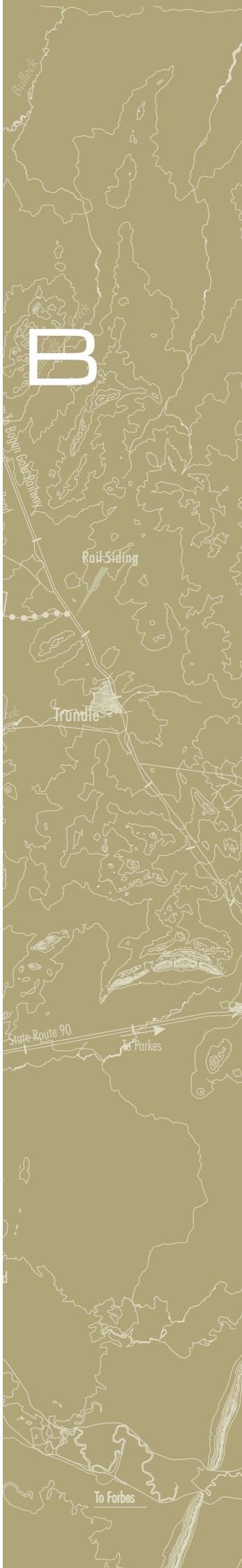
[97] EPA GTA

Appendix B

IVP's Letter of 18 April 2005 to DIPNR



IVANPLATS SYERSTON PTY LIMITED

ABN 21 008 755 155

Project Office:
Level 5, 190 St Georges Terrace
Perth, WA
Postal Address:
GPO Box 2783 Cloisters Square,
Perth WA 6001

19 April 2005

Department of Infrastructure, Planning and Natural Resources
20 Lee St,
Sydney, NSW 2000

Attention: David Kitto – Manager, Mining and Extractive Industries
By email: david.kitto@dipnr.nsw.gov.au

Dear Sir

Syerston Nickel Cobalt Project
Development Consent Modification

To aid your consideration of relevant requirements for a Statement of Environmental Effects (SEE) supporting an application under S96[2] to modify the conditions of the development consent for the Syerston Nickel Cobalt Project, please find following our understanding of the outcomes of the meeting held on 8 February 2005 and relevant correspondence[1].

The SEE will:

- Clearly identify the proposed modifications;
- Justify the proposed modifications;
- Assess the proposed modifications against the relevant provisions of the Lachlan and Parkes Shires Local Environmental Plans; and
- Assess the potential impacts of the proposed modifications, and describe what measures would be implemented to prevent, mitigate, and/or manage the potential impacts at the Mine and Processing Facility (MPF) and Limestone Quarry.

Potential impacts associated with the following will be addressed for the MPF:

- Air (gaseous emissions) and noise;
- Traffic;
- Waste management; and
- Surface and ground water (waste water management and water supply).

Potential impacts associated with the following will be addressed for the Limestone Quarry:

- Air (dust emissions) and noise; and
- Traffic (including potential impacts on stock movement).

[1] Modification Briefing Paper, dated 27 January 2005.

Consultation is proposed with the Department of Environment and Conservation, Parkes Shire Council, Lachlan Shire Council and adjoining landowners during the development of the SEE.

Could you please confirm that the above reflects DIPNR's requirements for an SEE.

Yours faithfully,

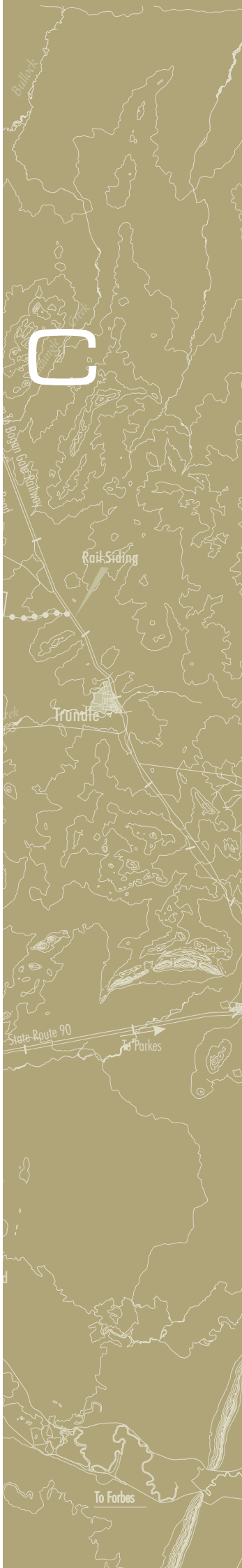
Ivanplats Syerston Pty Ltd.

Mick Ryan
Project Manager

cc Resource Strategies

Appendix C

Air Quality Assessment



HEGGIES
AUSTRALIA

10 May 2005

Heggies Air Quality Syerston Section 96(2)-h

Ivanplats Syerston Pty Ltd
C/- Resource Strategies Pty Ltd
Level 1, 11 Lang Parade
Milton
QUEENSLAND 4064

Attention: Mr Mick Ryan

Dear Sir

Syerston Nickel Cobalt Project Modifications - Assessment of Potential Air Quality Impacts

Ivanplats Syerston Pty Ltd is proposing to modify the original Development Consent for the Syerston Nickel Cobalt Project (Project) by submitting an Application to Modify a Development Consent under s96(2) of the *Environment Planning and Assessment Act 1979,* accompanied by a Statement of Environmental Effects (SEE).

Accordingly, attached is an assessment of potential air quality impacts in relation to the proposed modification to the subject Project, which includes the following information:

- A background to the proposed modification to the Project.
- A summary of the air quality impacts of the original Syerston Nickel Cobalt Project.
- An assessment of the likely changes in air quality impacts associated with the proposed modification to the Project, covering the mine, processing, and limestone quarrying components of the Project.

Regards

PETER GEORGIOU

AAAC
MEMBER FIRM
OF THE ASSOCIATION
OF AUSTRALIAN
ACOUSTICAL
CONSULTANTS

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1 Background

The original Black Range Minerals Pty Ltd Syerston Nickel Cobalt Project (the Project) has been purchased by Ivanplats Syerston Pty Ltd (IVP). IVP intends to modify the Project Development Consent. The Department of Infrastructure, Planning and Natural Resources (DIPNR) has advised IVP that the Development Consent modification application requires the preparation of a Statement of Environmental Effects (SEE).

The Project is located approximately 45 kilometres (km) north-east of Condobolin in western New South Wales and will produce mixed nickel cobalt sulphide precipitate, to be transported to the rail siding, approximately 25 km south-east of the Mine and Processing Facility (MPF) site for transport to Newcastle.

2 Proposed Project Modification

The proposed modification relates predominately to a change in the autoclave feed rate of ore from 2.3 million tonnes per annum (Mtpa) to approximately 2.5 Mtpa and removing the refinery section of the processing plant. This results in the following proposed changes:

- alterations to the general arrangement of the MPF;
- an increase in the production of mixed nickel and cobalt sulphide;
- a change in transport movements;
- alterations to process consumables;
- a reduction in power consumption;
- the removal of waste liquid streams; and
- a reduction in the workforce.

The proposed modification would also involve changes to the Limestone Quarry (Quarry) by way of an increase in annual production and revised general arrangement (including waste emplacement footprint).

Presented in **Table 1** is a summary of how the proposed modification may affect the product and process consumables required for the modified Project.

Table 1 Project Modification Details – Changes to Product and Process Consumables

Project Component	Original Approved Project	Modified Project
NICKEL-COBALT ORE		
Pressure Acid Leach Autoclave Feed Rate	• 2.3 Mtpa	• 2.5 Mtpa
PRODUCT		
Product	• Production of up to 42,000 tonnes per annum (tpa) of mixed sulphide precipitate or up to 20,000 tpa of nickel and 5,000 tpa of cobalt	• Production of up to 53,000 tpa of mixed sulphide precipitate
PROCESS CONSUMABLES/TRANSPORT		
Magnesium Oxide, Extractant, Modifier, Diluent	• Environmental Impact Statement (EIS) levels	• None required
Caustic Soda	• 10,000 tpa (1 delivery every two days)	• 100 tpa (4 deliveries per year)
Sulphur	• 210,000 tpa (average 12x48 tonne (t) road train deliveries per day)	• 260,000 tpa (average 15x48t road train deliveries per day)
Flocculant	• 900 tpa	• 1,100 tpa
Limestone	• 560,000 tpa (average 36 return trips per day using 48t road trucks quarry to MPF)	• 790,000 tpa (average 45 return trips per day using 48t road trucks quarry to MPF)

Presented in **Table 2** is a summary of how the proposed modification may affect the air quality related emissions associated with the modified Project.

Table 2 Project Modification Details – Air Quality Related Emissions

Project Component	Original Approved Project	Modified Project
ATMOSPHERIC EMISSIONS		
Carbon dioxide emission rate	• Tailings neutralisation vent stack: 1.22 kilograms/second (kg/s) • Leach Liquor Neutralisation Tank Vents: 2.83 kg/s • Power Plant HRSG: 4.5 kg/s • Hydrogen Reformer Stack: 0.48 kg/s • Total: 9.03 kg/s	• Tailings neutralisation vent stack: 1.6 kg/s (13% increase) • Leach Liquor Neutralisation Tank Vents: 3.7 kg/s (31% increase) • Power Plant HRSG: 3.5 kg/s (22% decrease) • Hydrogen Reformer Stack: 0.55 kg/s (15% increase) • Total: 9.3 kg/s (3% increase)
Gaseous emission rate from Sulphide Filter Extraction Fan	4.2 Nm^3/s (dry, 273K, 101.3 kPa)	5.3 Nm^3/s (dry, 273K, 101.3 kPa) (26% increase)
Gaseous emission rate from Sulphuric Acid Plant stack	17.0 Nm^3/s (dry, 273K, 101.3 kPa)	19.2 Nm^3/s (dry, 273K, 101.3 kPa) (13% increase)
Gaseous emission rate from Flare Stack	0.52 Nm^3/s (dry, 273K, 101.3 kPa)	0.65 Nm^3/s (dry, 273K, 101.3 kPa) (25% increase)
Gaseous emission rate from Hydrogen Reformer Stack	1.23 Nm^3/s (dry, 273K, 101.3 kPa)	1.42 Nm^3/s (dry, 273K, 101.3 kPa) (15% increase)
Gaseous emission rate from Power Plant HRSG	23.8 Nm^3/s (dry, 273K, 101.3 kPa)	18.4 Nm^3/s (dry, 273K, 101.3 kPa) (23% decrease)

3 Air Quality Impact Assessment of Original Approved Project

A summary of the air quality impacts of the original approved Project can be found in the following documentation prepared for the Project EIS:

- P. Zib & Associates Pty Ltd, *"Assessment of Air Quality for the Syerston Nickel Cobalt Project near Condobolin, NSW"*, August 2000 – herein referred to as the Zib EIS Report,

Additional air quality information prepared post-EIS but prior to approval being granted for the original approved Project can be found in the following documentation:

- P. Zib & Associates Pty Ltd, *"Assessment of Air Quality for the Syerston Nickel Cobalt Project near Condobolin, NSW – Supplementary Information"*, October 2000 – herein referred to as the Zib post-EIS Supplementary Report.

The above air quality assessments covered both:

- proposed emissions from the processing plant (involving extraction of nickel and cobalt sulphides and metal products), expressed through maximum emission rates of NO_X (compared against CAPER 1997) and maximum ground level concentrations of sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and hydrogen sulphide (H_2S); and
- fugitive emissions from the mine site (mining of the ore deposit) and limestone quarry operations (off-site), expressed through dust deposition (compared against the New South Wales Environment Protection Authority amenity based criteria of a maximum acceptable increase of $2g/m^2$/month) and maximum ground level concentrations of PM_{10} (compared against the NEPM 24-hour PM_{10} goal of 50 micrograms per cubic metre [$\mu g/m^3$]).

4 Air Quality Impacts of the Modification Proposal – Mine Operations

Fugitive emissions (ie. dust and particulate matter) would continue to be the prime air quality concerns of interest for the mine operations with the modification proposal.

4.1 PM_{10} Concentrations

Presented in **Table 3** is a summary of predicted 24-hour PM_{10} concentrations for Year 5 of the mine operation for the original approved Project – refer to Table 3 of the Zib post-EIS Supplementary Report. This table also includes the predicted 6th highest value that would correspond to the highest value for Currajong Park. This value is of interest as the NEPM PM_{10} goal is defined as a value not to be exceeded more than five times per year

Table 3 Original Approved Project – Predicted PM_{10} Concentrations at Nearest Residences [1]

Residence	Highest All-Year-Round Value	6th Highest Value
Currajong Park	80 $\mu g/m^3$	44 $\mu g/m^3$
Rosehill	50 $\mu g/m^3$	
Sunrise	45 $\mu g/m^3$	
Victoria Park[2]	41 $\mu g/m^3$	
Group 1[3]	31 $\mu g/m^3$ to 37 $\mu g/m^3$	
Group 2[4]	20 $\mu g/m^3$ to 26 $\mu g/m^3$	

Note 1 Values obtained from Table 3 of the Zib post-EIS Supplementary Report.

Note 2 Although documented in the EIS as being abandoned, results for the Victoria Park residence are included to maintain consistency with the Zib post-EIS Supplementary Report.

Note 3 The Zib post-EIS Supplementary Report reports that Group 1 residences consist of “Slapdown”, “Brooklyn”, “Flemington”, “Wanda Bye”, “Glenburn”, “Kelvin Grove” and “Milverton”. Relevant locations are shown in the EIS.

Note 4 The Zib post-EIS Supplementary Report reports that Group 2 residences consist of “Vale Head” and “Tarran Vale” and the northern edge of Fifield. Relevant locations are shown in the EIS.

It can be seen that, for the original approved Project, all predicted 24-hour PM_{10} levels were below the NEPM goal of 50 $\mu g/m^3$ (the value not to be exceeded more than five times per year).

Table 4 shows again estimated 24-hour PM_{10} concentrations for Year 5 of the mine operation for the original approved Project – refer to Table 3 of the Zib post-EIS Supplementary Report.

A conservative estimate has been made by Heggies of the likely 6th highest value that would correspond to this highest value for residences other than Currajong Park - this estimate was determined in the Zib post-EIS Supplementary Report. The Heggies estimates are made on the basis of numerous modelling exercises carried out by Heggies in similar mine site environments. This value is of interest as the NEPM PM_{10} goal is defined as a value not to be exceeded more than five times per year.

Table 4 Original Approved Project and Modified Project – Predicted PM_{10} Concentrations at Nearest Residences

Residence	Highest All-Year-Round Value [1]	Original Approved Project 6th Highest Value [2]	Modified Project 6th Highest Value [2]
Currajong Park	80 μg/m^3	44 μg/m^3	49 μg/m^3
Rosehill	50 μg/m^3	40 μg/m^3	44 μg/m^3
Sunrise	45 μg/m^3	36 μg/m^3	40 μg/m^3
Victoria Park[3]	41 μg/m^3	33 μg/m^3	37 μg/m^3
Group 1[4]	31 μg/m^3 to 37 μg/m^3	25 μg/m^3 to 30 μg/m^3	28 μg/m^3 to 33 μg/m^3
Group 2[5]	20 μg/m^3 to 26 μg/m^3	16 μg/m^3 to 21 μg/m^3	18 μg/m^3 to 23 μg/m^3

Note 1 Values obtained from Table 3 of the Zib post-EIS Supplementary Report.

Note 2 Currajong Park value obtained from Zib post-EIS Supplementary Report. Remaining values estimated by Heggies using ratios of 6th highest / highest from past quarry studies. These studies have indicated ratios of 6th highest / highest levels ranging from 0.5 to 0.8. The 0.8 ratio was used in the above table.

Note 3 Although documented in the EIS as being abandoned, results for the Victoria Park residence are included to maintain consistency with the Zib post-EIS Supplementary Report.

Note 4 The Zib post-EIS Supplementary Report reports that Group 1 residences consist of "Slapdown", "Brooklyn", "Flemington", "Wanda Bye", "Glenburn", "Kelvin Grove" and "Milverton". Relevant locations are shown in the EIS.

Note 5 The Zib post-EIS Supplementary Report reports that Group 2 residences consist of "Vale Head" and "Tarran Vale" and the northern edge of Fifield. Relevant locations are shown in the EIS.

It is proposed to increase the amount of mine product to be processed through the pressure acid leach autoclave from 2.3 Mtpa to 2.5 Mtpa (9% increase).

Most of the fugitive emissions associated with the operation of the mine would be linearly-related to the daily throughput of material. For example fugitive emissions from truck movements and loading of material into trucks would be linearly-related.

Remaining sources of fugitive emissions would occur at rates less than that associated with a linear increase in daily throughput. For example, the overall areas of exposed material prone to wind erosion prior to mine rehabilitation works would be kept at about the same magnitude as the original mine operation.

Accordingly, a conservative estimate of the increase in fugitive emissions associated with the modified mine operation would be of the order of 9% - these values are also shown in **Table 4**.

It can be seen that, for the proposed modification, predicted 6th highest 24-hour PM_{10} levels would comply with the NEPM goal of 50 μg/m^3 (the value not to be exceeded more than five times per year).

This predicted compliance of the modification proposal would rely on the same levels of controls being applied to the mine operation, including watering disturbed areas, road maintenance, prevention of truck overloading and the resulting spillage during loading and hauling, use of dust suppressants or cover crops on stockpiles and progressive rehabilitation of disturbed areas.

4.2 Dust Deposition

The Zib EIS Report included predictions of increases in dust deposition arising from operations of the MPF for Years 1, 5, 10 and 20 of the Project.

Taking into account the worst-case scenario (Year 10) in relation to dust deposition, all non-Company owned residences located in the vicinity of the Project were predicted to receive increases in the mean annual dust deposition rate of 0.5 g/m^2/month or less. These increases are well within the New South Wales (NSW) Department of Environment and Conservation (DEC) Environment Protection Authority (EPA) criterion of 2.0 g/m^2/month.

As noted above, it is proposed to increase the amount of mine product to be processed through the pressure acid leach autoclave from 2.3 Mtpa to 2.5 Mtpa (9% increase). Hence, a conservative estimate of the increase in dust deposition associated with the modified MPF would be of the order of 9%.

This would result in an increase in the worst-case mean annual dust deposition rate of 0.55 g/m^2/month for the proposed modification, still well within the NSW DEC (EPA) criterion for dust deposition.

5 Air Quality Impacts of the Modification Proposal – Quarry Operations

Fugitive emissions (ie. dust and particulate matter) would continue to be the prime air quality concerns of interest for the limestone quarry operations with the modification proposal.

5.1 PM_{10} Concentrations

Table 5 shows estimated 24-hour PM_{10} concentrations for Year 5 of the limestone quarry operation for the original approved Project – refer to Table 4 of the Zib post-EIS Supplementary Report. In addition to the Zib "highest" estimates, a conservative estimate has been made by Heggies of the likely 6th highest value that would correspond to this highest value, on the basis of numerous modelling exercises carried out by Heggies in similar quarry site environments. This value is of interest as the NEPM PM_{10} goal is defined as a value not to be exceeded more than five times per year.

It can be seen that, for the original approved Project, all predicted 24-hour PM_{10} levels were below the NEPM goal of 50 μg/m^3, even for the "highest" value shown in the table.

Table 5 Original Approved Project – Predicted PM_{10} Concentrations at Nearest Residences

Residence	Highest All-Year-Round Value [1]	6th Highest Value [2]	6th Highest Value [2] Increased by 25%
Abandoned (east of MLA)	46 μg/m^3	38 μg/m^3	48 μg/m^3
Danganmore	34 μg/m^3	27 μg/m^3	34 μg/m^3
Lesbina	29 μg/m^3	23 μg/m^3	29 μg/m^3
The Troffs	25 μg/m^3	20 μg/m^3	25 μg/m^3
Reas Falls	17 μg/m^3	14 μg/m^3	18 μg/m^3

Note 1 Values obtained from Table 4 of the Zib post-EIS Supplementary Report

Note 2 Values estimated by Heggies using ratios of 6th highest / highest from past quarry studies. These studies have indicated ratios of 6th highest / highest levels ranging from 0.5 to 0.8. The 0.8 ratio was used in the above table.

It is proposed to increase the amount of limestone product to be sent to the crushing facility at the quarry from 560,000 tpa to 790,000 tpa. A preliminary assessment of changes to dust emissions as a result of the production increase has been made. This assessment indicates that the dust emission rates from the relevant activities/sources identified in Attachment A.5 of Appendix K of the EIS would not necessarily increase as a result of the production increase. The assessment showed that the overall increase in dust emissions would be in the order of around 20%. For example, dust emissions from ore haulage would increase, however emissions from grading roads and wind erosion would remain unchanged.

Accordingly, a conservative estimate of the increase in fugitive emissions associated with the modified quarry operation would be of the order of 25% - these values are also shown in **Table 5**.

It can be seen that, for the modified Project, predicted 6th highest 24-hour PM_{10} levels would comply with the NEPM goal of 50 $\mu g/m^3$ (the value not to be exceeded more than five times per year).

This predicted compliance of the modification proposal would rely on the same levels of controls being applied to the limestone quarry operation, including watering disturbed areas, road maintenance, prevention of truck overloading and the resulting spillage during loading and hauling, use of dust suppressants or cover crops on stockpiles and progressive rehabilitation of disturbed areas.

5.2 Dust Deposition

The Zib EIS Report included predictions of increases in dust deposition arising from operations of the limestone quarry for Years 5 and 21 of the Project.

All non-Company owned residences located in the vicinity of the Project were predicted to receive increases in the mean annual dust deposition rate of 0.2 g/m^2/month or less. These increases are well within the NSW DEC (EPA) criterion of 2.0 g/m^2/month.

As noted above, it is proposed to increase the amount of limestone product to be sent to the crushing facility at the quarry from 560,000 tpa to 790,000 tpa leading to an increase in dust deposition associated with the modified quarry operation of the order of 25%.

This would result in an increase in the mean annual dust deposition rate of 0.25 g/m^2/month for the proposed modification, still well within the NSW DEC (EPA) criterion for dust deposition.

6 Air Quality Impacts of the Modification Proposal – Processing Operation

6.1 Continuous Emissions from the Processing Operation

Presented in **Table 6** is a summary of emissions from continuous point sources associated with the proposed processing operations for the original approved Project – refer to Table 2 of the Zib post-EIS Supplementary Report.

Table 6 Original Approved Project – Predicted Point Source Emissions

Source	Emission Rate	Emission Concentration[3] (Original Approved Project)	Emission Concentration (Proposed Modification)	CAPER Standard[2]
Sulphur Dioxide				
Sulphuric Acid Plant	25.7 g/s	1.51 g/m^3	1.51 g/m^3	2.8 g/m^3
Hydrogen Sulphide				
Sulphide Filter Extraction Fan	0.0003 g/s	0.07 g/m^3	0.07 g/m^3	5.0 g/m^3
Oxide of Nitrogen	**NO_X [1]**	**NO_X [1]**	**NO_X [1]**	**NO_2**
Flare Stack	0.11 g/s	0.21 g/m^3	0.21 g/m^3	2.0 g/m^3
Hydrogen Reformer Stack	0.12 g/s	0.10 g/m^3	0.10 g/m^3	2.0 g/m^3
Power Plant HRSG	2.6 g/s	0.11 g/m^3	0.11 g/m^3	0.07 g/m^3

Note 1 NO_X emissions consist primarily of NO (nitric oxide) plus a small amount of NO_2, hence expected compliance of the Power Plant HRSG emissions of NO_2.

Note 2 Standard specified in the *Clean Air (Plant and Equipment) Regulation 1997* (CAPER).

Note 3 Emission concentration calculated on the basis of relevant considerations included in the Development Consent and Table 2.

It can be seen that, for the original approved Project, all predicted emission concentrations were within the CAPER Standard goals set for the Project.

Table 6 shows no change to the emission concentrations as a result of the proposed modification. Volumetric flow rate changes which correspond to the volumetric emission rate changes identified in **Table 2** would maintain the emission concentrations described for the original approved Project.

It can be seen that, for the modified Project, all predicted emission concentrations would still be within the CAPER Standard goals set for the Project. Furthermore, it is understood that the modification proposal includes removal of the refinery component of the MPF. Removal of the refinery would result in reduced emissions due to the removal of the sulphide leach vent, nitric vent fan and electrowinning vent discharge points (ie. removal of discharge points 5, 6, 7, 15 and 16 nominated in Development Consent Condition 6.1.5). CAPER standards and goals would therefore no longer apply to these points.

6.2 Ground Level Concentrations Associated with Processing Operation Emissions

The Zib EIS Report contained estimates of ground level concentrations of SO_2, NO_X and H_2S.

- The predicted 1-hour, 24-hour and mean annual ground level concentrations (glc) of SO_2 were well within the corresponding NEPM goals (0.20 [parts per million] ppm, 0.08 ppm and 0.02 ppm respectively).
- The predicted 1-hour and mean annual glc of NO_2 were within the corresponding NEPM goals (0.12 ppm and 0.03 ppm, respectively).
- The predicted 3-minute concentrations of H_2S were within the Victorian design value of 0.14 µg/m^3.

These emission predictions were re-visited in the Zib post-EIS Supplementary Report by carrying out sensitivity testing of the dispersion modelling schemes used for the Project. The conclusion of this sensitivity testing was that the original (EIS) modelling had resulted in very conservative predictions, especially for low windspeed/neutral stability atmospheric conditions – refer for example to Table 1 of the Zib post-EIS Supplementary Report. In fact, the Zib post-EIS Supplementary Report concluded that the refined predictions subsequently made for the processing operation were a factor of 2-4 times lower than the EIS estimates.

As discussed above in **Section 6.1** and shown in **Table 6**, there would be no change to the emission concentrations described in the original approved Project. It is therefore clear that ground level concentrations associated with the proposed modification would continue to comply with all air quality goals (NEPM for SO_2 and NO_2 and Victorian H_2S). In addition, the removal of the discharge points associated with the refinery (refer to **Section 6.1** above) would further support this conclusion.

It is noted that the EIS contained recommendations for air quality control measures associated with the processing operation, including for example the potential need to determine actual concentrations of NO_2 (ie. the ratio of NO and NO_2) in non-continuous emissions. These recommendations should be retained for the proposed modification.

7 Conclusion

Heggies Australia has examined air quality impacts associated with the modification proposed for the original approved Project by IVP, in relation to the MPF and limestone quarry operations supporting the Project.

We find that, as in the case of the original approved Project, the proposed modification would comply with all NSW air quality goals (CAPER Standard for processing operation emissions, NEPM for SO_2, NO_2 and PM_{10} and the Victorian H_2S design goal).

It is assumed that all air quality control recommendations made in the original EIS would be retained for the modification proposal.

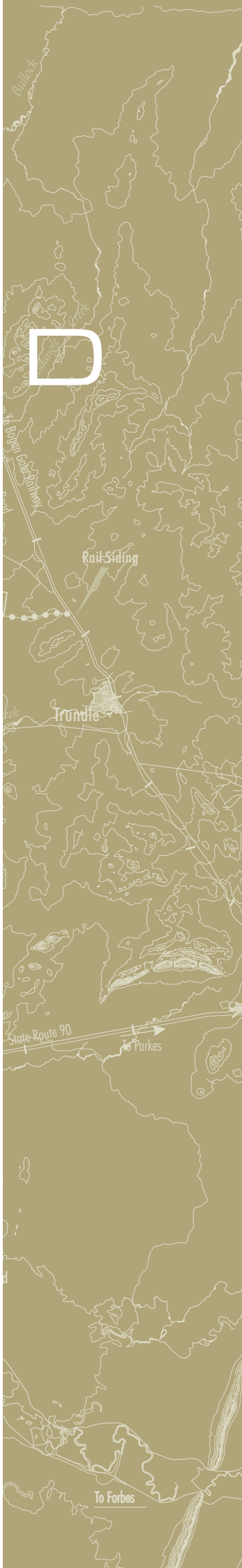
8 References

P. Zib & Associates Pty Ltd (2000), "Assessment of Air Quality for the Syerston Nickel Cobalt Project near Condobolin, NSW", in *Syerston Nickel Cobalt Project Environmental Impact Statement.*

P. Zib & Associates Pty Ltd (2000), "*Assessment of Air Quality for the Syerston Nickel Cobalt Project near Condobolin, NSW – Supplementary Information"*.

Appendix D

Noise and Blast Assessment



HEGGIES
AUSTRALIA

11 May 2005

10-4061 Syerston Modification 20050511

Ivanplats Syerston Pty Ltd
C/- Resource Strategies
Level 1
11 Lang Parade
MILTON QLD 4064

Attention: Mr Mick Ryan

Dear Sir

Syerston Nickel Cobalt Project Modification
Assessment of Potential Noise and Blasting Impacts

Ivanplats Syerston Pty Ltd is proposing to modify the original Development Consent for the Syerston Nickel Cobalt Project (Project) by submitting an Application to Modify a Development Consent under s96(2) of the *Environment Planning and Assessment Act 1979,* accompanied by a Statement of Environmental Effects (SEE).

Accordingly, attached is an assessment of potential noise and blasting impacts in relation to the proposed modification to the subject Project, which includes the following information:

- A background to the proposed modification to the Project.
- A summary of the noise and blasting impacts of the original Syerston Nickel Cobalt Project.
- An assessment of the likely changes in noise and blasting impacts associated with the proposed modification to the Project, covering the mine, processing, limestone quarrying and transportation components of the Project.

Regards

DICK GODSON

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1 Background

The original Black Range Minerals Pty Ltd Syerston Nickel Cobalt Project has been bought by Ivanplats Syerston Pty Ltd (IVP). IVP intend to modify the Project Development Consent. The Department of Infrastructure, Planning and Natural Resources (DIPNR) has advised IVP that the Development Consent modification application requires the preparation of a Statement of Environmental Effects (SEE).

The Project is located approximately 45 kilometres (km) north-east of Condobolin in western New South Wales and will produce mixed nickel and cobalt sulphide precipitate, to be transported to a rail siding, approximately 25 km south-east of the Mine and Processing Facility (MPF) site for transport to Newcastle.

2 Proposed Project Modification

The proposed modification relates predominately to a change in the autoclave feed rate of ore from 2.3 million tonnes per annum (Mtpa) to approximately 2.5 Mtpa and removing the refinery section of the MPF. This results in the following proposed changes:

- alterations to the general arrangement of the MPF;
- an increase in the production of mixed nickel and cobalt sulphide;
- a change in transport movements;
- alterations to process consumables;
- a reduction in power consumption;
- the removal of waste liquid streams; and
- a reduction in the workforce.

The proposed modification would also involve changes to the limestone quarry (Quarry) by way of an increase in annual production and revised general arrangement (including the waste emplacement footprint).

Presented in **Table 1** is a summary of the original approved Project components and how the proposed modification may affect the noise and blasting aspects of the original approved Project.

Table 1 Project Modification Details

Project Component		Original Approved Project	Modified Project
1	**Nickel-Cobalt Ore**		
Pressure Acid Leach Autoclave Feed Rate		• 2.3 Mtpa	• 2.5 Mtpa
2	**Products**		
2.1	Product	• Production of up to 42,000 tonnes per annum (tpa) of mixed sulphide precipitate or up to 20,000 tpa of nickel and 5,000 tpa of cobalt	• Production of up to 53,000 tpa of mixed sulphide precipitate
2.2	Product Transport	• Up to 42,000 tpa nickel-cobalt sulphides or up to 20,000 tpa nickel and 5,000 tpa cobalt • Backloaded in trucks from MPF to rail siding • Up to 1 backload train trip per fortnight required to transport annual load of 42,000 tpa product from rail siding to Newcastle (calculated using train capacity and annual production rate)	• 53,000 tpa nickel-cobalt sulphides • Backloaded in trucks from MPF to rail siding • 1 backload train trip per fortnight required to transport annual load of 53,000 tpa product to Newcastle (calculated using train capacity and annual production rate)

Project Component		Original Approved Project	Modified Project
3	**Transport of Process Consumables**		
3.1	Magnesium Oxide	• 21,000 tpa • B-double trucks to transport magnesium oxide by road from Young (as per EIS Appendix C Transport Assessment) • 2 deliveries per week required to transport annual load of 21,000 tpa (as per EIS Appendix C Transport Assessment)	No magnesium oxide required
3.2	Caustic Soda	• 10,000 tpa • Transported by rail from Sydney in containers attached to interstate train to Parkes. Pulled by contract locomotive from Parkes to rail siding (as per EIS Appendix C Transport Assessment) • Transported by truck from rail siding to MPF (5 x 48 t road train fleet)(as per EIS Appendix C Transport Assessment). • Average of 1 delivery every two days to MPF required to transport annual load of 10,000 t (as per EIS Appendix C Transport Assessment)	• Decrease to 100 tpa • Total of 4 deliveries required per year to transport annual load of 100 t
3.3	Extractant	• 3,000 Litres per annum (Lpa) • Monthly shipments from Canada (as per EIS Appendix C Transport Assessment) • Transported monthly by road to MPF (as per EIS Appendix C Transport Assessment)	No extractant required
3.4	Modifier	• 1,500 Lpa • Monthly shipments from USA (as per EIS Appendix C Transport Assessment) • Monthly transport by road to MPF (as per EIS Appendix C Transport Assessment)	No modifier required
3.5	Diluent	• 15,000 Lpa • Monthly transport by road from east coast to MPF (as per EIS Appendix C Transport Assessment)	No diluent required

Project Component	Original Approved Project	Modified Project
3.6 Sulphur	• 210,000 tpa • Monthly shipments from overseas to Newcastle of 20,000 to 50,000 t of sulphur (as per EIS Appendix C Transport Assessment) • Trains transporting sulphur from Newcastle to rail siding will each have 44 wagons (39 purpose built sulphur carrying containers and 5 conventional containers for miscellaneous goods). The containers will have 24 t capacity, so each train will carry 1,872 t of sulphur (as per EIS Appendix C Transport Assessment) • Two round trips required per week to transport sulphur from Newcastle to the rail siding (as per EIS Appendix C Transport Assessment) • Fleet of 5 road trains transporting 2 x 24 t sulphur containers per load to MPF from rail siding (as per EIS Appendix C Transport Assessment) • Average of 12 x 48 t road train deliveries per day required to transport annual load of 210,000 tpa to MPF (as per EIS Appendix C Transport Assessment)	• 260,000 tpa • Monthly shipments from overseas to Newcastle of 20,000 to 50,000 t of sulphur (as per EIS Appendix C Transport Assessment) • Trains transporting sulphur from Newcastle to Trundle rail siding will each have 44 wagons (39 purpose built sulphur carrying containers and 5 conventional containers for miscellaneous goods). The containers will have 24 t capacity, so each train will carry 1872 t of sulphur (as per EIS Appendix C Transport Assessment) • Three round trips required per week to transport sulphur from Newcastle to the rail siding (calculated using same train sulphur capacity and annual load required) • Same fleet of 5 road trains transporting 2 x 24 t sulphur containers per load to MPF from rail siding (as per EIS Appendix C Transport Assessment) • Average of 15 x 48 t road train deliveries per day required to transport annual load of 260,000 tpa to MPF (calculated using same road train fleet and capacity and annual load required)
3.7 Limestone	• 560,000 tpa • Same side tipping 48 tonnes (t) road truck fleet used for sulphur transport to transport limestone from quarry to MPF • Haulage trucks would operate 24 hours per day • Average of 36 return truck trips per day (as per EIS Appendix C Transport Assessment) • Crushing rate 200 tph	• 790,000 tpa • Average of 45 return truck trips per day using 48 t road trucks operating 24 hours per day • Crushing rate 250 tph

Project Component	Original Approved Project	Modified Project
4 Employees		
4.1 Employee workforce	• Average construction workforce of 600 and peak construction workforce of 1000 • Approximately 400 permanent positions during operational phase	• Construction timeframe may extend due to conditions of Development Consent, resulting in minor decrease in average and peak construction workforce. • The number of permanent positions during the operational phase is likely to reduce to approximately 300
4.2 Operational Traffic	• 300 employee vehicle movements per day (as per EIS Appendix C Transport Assessment) • 150 truck and van raw materials transport vehicle movements per day (as per EIS Appendix C Transport Assessment) • 100 other vehicle movements per day (as per EIS Appendix C Transport Assessment)	• 225 employee vehicle movements per day (Masson, Wilson, Twiney, 2005) • 169 truck and van raw materials transport vehicle movements per day (Masson, Wilson, Twiney, 2005) • 75 other vehicle movements per day (Masson, Wilson, Twiney, 2005)

3 Rail Traffic Noise Impact Assessment

A summary of the weekly train movements on the branch line at the rail siding site was presented in Table 5.2.1 of Appendix K of the Environmental Impact Statement (EIS).

Reference to **Table 1**, Item 3.2 (Caustic Soda) and Item 3.6 (Sulphur) indicates that the modified Project will result in only "*Three round trips ….. per week to transport sulphur from Newcastle to the rail siding"*. Table 11.1.1 of Appendix K of the EIS presented the predicted rail transportation noise at the closest residences to the branch line. This table has been reproduced as **Table 2**.

Table 2 Original Approved Project - Predicted Noise Levels due to Rail Transportation

Receiver	Maximum Number of Train Movements per Day*	Predicted Noise Level		DEC Recommended Criteria	
		LAeq(24hour)	LAmax	LAeq(24hour)	LAmax
Glen Rock	4	35 dBA	38 dBA	60 dBA	85 dBA
Ballenrae	4	33 dBA	14 dBA	60 dBA	85 dBA

* The maximum number of train movements would likely be less than those presented in this table and as such the predicted noise levels are considered to be higher than likely and therefore conservative.

The results presented in **Table 2** indicate that the predicted noise levels are below the Department of Environment and Conservation's (DEC's) recommended train noise assessment criteria at the nearest potentially affected residences.

Consequently, the noise levels resulting from the same number of weekly train movements associated with the modified Project will also be below the DEC's recommended train noise assessment criteria at the nearest potentially affected residences.

4 Road Traffic Noise Impact Assessment

The potential noise impacts of Project related road traffic on the surrounding public road network were assessed for the EIS (Appendix K) via the prediction of existing and future (with the Project operating) peak hourly traffic noise levels on the respective roads. **Table 3** presents the predicted traffic noise levels, reproduced from Appendix K (Table 10.1.1) of the EIS.

Table 3 Original Approved Project - Predicted Existing and Future $L_{Aeq(1hour)}$ Peak Traffic Noise Levels

Receiver	**Road**	**Location**	**Offset Distance**	**Peak Traffic Noise Levels $L_{Aeq(1hour)}$[1]**	
				Existing	**Future (as described in the EIS)**
Fifield Village	Fifield Bypass	-	1100 m	50 dBA	50 dBA
Platina Farm	MR 57 North	North of SR 90	300 m	34 dBA	36 dBA
Gillenbine	SR 64	East of MR 57 North	1100 m	21 dBA	35 dBA
Reas Falls	SR 64	East of MR 57 North	210 m	31 dBA	45 dBA
Glen Rock	MR 350	North of Trundle	750 m	30 dBA	35 dBA
Trundle Township	MR 350	-	20 m	52 dBA	54 dBA
Trundle School	MR 350	-	30 m	49 dBA	50 dBA

Note 1 Rounded to the nearest dBA

Based on the transport assessment for the modified Project (Appendix E), the total operational traffic generation for the Project is now forecast to be approximately 469 vehicle movements per day comprising the following:

- About 225 employee vehicle movements per day.
- About 169 truck and van raw materials transport vehicle movements per day.
- About 75 other vehicle movements per day.

Relative to the vehicle movements upon which the EIS noise level predictions presented in **Table 3** are based, there are now 75 fewer employee vehicle movements, 25 more truck movements and 25 fewer other vehicle movements per day.

Using the worst case situation for recalculating the traffic noise levels, based on increasing the numbers of trucks only (by the ratio of 169:150), **Table 4** presents the road traffic noise levels for the modified Project.

Table 4 Predicted Existing and Modified Future $L_{Aeq(1hour)}$ Peak Traffic Noise Levels

Receiver	Road	Location	Offset Distance	Peak Traffic Noise Levels $L_{Aeq(1hour)}$[1]	
				Existing	Future (as predicted for the proposed modification)
Fifield Village	Fifield Bypass	-	1100 m	50 dBA	50 dBA
Platina Farm	MR 57 North	North of SR 90	300 m	34 dBA	36 dBA
Gillenbine	SR 64	East of MR 57 North	1100 m	21 dBA	35 dBA
Reas Falls	SR 64	East of MR 57 North	210 m	31 dBA	46 dBA
Glen Rock	MR 350	North of Trundle	750 m	30 dBA	36 dBA
Trundle Township	MR 350	-	20 m	52 dBA	54 dBA
Trundle School	MR 350	-	30 m	49 dBA	50 dBA

Note 1 Rounded to the nearest dBA

As was the finding in Appendix K of the EIS, review of the road traffic level predictions given in **Table 4** indicates that all future peak hour noise levels are lower than both the recommended daytime and night-time traffic noise assessment criteria of LAeq (1hour) 60 dBA and 55 dBA respectively, with a marginal future increase of only 1 dBA predicted at Reas Falls and Glen Rock resulting from the modified Project.

Assuming a conservative 10 dBA attenuation (from outside to inside the building), the predicted traffic noise levels at the Trundle School would also be below the recommended DEC criterion for school rooms (internal LAeq [1 hour] of 45 dBA) described in Section 7.4 of Appendix K of the EIS.

5 Blast Emissions Impact Assessment

Blasting for the Project will only be conducted at the Quarry. Mined material at the MPF will be free dug.

The EIS for the original Project nominated on annual production of 560,000 t of limestone. The modified Project nominates an annual production of 790,000 t.

Based on the proposed blast design details presented in Table 12.1.1 of Appendix K of the EIS (and reproduced as **Table 5**), the increased limestone production will result in the number of blasts per year increasing by only 6, from 13 per year to 19 per year.

Table 5 Proposed Blast Design Details for the Quarry

Blast Design Parameter	Typical Dimension
Number of Holes	168
Number of Rows	6
Hole Diameter	102 mm
Hole Inclination	Vertical
Bench Height	15 m
Burden	2.6 m
Spacing	2.6 m
Subdrill	1.0 m
Stemming Depth	2.8 m (aggregate)
Delay Timing	Nonel (single hole per delay)
Column Explosive	ANFO
Powder Factor	0.85 kg/bcm
Maximum Instantaneous Charge (MIC)	87 kg

The levels of ground vibration and airblast at the three nearest potentially affected residences from blasting at the near-point of the Quarry as presented in Appendix K of the EIS (Table 12.2.1) are given in **Table 6**.

Table 6 Predicted Blast Emissions (MIC of 87 kg)

Residence Description	Distance from Nearpoint of Blasting	Predicted Blast Emission Level	
		PVS Ground Vibration Velocity	Peak Linear Airblast Level
Reas Falls	1450 m	0.2 mm/s	104 dBA linear
Danganmore	1650 m	0.1 mm/s	103 dBA linear
The Troffs[1]	1150 m	0.2 mm/s	106 dBA linear

[1] The Troffs is optioned for purchase to IVP

The following demonstrates that, despite an increased frequency of blasting, blast emissions (ie ground vibration and airblast) associated with the modified Project would not exceed relevant criteria for each blast, as was concluded in the EIS. The following are derived from the predicted levels of blast emissions in **Table 6** and the recommended structural damage and human comfort criteria presented in Section 7.6 of Appendix K of the EIS.

- The predicted levels of ground vibration at all residential properties (maximum 0.2 mm/s) are below the structural damage criterion of 15 mm/s recommended for residential buildings in British Standard 7385:Part 2-1993.
- The predicted levels of ground vibration at all residences are also therefore below the human comfort criterion of 5 mm/s for daytime blasting (Monday to Saturday 0900 hours to 1700 hours). Development Consent Condition 6.2.2a states that blasting may only take place between 0900 hours and 1700 hours Monday to Friday inclusive.
- The predicted levels of peak airbast at all residential properties (maximum 106 dB linear) are well below the US Bureau of Mines' structural damage limit of 132 dB linear.

- The predicted levels of peak airblast at all residential properties are also below the human comfort criterion of 115 dB linear for daytime blasting (Monday to Saturday 0900 hours to 1700 hours) recommended by the ANZECC. Development Consent Condition 6.2.2a states that blasting may only take place between 0900 hours and 1700 hours Monday to Friday inclusive.

6 Mine and Quarry Noise Impact Assessment

Removal of the refinery from the MPF has the potential to decrease noise levels at this site. Based on the unchanged mine fleet and equipment at the MPF, the increased feed rate of ore through the processing plant should not affect MPF noise levels.

There are no changes proposed to the Quarry mobile plant relative to the operations prescribed in Appendix K of the EIS. The proposed Quarry would however require an increased crushing rate from 200 tph to 250 tph. A conservative assessment of the effect on overall sound power levels of the limestone crusher results in an increased overall sound power level output of 1 dBA (ie an increase from 118 dBA to 119 dBA). Confirmatory modeling shows that such an increase in the overall sound power level from the crusher would not substantially change the noise levels (ie less than 1 dBA) at the nearest residences assessed in Appendix K of the EIS.

The general arrangement of the Quarry presented in Appendix K of the EIS would change as a result of the modified Project. Relevantly, these changes include revised layouts of the waste emplacements which would act as noise bunds (providing resulting noise attenuation). Although the extent of the emplacements would change in the earlier years of the modified Quarry operation, substantially the same bunding effect would be achieved to the south and southwest of the Quarry pit as presented in the EIS by selectively locating waste emplacements and topsoil stockpiles.

The predicted Quarry operating noise emissions for Year 5 are presented in **Table 7** (presented as Table 9.8.1 in Appendix K of the EIS).

Table 7 Predicted Daytime $L_{Aeq(15minute)}$ Quarry Operating Noise Emissions - Year 5 - dBA

Location	**$L_{Aeq(15minute)}$ Noise Emission**	**$L_{Aeq(15minute)}$ Noise Criteria**
	Calm	**Daytime (0700 hrs to 1700 hrs)**
Reas Falls	30	37
Moorelands	**42**	37
Gillenbine	36	37
Lesbina	**38**	36
Hillsdale	24	37
The Troffs[1]	33	36
Eastbourne	**38**	36

[1] The Troffs is optioned for purchase to IVP

Based on the proposed modified equipment, unchanged mine fleet and revised design of the waste emplacements, the Quarry operating noise levels are expected to be the same as those presented in **Table 7**.

In accordance with the above assessment, the potential impacts identified in Appendix K of the EIS would remain unchanged for the modified Project. Similarly, the following proposed mitigative actions presented in the Executive Summary of Appendix K of the EIS for the Quarry and MPF would remain relevant for the modified Project.

- For the Quarry, the conducting of operational monitoring, and, if then required, the construction of additional bunding to mitigate predicted exceedances at Moorelands, supported by confirmatory monitoring of mitigative effects. Additional attenuation works thereafter, if necessary.

- For the MPF, the conducting of confirmatory monitoring throughout operations (notably later in the mine life when exceedances of 3 dBA to 5 dBA at Currajong Park are predicted) followed by actions such as the modification of the noise emissions at the source or receiver, if exceedances are confirmed. Additional attenuation works thereafter if necessary.

7 Conclusion

Heggies Australia has examined the noise and blasting impacts associated with the modified Project by IVP, in relation to the MPF and quarrying operations, road and rail transportation, and blasting operations supporting the modified Project.

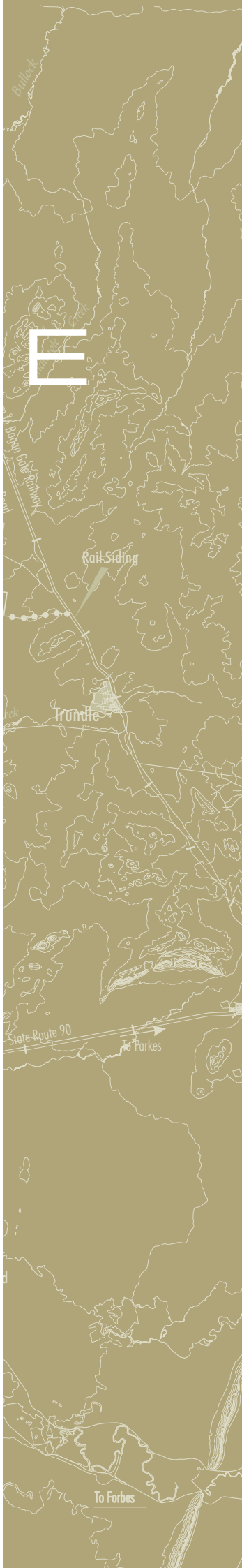
We find that the modified Project would potentially result in no increase in MPF operations, quarry operations or road/rail transportation noise levels (except a marginal 1dBA increase in road traffic noise levels at Reas Falls and Glen Rock) and no difference in blasting impacts.

8 References

Richard Heggie Associates (2000) Construction, Operation and Transportation Noise and Blasting Impact Assessment Syerston Nickel-Cobalt Project in Syerston Nickel-Cobalt Project Environmental Impact Statement. Prepared for Black Range Minerals Ltd.

Appendix E

Traffic Report



TRAFFIC REPORT

Syerston Nickel Cobalt Project

May 2005

Prepared for
Ivanplats Syerston Pty Ltd

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Appendix A - Summary of Original Report A-1
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Appendix B - Development Consent Conditions B-5

1. Introduction

In August 2000, a transport assessment was undertaken by Masson Wilson Twiney to investigate the traffic and transport implications associated with a proposal by the Proponent, Black Range Minerals Pty Ltd, to extract nickel and cobalt from a mine site at Fifield, in the Central West of New South Wales. This transport assessment was included in the Syerston Nickel Cobalt Project Environmental Impact Statement (EIS) (Black Range Minerals, 2001) for the development. For ease of reference, the summary of the original report is provided **Appendix A**.

The Proponent for the proposal has since changed to Ivanplats Syerston Pty Ltd (Ivanplats Syerston). Ivanplats intends to modify the original proposal and as a result this report has been prepared to assess the traffic and transport implications of these changes. This assessment is based on the existing transport system described in the EIS transport assessment.

The remainder of this report is set out as follows:

- Chapter 2 summarises the transport-related differences between the original assessment and the new Ivanplats Syerston proposal;
- Chapter 3 discusses the implications of the associated traffic generation of the new proposal;
- Chapter 4 reviews the likely impact to the transport network surrounding the mine if the Ivanplats Syerston proposal was approved; and
- Chapter 5 provides a summary of the report and presents the conclusions.

2. Proposed Changes

The Syerston Nickel Cobalt project would produce mixed nickel-cobalt sulphide precipitate. The precipitate would then be transported by truck to the Trundle rail siding, approximately 30km west of the mine site, for conveyance by rail to Newcastle.

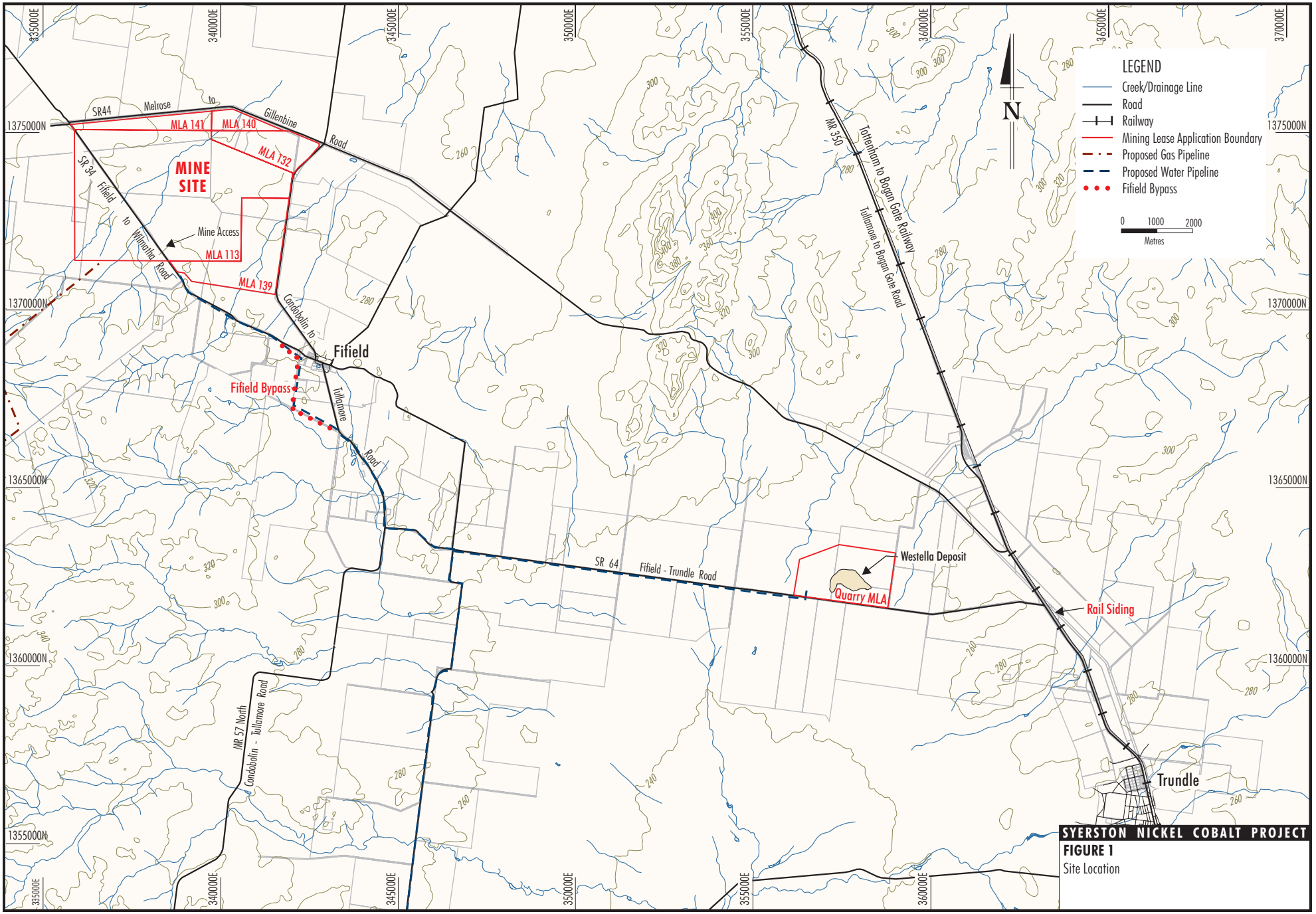
Raw materials such as sulphur would be required at the mine for treatment of the nickel-cobalt ore. These materials would be transported via rail to the Trundle rail siding and then on to the mine site by truck. Limestone would be transported by road from a nearby quarry and miscellaneous items such as fuel, lubricant and bulky goods would be sourced from local suppliers and transported to the mine by road.

A site plan showing the mine location, surrounding road network, the limestone quarry and the Trundle rail siding are provided overleaf in **Figure 1**. The key transport-related differences between the original assessment and the Ivanplats Syerston proposal are summarised below in **Table 2-1**.

Table 2-1– Summary of Key Transport-related Differences

Project Component	Original Project	Modified Proposal
Production	Extraction of up to 42,000 tpa of mixed sulphide precipitate or up to 25,000 tpa of nickel and cobalt	Extraction of up to 53,000 tpa of mixed sulphide precipitate
Operational Workforce	400 employees	300 employees
Limestone Production and Transport	Extraction of up to 560,000 tpa	Extraction of up to 790,000 tpa
	Limestone-related truck movements of 36 return trips per day	Limestone-related truck movements of 45 return trips per day
Sulphur Demand and Transport	Annual demand of 210,000 tpa	Annual demand of 260,000 tpa
	Two rail trips from Newcastle per week and 12 truck deliveries per day	Three rail trips from Newcastle per week and 15 truck deliveries per day
Caustic Soda Demand and Transport	Annual demand of 10,000 tpa	Annual demand of 100 tpa
	One truck delivery from the rail siding every two days	One truck delivery from the rail siding every three months
Magnesium Oxide (Magnesia), Extractant, Modifier and Diluent	2 return trips per day	Not required

Under the Ivanplats Syerston proposal, the increase in limestone demand would see an additional 18 truck movements per day between the quarry and the mine site. The increase in sulphur demand would see an additional 6 truck movements per day between the rail siding and the mine site. However, with magnesium oxide no longer required under the new proposal, this would eliminate 4 truck movements per day between the Young and the mine site. The reduction in caustic soda usage would also see truck movements between the rail siding and the mine site drop from 8 movements per week to just 2 movements every three months.



SYERSTON NICKEL COBALT PROJECT

FIGURE 1

Site Location

IVP-05-01 SEE Transport_001B

3. Implications for Traffic Generation

3.1 Transport of Raw Materials and Product

The assessment of the traffic implications associated with the transportation of raw materials to and from the mine site are based on the following assumptions:

- Trucks transporting raw materials and nickel-cobalt sulphide precipitate between the Trundle rail siding and the mine site would use Main Road 350 (MR350), State Road 64 (SR64), Main Road 57 North (MR57 Nth), the Fifield By-pass and State Road 34 (SR34).
- Trucks transporting limestone from the nearby quarry and the mine site would use State Road 64 (SR64), Main Road 57 North (MR57 Nth), the Fifield By-pass and State Road 34 (SR34).
- Trucks transporting miscellaneous items between local retailers and the mine site would use Main Road 57 North from Condobolin, the Fifield By-pass and State Road 34 (SR34).

The Ivanplats transport routes detailed above are similar to those proposed for the original assessment.

Table 3-1 compares road and rail movements of the original (approved) project with the modified proposal. The numbers provided in **Table 3-1** are indicative of an average week which is why rail movements associated with caustic soda are zero. The transportation of caustic soda by rail would only occur once every three months for the Ivanplats Syerston proposal (see **Section 2**) by general rail traffic.

Table 3-1– Summary of Materials Movement

Product	Daily Truck Movements										Weekly Train Movements[1]	
	Rail Siding		Limestone Quarry		Young		Local Sources		Sydney			
	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.	Orig.	Mod.
Sulphur	24	30									4	6
Caustic Soda	2	-									2	-
Magnesia					4	-						
Limestone			72	90								
Misc. Bulk	4	4										
Other							40	40	4	4		
Fuel/Lubric							1	1				

Note: Orig. = Original Project; Mod. = Modified (Ivanplats Syerston) Proposal
(1) Between Newcastle/Sydney and the rail siding

From **Table 3-1**, it is evident that the modified (Ivanplats) proposal would see an increase of 22 truck movements per day however, on average rail trips generated would be similar to that of the original project.

3.2 Employee Traffic

As mentioned previously in **Section 2**, under the modified proposal the operational workforce of the mine would drop from 400 employees proposed for the original assessment to 300 employees. Thus, traffic attributed to employee-related traffic under the original assessment would be reduced under the Ivanplats Syerston proposal.

The original assessment estimated total employee-related traffic at 300 vehicle movements per day. From similar traffic studies conducted at the Cadia mine near Orange, it was determined that day shift employees travelled with an average of 1.4 employees per vehicle whereas the night shift employees travelled with 1.2 employees per vehicle.

Adopting similar principles to the Ivanplats Syerston proposal, it is anticipated that the new proposal would have a reduced employee-related traffic generation of 225 vehicle movements per day.

Employee homes are expected to be distributed in accordance with the prevailing distribution of population in the vicinity of the mine. Assuming similar distribution to that presented in the original assessment, **Table 3-2** shows the likely reductions in daily and peak-hour employee traffic leading to and from the towns likely to supply mine employees under the modified proposal.

Table 3-2 – Expected Distribution of Employees and Their Traffic

Location	Employee Distribution	Daily Volume (vehicles / day)	
		Original	Modified
Parkes	65.5%	192	147
Trundle	2.5%	8	6
Tullamore	2.0%	6	5
Condobolin	29.0%	84	65
Bogan Gate	0.5%	2	1
Ootha	0.5%	2	1
Total		**294**	**225**

3.3 Other Traffic

Other traffic visiting the mine during its operational phase will include daily consumables, locally sourced spare parts and equipment, maintenance contractors, mine staff visiting off-site facilities, regulating inspectors and general visitors.

The original assessment assumed a further 100 vehicle movements per day to accommodate the additional traffic however as the modified proposal involves reduced staff, it is expected that this ancillary traffic would be similarly reduced to approximately 75 vehicle movements per day. Of these 75 vehicles, it is assumed 90 percent of these would be oriented towards Parkes and 10 percent towards Condobolin.

It is assumed vehicles travelling from Parkes would come via the State Road 90 (SR 90), Main Road 350 (MR 350), State Road 64 (SR64), Main Road 57 North (MR57 Nth), the Fifield By-pass and State Road 34 (SR34). Vehicles travelling from Condobolin would

come via Main Road 57 North, the Fifield By-pass and State Road 34 (SR34). These routes are the same as those outlined in the original proposal. This 'other' traffic would occur mainly between 7:00am and 6:00pm with peak hourly traffic volumes being decreased by perhaps 10 vehicle movements per hour.

4. Implications for Local Transport System

4.1 Rail

On average, the modified proposal would not require any additional rail trips on top of what was estimated in the original project. Every three months caustic soda would be delivered on a general goods train.

4.2 Road

In total, the operational traffic generation of the Ivanplats Syerston proposal is forecast to be approximately 469 vehicle movements per day made up as follows:

- 225 employee vehicle movements per day;
- 169 truck and van raw materials transport vehicle movements per day; and
- 75 'other' vehicle movements per day

In contrast, the original assessment estimated 550 vehicle movements per day.

Of the forecast total number of vehicle movements, truck movements require particular attention when assessing implications for the local transport system. Under the modified proposal, the generated truck volumes would have the greatest impact on roads between the Trundle rail siding and the mine site. These would include Main Road 350, State Road 64, Main Road 57 North, the Fifield By-pass and State Road 34. Mine-related truck volumes for the original assessment and the modified proposal on roads surrounding the mine site are provided below in **Table 4-1**.

Table 4-1 – Comparison of Mine-related Daily Truck Volumes

Road	Location	Future Mine-related Truck Volumes (trucks / day)	
		Original	Ivanplats
SR 34	S of Mine Access	151	169
Fifield By-pass	S of SR 34	151	169
MR 57 Nth	N of SR 64	151	169
MR 57 Nth	S of SR 64	49	45
SR 64	E of MR 57 Nth	102	124
SR 64	E of Limestone Quarry	30	34
MR 350	S of SR 64	30	34

Out of all the roads listed in **Table 4-1**, State Road 64 between Main Road 57 North and the Limestone Quarry would see the greatest increase in mine-related truck movements under the modified proposal with an additional 22 movements per day. However, assuming an operational workday of 10 hours, on average this would equate to an extra 2-3 additional truck movements per hour more than the original assessment. This change is very low and would not necessitate any additional upgrading beyond that originally proposed and required by the Development Consent conditions 7.1 and 7.2 (see **Appendix B**).

5. Conclusion

The modified proposal will involve a higher annual production rate than that proposed for the approved mine. This will result in a slight increase in truck movements. However, this traffic will be to some extent offset by a significant decrease in light traffic as the mine will have fewer employees.

The additional truck traffic will amount to only about three movements per hour on the most affected road. This will not necessitate any road and intersection upgrades beyond those originally required by the EIS and Development Consent conditions 7.1 and 7.2. These are reproduced in **Appendix B**.

With regards to rail traffic, although the increase in sulphur demand would require one additional rail trip each week under the modified proposal, this trip is effectively cancelled out by the elimination of one weekly rail trip associated with the transportation of caustic soda under the original proposal.

Under the modified proposal, caustic soda is required only four times per year and would be delivered on a general goods train.

It is therefore concluded that the recommendations proposed under the original assessment in relation to road and intersection upgrades are still applicable under the modified (Ivanplats) proposal. These are detailed below:

- conduct investigations to determine the possible need for minor safety improvements at railway level crossings on State Route 90, MR350 and the access road to the proposed siding and implement as appropriate
- provide AUSTROADS Type C intersection upgrades at the following intersections:
  - State Route 90/MR350
  - MR350/SR64
  - SR64/limestone quarry access
  - SR64/SR361
  - SR64/SR66
  - SR64/MR57 North with priority to SR64
  - Fifield Bypass/MR57 North
  - Fifield Bypass/SR34
  - SR34/Mine access road
  - State Route 90/MR57 North
- provide 3m wide shoulders for about 30m on each side of MR350 and SR64 at all minor side roads and property accesses
- provide AUSTROADS Type B intersection treatment at the intersection of SR60 with MR57 North
- provide lighting at the intersections of MR350/SR64 and MR 57 North/SR64

- provide appropriate signage at new and upgraded intersections.

Shire Road 44 (Melrose – Gillenbine Road) and Shire Road 34 (Fifield – Wilmatha Road) will need to be bitumen sealed at the same time.

Additional traffic from the mine will necessitate sealing Shire Road 83 over its full length which would make it the principal light traffic route between Parkes to the mine via Trundle. Heavy vehicles associated with the mine will be required to use the nominated route through Bogan Gate. Should the whole of SR83 be upgraded to a standard suitable for heavy vehicles some time in the future, the requirement that heavy vehicles associated with the mine travel through Bogan Gate would no longer be necessary.

Appendix A - Summary of Original Report

A.1 Summary

The Proposal

- It is proposed to develop a nickel – cobalt mine at Fifield in Lachlan Shire.
- 371 persons are expected to work at the mine during the operational phase and approximately 25,000 tpa of nickel and cobalt or 42,000 tonnes of nickel cobalt sulphide precipitate is expected to be produced per annum.
- On site processing of mined ore is proposed.
- Principal raw materials and product are proposed to be transported by rail to/from Newcastle and Sydney and then by truck to the mine site and also by truck from a nearby limestone quarry.
- A new railway siding is proposed to be constructed for loading and unloading trains.

The following are the key findings of this investigation.

Existing Transport System

- Arterial road access to the region is provided by State Route 90 which connects Parkes to Condobolin. This has a two lane sealed carriageway in generally good condition.
- The main route to the mine will be via Main Road 350 which runs from State Route 90 at Bogan Gate to Tullamore via Trundle and thence Shire Route 64 to Fifield.
- Main Road 350 has a two lane sealed carriageway in generally good condition. However it has three level crossings over the Bogan Gate to Tottenham railway which runs parallel to it.
- Shire Road 83 provides a shorter route to Trundle off State Route 90 from the east, however, only part of it is sealed.
- Shire Road 64 between MR350 and Fifield has only a single lane sealed carriageway.
- Condobolin is the nearest town to the mine. Access between it and the mine site is provided by Main Road 57 North (MR57 north) via Shire Route 60 (Springfield Road).
- Traffic volumes on all of these roads are currently low and the roads which are sealed in the vicinity of the mine site and the principal ones leading to and from it presently exhibit 'Good' operating conditions. Those roads which are unsealed presently exhibit 'Fair' or 'Poor' operating conditions.
- Intersections in the area all operate satisfactorily under priority controls.
- Parkes is connected to Sydney by a heavy gauge railway line that crosses the Blue Mountains and to Newcastle by a heavy gauge railway that passes through Dubbo and the Hunter Valley.

- Rail Access Corporation has indicated that the line through the Blue Mountains and the Sydney Metropolitan area has only limited available train paths with goods trains only passing outside of peak commuter hours.

Transport Demands Generation

- At full operation the mine is expected to generate about 550 vehicle movements per day made up as follows:
    - about 300 employee vehicle movements per day
    - about 150 truck and van raw material transport vehicle movements per day
    - about 100 other vehicle movements per day
- During construction the traffic generation of the mine will be variable. It is expected to average about 420 vehicle movements per day but increase to about 580 vehicle movements per day during the peak month of construction.
- Construction of water and gas pipelines to the mine site are indicatively expected to generate a further 50 vehicle movements per day each. The focus of these will vary depending on which part of the pipeline was under construction at the time.
- About six train movements (three each way) are expected to be generated on the Bogan Gate to Tottenham branch railway line each week.
- The rail line through Dubbo and the Hunter Valley will be used for the transport of all bulk materials by rail from Newcastle. The line through the Blue Mountains will only be used for the transport of caustic soda from Sydney.

Implications of Rail Transport

- There is adequate capacity on the railway lines serving the area to accommodate the rail traffic that will be generated by the mine.
- Use of rail will result in a significant reduction in the number of heavy trucks that would otherwise be generated by the mine.

Implications of Road Transport

- As part of the project it is proposed to construct a new road bypass around the south western side of Fifield.
- It is also proposed to upgrade SR64 from the Fifield Bypass to MR350 where the new railway siding is to be constructed. These improvements will satisfactorily cater for the main trucking movements to and from the site.
- The route between the rail siding and the mine will have priority at all intersections except the intersection of MR350/SR64. The intersection of MR57 North and SR64 will need be realigned to make the south approach of MR57 North the stem of the T-intersection. The configuration of this intersection will need to be agreed with Councils and RTA in the detailed design phase.

- Lighting at the intersections of MR350/SR64 and MR57 North/SR64 is required and appropriate signage should be installed at new and upgraded intersections.
- On MR350 it will be necessary to improve intersections at SR64 and at State Route 60.
- Comparison against formal warrants for different types of controls indicates that existing sign only controls at railway level crossings on MR350 are sufficient.
- It is however recommended that the possible need for minor safety improvements be checked at each.
- Subject to this, MR350 will be able to satisfactorily cater for the mine generated traffic.
- SR83 would be likely to attract a large amount of light traffic between Parkes and the mine which would necessitate its sealing. Consultation between the Traffic Sub-Committee members is proposed.
- Lachlan Council proposes as a separate exercise to upgrade Shire Road 60 to replace MR57 North as the principal road route between Condobolin and the mine.
- Shire Road 44 (Melrose – Gillenbine Road) and Shire Road 34 (Fifield – Wilmatha Road) will need to be upgraded at the same time as SR60. The objective would be to then transfer Main Road status from MR57 North to SR60.
- Extra traffic on this route due to the mine is not expected to be high but improved access between Condobolin and the mine would benefit both.
- Aside from the improvements mentioned above, intersections that will be subject to increased turning movements will need to be upgraded to provide sheltered right turn lanes, left turn deceleration lanes and improved left turn radii where appropriate.
- Subject to the improvements mentioned it is considered that the road system would be able to satisfactorily accommodate the generated traffic.

A.2 Conclusions

It is concluded that transport provisions for the proposed mine have been well planned through the proposed use of rail and the proposed substantial upgrading of the route between the mine and the proposed new rail siding.

To ensure satisfactory operation of the road system the following recommendations for additional improvement are made:

- conduct investigations to determine the possible need for minor safety improvements at railway level crossings on State Route 90, MR350 and the access road to the proposed siding and implement as appropriate
- provide AUSTROADS Type C intersection upgrades at the following intersections:
  - State Route 90/MR350
  - MR350/SR64
  - SR64/limestone quarry access
  - SR64/SR361

- SR64/SR66
- SR64/MR57 North with priority to SR64
- Fifield Bypass/MR57 North
- Fifield Bypass/SR34
- SR34/Mine access road
- State Route 90/MR57 North

- provide 3m wide shoulders for about 30m on each side of MR350 and SR64 at all minor side roads and property accesses
- provide AUSTROADS Type B intersection treatment at the intersection of SR60 with MR57 North
- provide lighting at the intersections of MR350/SR64 and MR 57 North/SR64
- provide appropriate signage at new and upgraded intersections.

Lachlan Council proposes as a separate exercise to progressively upgrade sections of Shire Road 60. This will replace MR57 North as the principal road route between Condobolin and the mine.

Shire Road 44 (Melrose – Gillenbine Road) and Shire Road 34 (Fifield – Wilmatha Road) will need to be bitumen sealed at the same time.

Additional traffic from the mine will necessitate sealing Shire Road 83 over its full length which would make it the principal light traffic route between Parkes to the mine via Trundle. Heavy vehicles associated with the mine will be required to use the nominated route through Bogan Gate. Should the whole of SR83 be upgraded to a standard suitable for heavy vehicles some time in the future, the requirement that heavy vehicles associated with the mine travel through Bogan Gate would no longer be necessary.

Appendix B - Development Consent Conditions

v. strategies for mitigating truck noise emissions that exceed the relevant EPA criteria and describe appropriate actions to be undertaken to reduce noise impacts in the event of complaints being received from residences;
vi. procedures for the ongoing assessment of truck noise impacts on private dwellings and identify procedures for the implementation of reasonable mitigation works on private dwellings adversely impacted by road noise from the operations;
vii. details of monitoring that will be undertaken;
viii. methods for educating drivers in the reduction of truck noise impacts;
ix. scheduling truck movements outside critical time periods
x. details of ongoing community liaison to monitor complaints
xi. phasing in the increased road use

(d) The applicant shall also include a summary of all noise monitoring results in the AEMP.

6.4 *Light Emissions*

Impact from night lighting will be minimised by :
i. screening or directing all on-site lighting away from residences and roadways to the satisfaction of LSC, PSC, and FSC, and
ii. only lighting where specifically required.

7. Transport and Utilities

7.1 Road Transport

(a). The Applicant shall prepare a Traffic Code of Conduct for all haulage vehicles associated with the Syerston Project operating within the Lachlan, Parkes and Forbes Shires prior to commencement of construction and to the satisfaction of LSC, PSC, FSC respectively, in consultation with the Director-General, requiring these haulage vehicles to comply with the Code. The Code shall include, but not be limited to:
- operators conforming to designated haulage routes, including clear stipulation that MR 354 shall not be used by haulage vehicles travelling to/from the Project site, and that any contracts with hauliers have this prohibition clearly stated in the contract;
- hours of operation;
- speed limits;
- vehicle maintenance;
- load coverage;
- behavioural requirements;
- noise; and
- protocols with school bus operations.

The Code of Conduct shall also include measures that will be undertaken by the Applicant in the event it is established that haulage vehicles have not complied with the Code.

(b). The Applicant is to include reports of violations of this condition in its AEMR and to observe any requirements of the Director General regarding the implementation of this condition.

(c). The route to be taken by all restricted access vehicles such as B Doubles type and Road Train type shall conform to the designated routes as prescribed under the Roads Act 1993, and cited as "General Notice for the Operation of B Doubles 1996" (or its latest version), and General Notice for the Operation of Road Trains 1996" (or its latest version).

(d).The Applicant shall provide radio communications between all school buses and haulage operators operating on the materials haulage route between the rail siding and mine site.

7.2 Road Works to be undertaken

(a) The Applicant shall prepare a road construction program detailing the timing and scheduling of road construction required by these conditions to reflect the level of project construction and operation activity and associated road usage. The program shall be prepared in consultation with LSC and PSC and to the satisfaction of the Director-General, prior to commencement of construction.

(b) All works to be undertaken on public roads as detailed in the EIS shall be at the expense of the Applicant. This includes:

- (i) road upgrades as shown on Figure B1-1 of the EIS, including the construction of the Fifield by-pass;
- (ii) the sealing of sections of the Mellrose to Gillenbine Road and Fifield to Wilmartha Road in Lachlan Shire as described in the EIS (refer also subclause 7.2 (e) below);
- (iii) upgrade of intersections subject to increased traffic as identified in Appendix C, section 6.2 of the EIS;
- (iv) all necessary lighting and signage associated with subclauses (i)-(ii) above.

(c) The Applicant shall seal the gravel sections of the Middle Trundle Road (SR 83) in Parkes Shire to a heavy vehicle standard in accordance with AUSTROADS specifications, and also contribute $300,000 (indexed according to the Consumer Price Index (CPI) at the time of payment) to PSC for the upgrade of the remainder of SR 83 to the same heavy vehicle standard. The contribution shall be made immediately prior to commencement of the road upgrade works. The Applicant shall ensure, as far as possible, that all the Middle Trundle Road upgrade works occur concurrently.

(d) Any upgrades to MR 350 between the junctions of SR 83 and SR 171 shall be negotiated as part of the PSC Road Maintenance Agreement (refer condition 7.5) except for those portions of MR 350 between the junctions of SR 83 and SR 171 that may require upgrading for safety reasons, to a 7.5m seal with a 0.5m shoulder, unless otherwise agreed by the Director-General. The portions of road that require upgrading for safety reasons shall be determined by an independent surveyor/engineer mutually agreed to and funded equally by the Applicant and PSC, and the works carried out at the expense of the Applicant.

(e) Condition 7.2(b) (ii) above does not apply if the Applicant and LSC mutually agree to construct Route E as shown in Appendix 2 of LSCs submission to DUAP dated 23 January 2001, subject to any necessary approvals.

In the event that Route E is constructed, the Applicant shall as a minimum contribute funds for the road construction which would equate to the sealing SR 34 and SR 44 as detailed in the EIS. Any additional contribution towards the road upgrade shall be agreed between the Applicant and LSC as part of the

mutual agreement to construct Route E, and may be based on predicted/actual traffic usage of the route by mine traffic (refer also condition 7.5 (b));

(f) Any upgrades to the Springvale Road (SR 60) shall be negotiated as part of the LSC Road Maintenance Agreement (refer condition 7.5) except for those portions of SR 60 that may require upgrading for safety reasons, unless otherwise agreed by the Director-General. The portions of road that require upgrading for safety reasons shall be determined by an independent surveyor/engineer mutually agreed to and funded equally by the Applicant and LSC, and the works carried out at the Applicant's expense.

(g) All road works undertaken at the Applicant's expense on public roads within the Lachlan, Parkes and Forbes Shires as applicable shall be subject to a 12 month defects liability period where all defects shall be repaired at full cost to the Applicant. The 12 month period commences from completion of the relevant road work. A security deposit or bank guarantee of 10% of agreed road work costs shall be lodged with LSC, PSC and LSC as applicable prior to commencement of road works, reducing to 5% on issue of the compliance certificate (refer condition 7.3 (i) below). LSC, PSC, and FSC as relevant shall use the security to make good any roadwork defects if required. Any unspent part of the security will be refunded to the Applicant on expiry of the 12 month defects liability period.

7.3 Submission of Engineering Plans for Roadworks

a) [75]Prior to any work commencing within a public road reserve located within the Lachlan, Parkes or Forbes Shires, the Applicant shall submit for the approval of LSC, PSC or FSC respectively detailed engineering design drawings of intended works. The drawings are to be accompanied by associated sediment control plans, environmental management plans, work method statements and traffic control plans.

b) [76]Environmental management plans shall take into consideration the implications of the "Parkes Shire Roadside Management Plan", Parkes Shire Council 1997, for works to be undertaken in Parkes Shire, particularly identification and treatment of high value roadside vegetation.

c) [77]Road and intersection designs are to be in accordance with the RTA's "Road Design Guide" 1999 (or its latest version) and/or AUSTROADS – Guide to Traffic Engineering Practice series.

d) [78]Intersections shall be designed in accordance with AUSTROADS – Guide to Traffic Engineering Practice Part 5. In adopting intersection configurations as per AUSTROADS, the curve returns, storage lengths and taper distances should reflect the maximum size vehicle expected to use the facility, and the design should accommodate

[75] LSC, PSC, FSC General Terms of Approval

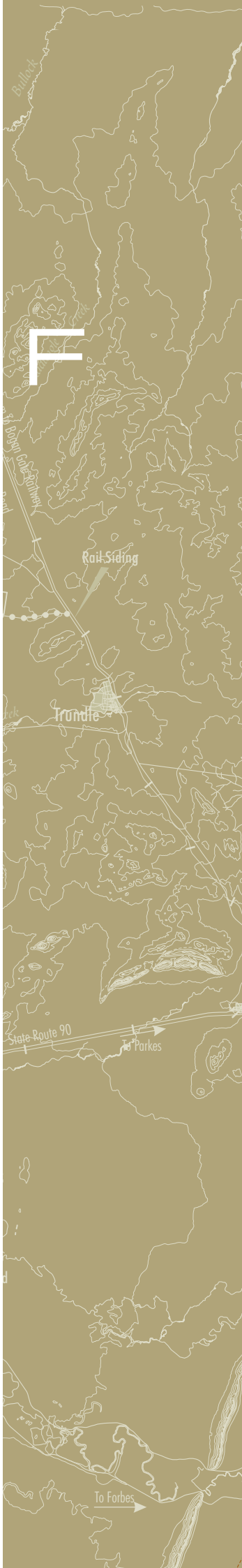
[76] PSC General Terms of Approval

[77] LSC, PSC, FSC General Terms of Approval

[78] LSC, PSC, FSC General Terms of Approval

Appendix F

8 Part Tests of Significance



SYERSTON NICKEL COBALT PROJECT

LIMESTONE QUARRY, RAIL SIDING, MINE AND PROCESSING FACILITY MODIFICATION

EIGHT PART TESTS OF SIGNIFICANCE

PREPARED BY
RESOURCE STRATEGIES PTY LTD

MAY 2005
Project No. IVP-04-01
Document No. 8PT-RO01-E

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1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Syerston Nickel Cobalt Project is owned by Ivanplats Syerston Pty Ltd (IVP). IVP acquired the Project from Black Range Minerals Pty Ltd during July 2004. The Project is located approximately 4.5 kilometres (km) north-west of the village of Fifield and approximately 45 km north-east of Condobolin in the Central West Region of New South Wales (NSW) (Figure 1).

The Syerston Nickel Cobalt Project includes the construction, operation and rehabilitation of a nickel cobalt mine, processing facility and service infrastructure to provide road access, water and natural gas to the site.

The major components of the Project comprise:

- an open pit mining operation;
- an ore processing facility, including refinery;
- production plants for ore processing reagents including sulphuric acid, hydrogen sulphide, hydrogen, oxygen and nitrogen;
- a natural gas fired co-generation plant for electricity and steam generation;
- mine waste emplacements;
- a tailings storage facility;
- process water evaporation ponds and surge dam;
- water treatment facilities, administration offices and workshop/maintenance facilities;
- a limestone quarry;
- a dedicated rail siding;
- a materials transport route between the limestone quarry, rail siding and the mine and processing facility (MPF);
- two borefields for provision of process water and an associated water supply pipeline; and
- a natural gas pipeline from the existing Moomba to Sydney gas pipeline south of Condobolin to the mine and processing facility site.

The original Development Application (DA) for the Syerston Nickel Cobalt Project was assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). Development Consent for the Syerston Nickel Cobalt Project was granted on 23 May 2001.

A Statement of Environmental Effects (SEE) has been prepared by IVP to support an application to modify the Syerston Nickel Cobalt Project Development Consent under Section 96(2) of the EP&A Act. The proposed modified development is referred to as the Project herein.

The proposed modifications include increasing the annual throughput of ore to the pressure acid leach autoclaves in the processing facility from 2.3 million tonnes per annum (Mtpa) to around 2.5 Mtpa and removing the refinery section of the processing plant. These modifications are required in order to improve the financial viability of the Project and to reduce project risk. As a consequence of the modifications, the amount of power, natural gas and number of reagents required for processing the ore are reduced. Additional modifications to the quarry operations have also been proposed. A detailed description of the Project modifications is provided in the SEE.

1.2 PURPOSE AND SCOPE

The purpose of this document is to assess the modified Project for significant effects on threatened species, populations, ecological communities, and their habitats in accordance with Section 5A of the EP&A Act.

A list of threatened species, populations and endangered ecological communities known or considered possible occurrences in the Project area and surrounds was compiled in consideration of a number of references and factors including:

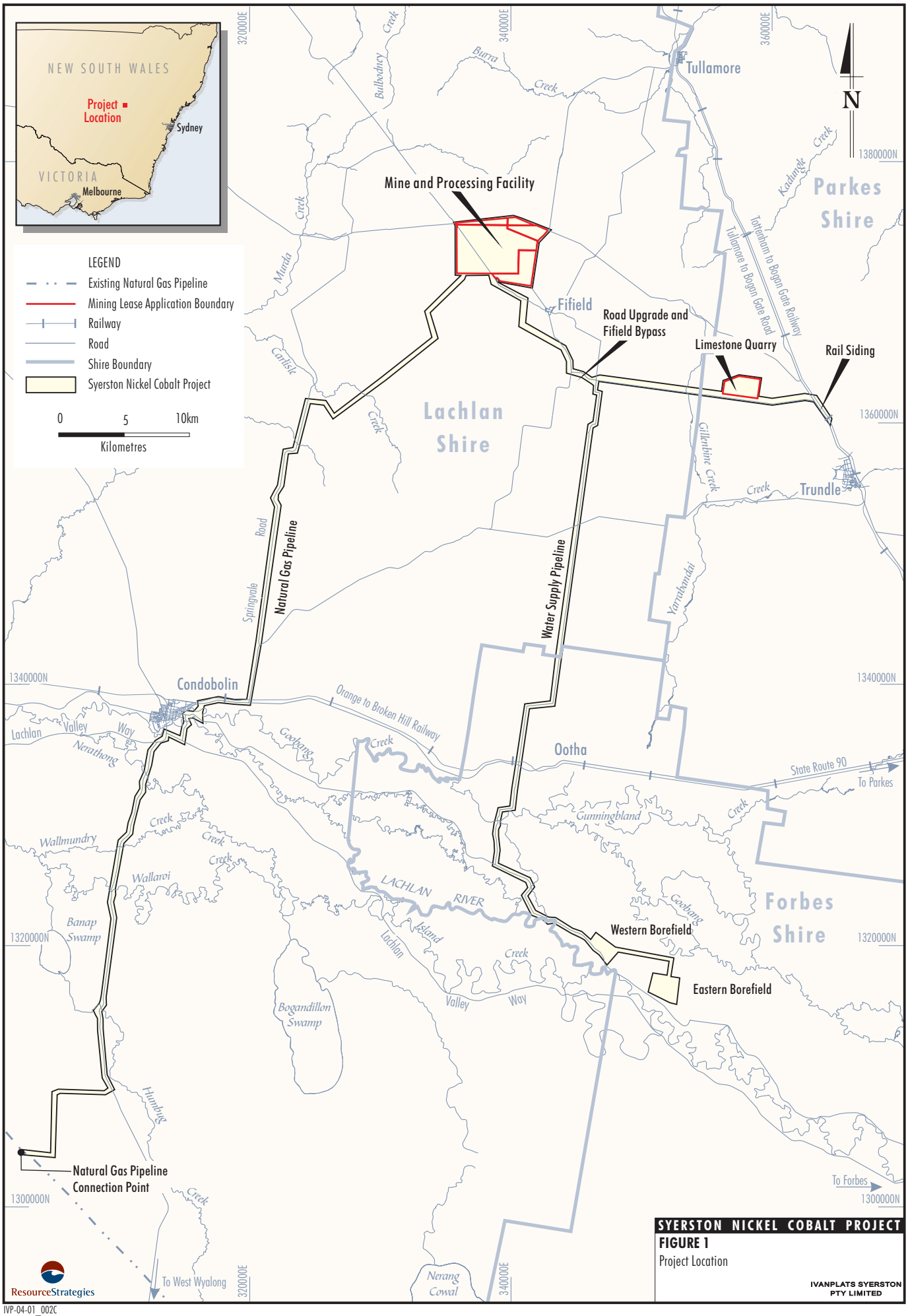
- The schedules of the NSW *Threatened Species Conservation Act, 1995* (TSC Act).
- Department of Environment and Conservation (DEC) Atlas of NSW Wildlife database records for the Project area and wider region (ie. Boona Mount, Tullamore, Peak Hill, Condobolin and Bogan Gate 1:100,000 map sheets) (DEC, 2005a).
- Flora and fauna surveys of the Project area and surrounds (eg. Orchid Research, 2000; Mount King Ecological Surveys, 2000).
- Database records obtained from Birds Australia (2005), Australian Museum (2005) and Sydney Royal Botanic Gardens (2005) within a search area of approximately 200 hectares (ha) surrounding the Project.
- Preliminary and Final Determinations of the NSW Scientific Committee.
- Distribution and habitat descriptions in seminal texts such as Cogger (2000) and Strahan (1998).
- The essential lifecycle components of candidate species (including breeding, foraging, roosting/nesting and movement/migration).
- The occurrence of hollows and other relevant microhabitats (eg. logs, rock shelter, leaf litter, etc.) in the Project area and surrounds.
- The nature and extent of the disturbance associated with the Project.
- The prevalence of introduced species and historic/current land usage.

The resulting list of species, populations and ecological communities is presented in Table 1.

Table 1
Threatened Species or Their Habitats Assessed by Eight Part Tests of Significance

Threatened Species, Populations, Ecological Communities or their Habitats		Conservation Status	
		TSC Act[1]	EPBC Act[2]
Fauna Species			
Climacteris picumnus victoriae	Brown Treecreeper	V	-
Pyrrholaemus sagittata	Speckled Warbler	V	-
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-
Melanodryas cucullata cucullata	Hooded Robin	V	-
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V	-
Stagonopleura guttata	Diamond Firetail	V	-
Endangered Ecological Communities			
White Box, Yellow Box, Blakely's Red Gum Woodland		E	E
Fuzzy Box Woodland		E	-

[1] NSW *Threatened Species Conservation Act, 1995*
[2] Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*
V (Vulnerable), E (Endangered)



SYERSTON NICKEL COBALT PROJECT

FIGURE 1

Project Location

IVANPLATS SYERSTON PTY LIMITED

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2 BACKGROUND AND APPLICATION OF THE EIGHT PART TEST OF SIGNIFICANCE

2.1 BACKGROUND

The Eight Part Test of Significance is a systematic list of factors that must be taken into account under the EP&A Act in assessing the impact of a proposed development on threatened species, populations, ecological communities, and/or their habitats. The eight factors are:

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at the risk of extinction

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

(e) Whether critical habitat will be affected

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

These factors are considered for six threatened fauna species (Section 3.1) and two endangered ecological communities (Section 3.2) identified in Table 1. The assessment is made in accordance with NSW National Parks and Wildlife Service (NPWS) (1996a) *Information Circular No. 2: Threatened Species Assessment under the EP&A Act: The '8 Part Test of Significance'*. The application of parts (a) to (h) of the Eight Part Test is discussed further in Section 2.2.

2.2 APPLICATION OF THE EIGHT PART TEST

The following sections (a) to (h) provide an overview of the factors considered for the threatened species and endangered ecological communities addressed in Section 3 of this report.

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at the risk of extinction

This question requires the understanding of the lifecycle components of the threatened species. Important lifecycle components for plants include seed banks, recruitment (germination and establishment of plants) and reproduction (including pollination and fecundity). For animals important lifecycle components include breeding, mortality, dormancy, roosting, feeding, migration and dispersal. Habitat resources such as trees with hollows, caves, water bodies and foraging resources may be essential to the lifecycle of a species (NPWS, 1996a).

A local population of the species is determined by the species' home range and important lifecycle components such as breeding, dormancy, roosting, feeding, migration and dispersal (NPWS, 1996a). NPWS (1996a) and DEC (2004) define a local population as one that occurs within a study area, except in the case where the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the study area boundary, can be demonstrated.

A local population should be considered to be viable (ie. a population that has the capacity to live, develop and reproduce under normal conditions), unless the contrary can be conclusively demonstrated through analysis of records and references (NPWS, 1996a).

Part (a) of the Eight Part Test is only applicable to the threatened species addressed in Section 3.1 of this report. It is not applicable to Section 3.2 which addresses endangered ecological communities.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Part (b) of the Eight Part Test assesses endangered populations and the impacts of development on them. The following endangered populations are currently (April 2005) listed in Schedule 1 of the TSC Act:

- Tusked Frog (*Adelotus brevis*) population in the Nandewar and New England Tablelands Bioregions.
- Gang-gang Cockatoo (*Callocephalon fimbriatum*) populations in the Hornsby and Ku-ring-gai Local Government Areas (LGAs).
- Riverina population of the Glossy Black-cockatoo (*Calyptorhynchus lathami*).
- White-browed Treecreeper (*Climacteris affinis*) population in the Carrathool LGA south of the Lachlan River and Griffith LGAs.
- Emu (*Dromaius novaehollandiae*) population in the NSW North Coast Bioregion and Port Stephens LGA.
- Manly Point population of the Little Penguin (*Eudyptula minor*).
- Barrington Tops population of the Broad-toothed Rat (*Mastacomys fuscus*) in the LGAs of Gloucester, Scone and Dungog.
- North Head population of the Long-nosed Bandicoot (*Perameles nasuta*).
- Wagga Wagga LGA population of the Squirrel Glider (*Petaurus norfolcensis*).
- Population of the Squirrel Glider (*Petaurus norfolcensis*) on the Barrenjoey Peninsula, north of Bushrangers Hill.
- Hawks Nest and Tea Gardens population of the Koala (*Phascolarctos cinereus*).
- Pittwater LGA population of the Koala (*Phascolarctos cinereus*).
- *Menippus fugitivus* population in the Sutherland Shire.
- Gosford Wattle (*Acacia prominens*) in the Hurstville and Kogarah LGAs.
- *Chorizema parviflorum* in the Wollongong and Shellharbour LGAs.
- *Darwinia fascicularis* subsp*. oligantha* populations in the Baulkham Hills and Hornsby LGAs.
- Kemps Creek population of *Dillwynia tenuifolia*.
- *Eucalyptus seeana* population in the Greater Taree LGA.
- *Glycine clandestina* (broad leaf form) in the Nambucca LGA.
- *Keraudrenia corrolata* var. *denticulata* in the Hawkesbury LGA.
- *Lespedeza juncea* subsp. *sericea* population in the Wollongong LGA.
- *Marsdenia viridiflora* R. Br subsp. *viridiflora* in Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith LGAs.
- *Pomaderris prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown LGAs.
- *Pultenaea villifera* in the Blue Mountains LGA.

- Tadgell's Bluebell (*Wahlenbergia multicaulis*) in the LGAs of Auburn, Bankstown, Strathfield, Baulkham Hills, Hornsby, Parramatta and Canterbury.
- Low-growing form of *Zieria smithii*, Diggers Head.
- *Dillwynia tenuifolia* in the Baulkham Hills LGA.
- *Eucalyptus parramattensis* subsp. *parramattensis* in the Wyong and Lake Macquarie LGAs.
- Woronora Plateau population of *Callitris endlicheri* (a tree).
- Long-nosed Potoroo population, Cobaki Lakes and Tweed Heads West.
- *Eucalyptus oblonga* (a tree) population, Bateau Bay.

None of the above endangered populations occur in the Project area and surrounds. Therefore Part (b) of the Eight Part Test is not applicable to the Project area and is indicated as such in the following Eight Part Tests of Significance.

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

In accordance with regional mapping contained within *An Interim Biogeographic Regionalisation of Australia (IBRA): A Framework for Setting Priorities in the National Reserves System Co-operative Program* (Thackway and Cresswell, 1995; Environment Australia, 2000), the Project area is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

The TSC Act defines habitat as, "*an area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community and includes any biotic or abiotic component*". For the purpose of this assessment, known habitat is considered to be habitat in which the species has been recorded. Further, potential habitat is considered to be habitat in which the species has not been recorded but may potentially utilise.

The distribution of vegetation (and associated habitat) in the Cobar Peneplain Bioregion is as follows (NPWS, 2003a):

- Mulga (*Acacia aneura*) are more common in arid areas of the bioregion.
- Mulga (*A. aneura*) and Poplar Box (*Eucalyptus populnea bimbil*) which are dominant in the north of the bioregion.
- Poplar Box (*E. populnea bimbil*), Red Box (*E. intertexta*) and White Cypress Pine (*Callitris glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- Belah (*Casuarina pauper*), Wilga (*Geijera parviflora*) and Rosewood (*Alectryon oleifolius*) are not well represented.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) are limited.
- Grasslands are not common.
- Mallee is widespread on rocky ridges and sandplains.
- Shrublands consisting of *Eremophila*, *Dodonaea* and *Senna* spp. are common.

The distribution of vegetation (and associated habitat) in the NSW South Western Slopes Bioregion is as follows (NPWS, 2003a):

- White Box (*E. albens*) woodlands in the eastern hill country.
- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Grey Box (*E. microcarpa*) woodlands, with Yellow Box (*E. melliodora*), White Cypress Pine (*C. glaucophylla*) and Belah (*C. pauper*) occupying lower areas in the western half of the bioregion.
- Red Stringybark (*E. macrorhynca*) on higher slopes with Dwyer's Red Gum (*E. dwyeri*) in the western half of the bioregion.
- Black Cypress Pine (*C. endlicheri*), Kurrajong (*Brachychiton populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- Poplar Box (*E. populnea*), Kurrajong, Wilga (*Geijera parviflora*) and Red Box (*E. intertexta*) occur in the north-west of the bioregion.
- Mallee (including Bull Mallee (*E. behriana*), Blue Mallee (*E. polybractea*), Green Mallee (*E. viridis*) and Congoo Mallee (*E. dumosa*)) occur in limited areas of the central west.
- Weeping Myall (*Acacia pendula*), Rosewood (*Alectryon oleifolius*) and Yarran (*Acacia homalophylla*) associations occur towards the edge of the Riverine Plain.
- River Oak (*Casuarina cunninghammia*) found along eastern streams and River Red Gum (*E. camaldulensis*) lining the larger central and western streams with some Back Box (*E. largiflorens*), Lignum (*Muehlenbeckia cunninghamii*) and River Cooba (*Acacia stenophylla*) also occurring.

The determination of whether a significant area of known habitat is to be removed or modified from within the bioregion as a result of the development has taken the following factors into account:

- the amount of habitat of the threatened species, population or ecological community that occurs within the Cobar Peneplain and NSW South Western Slopes Bioregions, within the Project area;
- the amount of habitat that would be removed or modified by the proposed development; and
- the ecological integrity of the habitat to be removed.

Part (c) of the Eight Part Test is applicable to the threatened species and endangered ecological communities presented in Sections 3.1 and 3.2.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

Part (d) of the Eight Part Test requires definition and discussion of known habitat areas, connectivity between habitat and mechanisms that act to isolate known habitats.

In relation to the movement of fauna, species possess a variety of dispersal mechanisms by which they are able to colonise new habitats or maintain genetic health by interacting with different populations in a locality. For example, amphibians are typically restricted to water bodies such as rivers, creeks or lagoons, however they may undertake forays across elevated terrain in damp conditions. By comparison, birds are generally highly mobile and are able to cover relatively large areas of land.

Factors such as habitat clearance, fire, damming, road/freeway construction, fences, mining/quarrying, etc. can create a barrier to the dispersal of some species. The type of barrier and the species involved will determine the level of impact on dispersal capability or the degree of isolation.

Part (d) of the Eight Part Test is applicable to the threatened species and endangered ecological communities presented in Sections 3.1 and 3.2.

(e) Whether critical habitat will be affected

Part (e) of the Eight Part Test considers whether a proposed development or activity is likely to affect land that is, or is part of, critical habitat.

In accordance with Division 1 of Part 3 of the TSC Act habitat that is eligible to be declared to be critical habitat is:

> *the whole or any part or parts of the area or areas of land comprising the habitat of an endangered species, population or ecological community that is critical to the survival of the species, population or ecological community*.

There is no critical habitat within the vicinity of the Project area and surrounds as designated by the Register of Critical Habitat held by the Director-General of the NSW NPWS.

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2).

Information on the representation of threatened species and endangered ecological communities in conservation reserves has been principally sourced from:

- information on conservation reserves administered by the DEC (DEC, 2005b);
- various DEC management plans for parks and reserves in the Cobar Peneplain Bioregion (NPWS, 1996b and c); and
- various DEC management plans for parks and reserves in the NSW South Western Slopes Bioregion (NPWS, 2004a, b, c and d; 2003 b, c, d, e and f; NPWS, 2001a; NPWS, 2000; NPWS, 1997; NPWS, 1995; NPWS, 1994).

Tables 2a and 2b provides a summary of the habitat in conservation reserves within the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion, respectively (for which habitat information was available).

In addition to the conservation reserves listed in Table 2a, the following protected areas also occur within the Cobar Peneplain Bioregion: Mount Grenfell Historic Site and Nombinnie State Conservation Area (DEC, 2005b).

In addition to the conservation reserves listed in Table 2b, the following protected areas also occur within the NSW South Western Slopes Bioregion: Livingstone National Park and Avisford, Boginderra Hills, Burrinjuck, Copperhannia, Dananbilla, Dapper, Ellerslie, Eugowra, Koorawatha, Mudjarn, Mullengandra and Razorback Nature Reserves, as well as, Koonadan Historic Site and Yaranighs Aboriginal Grave Historic Site and Mount Canobolos, Mullion Range and Tallaganda State Conservation Areas. Seven landholders have also entered into voluntary conservation agreements (DEC, 2005b).

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FIGURE 2

National Parks and Nature Reserves in the Cobar Peneplain and New South Western Slopes Bioregions

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IVP-04-01_005B

Table 2a
Habitat in Conservation Reserves of the Cobar Peneplain Bioregion

Conservation Reserve	Area (ha)	Description of Habitat Present
National Parks		
Gundabooka National Park	43,592	The vegetation in the park consists almost entirely of intergrading open woodland communities. Twenty one different plant communities have been recorded, dominated by Mulga (*Acacia aneura*), Bimble Box, Red Box, (*Eucalyptus intertexta*), Ironwood (*Acacia excelsa*), White Cypress Pine (*Callitris columellaris*), Belah (*Casuarina cristata*), Leopardwood (*Flindersia maculosa*), Western Bloodwood (*Eucalyptus terminalis*) and Grey Mallee (*Eucalyptus morrisii*) in various associations (DEC, 2005b).
Cocoparra National Park	8,358	Woodlands are the predominant plant communities of Cocoparra National Park. The woodlands of the sheltered gullies are dominated by eucalypts, usually: Bimble Box, Dwyer's Red Gum, Ironbark, Blakely's Red Gum and Yellow Box. Red Stringybark woodlands are dominated by Dwyer's Gum and Black Cypress Pine. The shrubland plant community is dominated by Broombush (*Melaleuca uncinata*) (DEC, 2005b; NPWS, 1996b).
Nature Reserves		
Gubbata Nature Reserve	162	Gubbata Nature Reserve is dominated by Pointed Mallee, Congoo Mallee and Vorrel (DEC, 2005b). Some Spinifex and Scrub Cypress are also present (*ibid*.).
Cocopara Nature Reserve	4,647	Vegetation communities in this reserve include Black Cypress, Currawang, Dwyer's Red Gum and Red Stringy Bark on hills with Box woodlands on lower and more fertile slopes (DEC, 2005b; NPWS, 1996b)
Nombinnie Nature Reserve	70,000	Apart from the mallee, the vegetation is made up of stands of white cypress pine woodlands, woodlands of Bimble Box and Red Box, Black Box in depressions, Lignum, Belah woodlands in association with Western Rosewood, Wilga, Leafless Cherry and Warrior Bush (DEC, 2005b).
Pulletop Nature Reserve	145	Pulletop Nature Reserve is dominated by Mallee (DEC, 2005b).
Quanda Nature Reserve	854	Quanda Nature Reserve is dominated by Green Mallee with some Bimble Box (DEC, 2005b).
Round Hill Nature Reserve	13,630	The northern parts of Round Hill Nature Reserve are located on the edge of the Cobar Peneplain (DEC, 2005b; NPWS, 1996c). Along with Yathong and Nombinnie Nature Reserves, Round Hill forms part of one of the largest contiguous blocks of mallee in western NSW (*ibid.*).
Tollingo Nature Reserve	3,232	Tollingo Nature Reserve contains a mixed mallee community of Pointed Mallee, Congoo Mallee, Narrow-leafed Mallee and Yorrel (DEC, 2005b). Red Box and Poplar Box are scattered through the mallee (*ibid.*).
Woggoon Nature Reserve	6,565	Woggoon Nature Reserve contains communities of Pointed Mallee and Congoo Mallee on sandy soils (DEC, 2005b). Poplar Box and White Cypress Woodland grows on heavier soils in the south of the reserve (*ibid*.).
Yathong Nature Reserve	107,241	The reserve has extensive areas of Box woodlands, Cypress and Belah (DEC, 2005b; NPWS, 1996c).

Table 2b
Habitat in Conservation Reserves of the NSW South Western Slopes Bioregion

Conservation Reserve	Area (ha)	Description of Habitat Present
National Parks		
Benambra National Park	1,399	Habitat types within this park include open forest, shrubland and rocky shrubland (NPWS, 2003f).
Conimbla National Park	7,590	Habitat types within this park include Eucalypt forests, open Eucalypt forests with Cypress Pine, heathlands and woodland on rocky slopes and ranges (NPWS, 1997). This park also contains woodlands dominated by Belah with Grey Box, Rosewood and Yarran on alluvial plains (DLWC, 2001). Flood plains and depressions within the park contain Black Box or River Red Gum with Swamp Cane Grass and Lignum (*ibid*.).
Goobang National Park	42,080	The largest strip of protected remnant forest and woodland in the central west which contains a diverse range of plant communities, including open forest, open heathland, mallee and open woodland (DEC, 2005b; NPWS, 2001a). White Box woodland also occurs within this park. This park contains 55 km of range and escarpment country (NPWS, 2001a).
Minjary National Park	1,462	This park contains woodland and forest habitat on slopes and ranges (NPWS, 2003e). Dwyers Red Gum occurs on numerous rocky outcrops (*ibid*.). White Box woodland also occurs within this park.
Nangar National Park	9,196	Eucalyptus woodland habitat is dominant in this park (NPWS, 2004b). Three main types of vegetation are present in this park, namely Box woodland, Scribbly Gum-Black Pine and Ironbark-Black Pine (*ibid*). White Box woodland also occurs on low to moderate sloped sheltered sites (*ibid*.). The park has been previously logged.
Weddin Mountains National Park	8,361	This park is characterised by Mugga Ironbark open forest and woodland (NPWS, 1995). Large areas of heath also occur which are dominated by *Allocasuarina diminuta* ssp. *diminuta*.
Woomargama National Park	23,577	This park is the largest protected area west of The Great Dividing Range in south-eastern NSW (DEC, 2005b). This park also contains the largest area of box woodland remnant in the South Western Slopes (*ibid*.). Parts of the park are close to 1000 m above sea level (*ibid*.).
Nature Reserves		
Big Bush Nature Reserve	640	Habitat types in this reserve include tall open woodland on ridges and lower slopes, dry heathland and low open woodland on ridge tops and upper slopes (NPWS, 2004d). Green Mallee (*E. viridis*) also occurs in this reserve (*ibid*.).
Buddigower Nature Reserve	327	Forests and Woodlands dominated by one or more Eucalyptus species (eg. Dwyer's Red Gum, Mugga Ironbark, Green Mallee, Cypress Pine) on ridges, hills and footslopes (DLWC, 2001).
Downfall Nature Reserve	496	The reserve contains up to six distinct forest types. These include: • Apple box forest in broad low-lying gullies and valley floors; • Peppermint moist forest on exposed lower slopes; • Red Stringybark-Scribbly Gum-Rough barked Red Box-Tussock grass open forest on western slopes at middle elevations; • Peppermint-mixed Box grassy forest on exposed lower western slopes; • Norton's Box-Peppermint grassy open forest on western and northern slopes; and • Secondary wattle shrubland in previously cleared pockets (NPWS, 2004d).
Flagstaff Memorial Nature Reserve	18	Eucalypt woodland provides habitat within this reserve (NPWS, 2003b). Eucalypt species which are present include White Box, Yellow Box, Blakely's Red Gum and Grey Box.
Ingalba Nature Reserve	4,012	Habitat types in this reserve include tall open woodland on ridges and lower slopes, dry heathland and low open woodland on ridge tops and upper slopes (NPWS, 2004a).

Table 2b (Continued)
Habitat in Conservation Reserves of the NSW South Western Slopes Bioregion

Conservation Reserve/Protected Area	Area (ha)	Description of Habitat Present
Munghorn Gap Nature Reserve	5,934	Generally, the vegetation of the area is woodland dominated by eucalypt woodland and forest. Dominant species include *Eucalyptus fibrosa*, *E. oblonga*, *E. sideroxylon*, *E. dwyeri*, *E. punctata*, *E. agglomerate* and *E. caleyi*. Where skeletal soils occur or drainage is poor, a shrubland formation dominates. The influence of basalt leads to the presence of *Callitris* species and the river valley contains *Casuarina cunninghamiana* in association with more moisture-dependent species such as *E. crebra, E. dawsonii, E. blakelyi* and *Angophora floribunda* (NPWS, 2003d).
Narrandera Nature Reserve	71	This reserve is located on the floodplains of the Murrumbidgee River (DEC, 2005b). River Red Gum is present on the floodplain with scattered Yellow Box.
Nest Hill Nature Reserve	759	Vegetation types in the reserve include: dry shrub/forb open forest, forest and open forest (NPWS, 2004c).
Pucawan Nature Reserve	274	Habitat types in this reserve include tall open woodland on ridges and lower slopes, dry heathland and low open woodland on ridgetops and upper slopes (NPWS, 2004a).
Tabletop Nature Reserve	104	This reserve form part of the broader ridge of forested land covering the Great Yambla Range (NPWS, 2003f). Habitat types include relatively intact native grasslands, woodlands and forests (*ibid*.). White Box (*E. albens*) also occurs in this reserve.
The Charcoal Tank Nature Reserve	86	This reserve contains woodlands which are dominated by Green Mallee and Cypress Pine with Dwyers Red Gum on slopes and crests (DLWC, 2001).
The Rock Nature Reserve	347	This reserve towers 250 metres (m) over the surrounding landscape (DEC, 2005b). The reserve contains woodland habitat, comprising of Grey Box, Blakely's Red Gum and White Box (*ibid*.).
Ulandra Nature Reserve	3,931	Eucalypt open woodland is the dominant habitat type within this reserve, comprising of eucalyptus such as *E. goniocalyx*, *E. blakelyi* and *E. dwyeri* (NPWS, 1994). Low open forest also occurs in some areas (*ibid*.).
Wiesners Swamp Nature Reserve	103	The reserve consists of seasonally flooded River Red Gum (*Eucalyptus camaldulensis*) woodland and mixed box woodland, both of which have been modified by past clearing and grazing. It provides reliable waterbird habitat and a stopover for nomadic and migratory birds. Numerous tree hollows provide shelter and breeding opportunities for hollow-dependent birds and arboreal mammals (NPWS, 2003c).

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

Schedule 3 of the TSC Act makes provision for listing threatening processes as recognised by the NSW Scientific Committee. There are currently (April 2005) 25 key threatening processes listed within the Schedule:

- alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- anthropogenic climate change;
- bushrock removal;
- clearing of native vegetation;
- competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*);
- competition from feral honeybees (*Apis mellifera*);
- introduction of the Large Earth Bumblebee (*Bombus terrestris*);
- high frequency fire resulting in the disruption of lifecycle processes in plants and animals, and loss of vegetation structure and composition;
- importation of Red Imported Fire Ants (*Solenopsis invicta*);
- infection of native plants by *Phytophthora cinnamomi*;

- invasion of native plant communities by exotic perennial grasses;
- invasion of native plant communities by *Chrysanthemoides monilifera*;
- loss and/or degradation of sites used for hill-topping by butterflies;
- predation by the Mosquito Fish (*Gambusia holbrooki*);
- predation by the European Red Fox (*Vulpes vulpes*);
- predation by the Feral Cat (*Felis catus*);
- predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island;
- Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations;
- infection of frogs by amphibian chytrid causing the disease Chytridiomycosis;
- death or injury to marine species following capture in shark control programs on ocean beaches;
- removal of dead wood and dead trees;
- entanglement in or ingestion of anthropogenic debris in marine and estuarine environments;
- feral pigs;
- competition and habitat degradation by feral goats; and
- herbivory and environmental degradation caused by feral deer.

The above threatening processes have been considered in the following Eight Part Tests of Significance.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

In assessing species' distribution boundaries under Part (h) of the Eight Part Test, a number of databases and reference materials have been examined including the Atlas of NSW Wildlife (DEC, 2005a, b and c), field guides and seminal texts (eg. Schodde and Tidemann, 1997; Cogger, 2000; Garnett and Crowley, 2000; Strahan, 1998). Various scientific publications and recovery plans have also been reviewed.

3 EIGHT PART TESTS OF SIGNIFICANCE

3.1 THREATENED FAUNA SPECIES

3.1.1 Brown Treecreeper (eastern sub-species) (*Climacteris picumnus victoriae*)

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Brown Treecreeper (eastern sub-species) (*Climacteris picumnus victoriae*) breeds between June and December, earlier in inland areas and later towards the coast (Schodde and Tidemann, 1997). The Brown Treecreeper (eastern sub-species) builds cup nests, which are made from dried grass, bark and dung; usually lined with fur, feathers or plant down (*ibid.*). Nests are often built in the hollows of trees, on branches or fence posts, 1-3 m above the ground (NSW Scientific Committee, 2001a). Approximately 2-3 eggs are laid, and incubated for 16-17 days (Schodde and Tidemann, 1997).

This species is insectivorous, and forages on tree trunks and the ground for ants, beetles and larvae (Garnett and Crowley, 2000) and is sedentary, often occurring in pairs or small groups (NSW Scientific Committee, 2001a).

Populations of the Brown Treecreeper are communal and sedentary (Schodde and Tidemann, 1997). Pairs or groups of three to six hold to the same large territory of about 5-10 ha year round (*ibid.*).

The Brown Treecreeper (eastern sub-species) is particularly sensitive to the clearance and fragmentation of woodland habitat. The abundance of this species decreases with decreasing remnant size, to the point where this species is thought to be unable to maintain a viable population in remnant vegetation less than 200 ha (Barrrett *et al.*, 1994 in NSW Scientific Committee, 2001a). Other threats relevant to this species include removal of dead timber and loss of hollow bearing trees and grazing by stock in woodland areas (NSW Scientific Committee, 2001a). Remnant vegetation which occurs in the Project disturbance area offers potential foraging, roosting and breeding habitat resources for the Brown Treecreeper (eastern sub-species). The Project will involve the removal/modification of a portion of potential habitat for this species and may disrupt foraging, roosting and breeding habitat resources.

The Brown Treecreeper has been recorded at 49 locations in the region (ie. Boona Mount, Tullamore, Peak Hill, Condobolin and Bogan Gate 1:100,000 map sheets) the closest of which is located within the MPF (DEC, 2005a). In addition this species has been recorded by Birds Australia (2005) in a search area of approximately 200 ha surrounding the Project area. This species was recorded during fauna surveys within the Project area and surrounds (Mount King Ecological Surveys, 2000).

It is likely that a local population of the Brown Treecreeper (eastern sub-species) exists within the Project area given that the species was recorded during past surveys, other records of this species proximal to the Project area and the occurrence of potential habitat resources. However, the removal/modification of a portion of habitat for the Brown Treecreeper (eastern sub-species) is unlikely to disrupt the lifecycle such that a local viable population of this species would be placed at risk of extinction given the localised nature of the Project area disturbance and the occurrence of proximal known and potential habitat resources to the Project area.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

The Brown Treecreeper (eastern sub-species) favours open eucalypt woodlands and drier open forests, including mallee and river gum (Schodde and Tidemann, 1997; NSW Scientific Committee, 2001a).

As stated in Section 2.2, the Project is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion. In the Cobar Peneplain Bioregion, potential habitat for the Brown Treecreeper (eastern sub-species) occurs in the following vegetation types (after NPWS, 2003a):

- Mulga (*A. aneura*) and Poplar Box (*E. populnea bimbil*) which are dominant in the north of the bioregion.
- Poplar Box (*E. populnea bimbil*), Gum Coolibah (*E. intertexta*) and White Cypress Pine (*C. glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) on watercourses are limited.
- Mallee is widespread on rocky ridges and sandplains.

In the NSW South Western Slopes Bioregion, potential habitat for the Brown Treecreeper (eastern sub-species) occurs in the following vegetation types (after NPWS, 2003a):

- White Box (*E. albens*) woodlands in the eastern hill country.
- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Grey Box (*E. microcarpa*) woodlands, with Yellow Box (*E. melliodora*), White Cypress Pine (*C. glaucophylla*) and Belah (*C. pauper*) occupying lower areas in the western half of the bioregion.
- Red Stringybark (*E. macrorhynca*) on higher slopes with Dwyer's Red Gum (*E. dwyeri*) in the western half of the bioregion.
- Black Cypress Pine (*C. endlicheri*), Kurrajong (*B. populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- Poplar Box (*E. populnea*), Kurrajong, Wilga (*G. parviflora*) and Red Box (*E. intertexta*) occur in the north-west of the bioregion.
- Mallee (including Bull Mallee (*E. behriana*), Blue Mallee (*E. polybractea*), Green Mallee (*E. viridis*) and Congoo Mallee (*E. dumosa*) occur in limited areas of the central west.
- River Red Gum (*E. camaldulensis*) lining the larger central and western watercourses.

Recent vegetation mapping covering the Project area and wider region was produced by the DLWC (2002) for the Boona Mount, Tullamore, Condobolin Bogan Gate, Tottenhan and Dandaloo 1:100,000 map sheets. These vegetation maps along with other large scale vegetation mapping in NSW (eg. Sivertson and Metcalfe, 1995) were used by Keith (2004) to produce a compilation map of NSW vegetation. Despite available mapping, the vegetation of the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion has not yet been fully mapped to a standard that is suitable for quantitative bioregional assessment of the habitat for the Brown Treecreeper (eastern sub-species).

As previously stated, the Brown Treecreeper (eastern sub-species) appears unable to maintain a viable population in remnants less than 200 ha and its abundance decreases as remnant size decreases (Barrett *et al.,* 1994 in NSW Scientific Committee, 2001a). Previous vegetation clearing in NSW has resulted in a reduction in the area and fragmentation of the potential habitat types listed above, particularly habitat which occurs on the plains (Benson, 1999).

Approximately 420 ha of native vegetation will be cleared or modified for the MPF, of which only a portion is known or potential habitat for the Brown Treecreeper (eastern sub-species).

In relation to the regional distribution of known or potential habitat for this species it is considered that the area to be removed or modified for the Project does not constitute a significant area given the small scale of the habitat removal/modification required for the Project and the greater quantity and quality of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The habitat requirements for the Brown Treecreeper (eastern sub-species), and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. As previously established, known and potential habitat for the Brown Treecreeper (eastern sub-species) occurs within the Project area and surrounds.

Fragmentation of habitat is a recognised threat of the Brown Treecreeper (eastern sub-species) (NSW Scientific Committee, 2001a). Populations of the Brown Treecreeper are communal and sedentary (Schodde and Tidemann, 1997). As previously stated, the Brown Treecreeper (eastern sub-species) appears unable to maintain a viable population in remnants less than 200 ha and its abundance decreases as remnant size decreases (Barrett *et al*., 1994 in NSW Scientific Committee, 2001a).

The flatter terrain of the Project area has been cleared of native vegetation except for scattered remnant native trees, while the hillier sites retain a greater cover of native vegetation but have been thinned (Orchid Research, 2000). The remnant towards the north of the Project area has also been thinned due to past logging resulting in few old growth trees remaining (*ibid*.) (Figure 3).

Vegetation clearance associated with the Project may cause some fragmentation of current interconnecting habitat for the Brown Treecreeper (eastern sub-species). However, an area of known (or potential) habitat is unlikely to become isolated from current interconnecting or proximate areas of habitat for this species given the mobility of the species, the already highly disturbed and fragmented nature of the potential habitat and the localised nature of the disturbance.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

The eastern sub-species of the Brown Treecreeper is distributed throughout central NSW on the western side of the Great Dividing Range (NSW Scientific Committee, 2001a). Records of this species are distributed throughout the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion (DEC, 2005c).

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Brown Treecreeper has been recorded from both national parks in the Cobar Peneplain Bioregion, namely, Cocopara and Gundabooka National Parks as well as eight nature reserves, namely, Cocopara, Gubbata, Nombinnie, Pulletop, Round Hill, Tollingo, Woggoon and Yathong Nature Reserves (DEC, 2005b).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Brown Treecreeper has been recorded from four national parks, namely Weddin Mountains, Nangar, Goobang and Conimbla National Parks, as well as 14 nature reserves, namely, Wiesners Swamp, Ulandra, The Rock, The Charcoal Tank, Tabletop, Pucawan, Munghorn Gap, Ingalba, Dapper, Copperhannia, Buddigower, Boginderra, Big Bush and Avisford Nature Reserves (DEC, 2005c).

In addition, management plans available for the protected areas in the bioregion indicate the species has been recorded in Benambra National Park as well as Nest Hill and Downfall Nature Reserves (NPWS, 2003e and 2004d).

It is recognised that potential habitat for this species occurs in Flagstaff Memorial Nature Reserve although this species has not previously been recorded in this reserve (NPWS, 2003b). Further, some potentially suitable habitat occurs in Livingstone, Minjary and Woomargama National Parks and Narrandera Nature Reserve (refer Tables 2a and 2b).

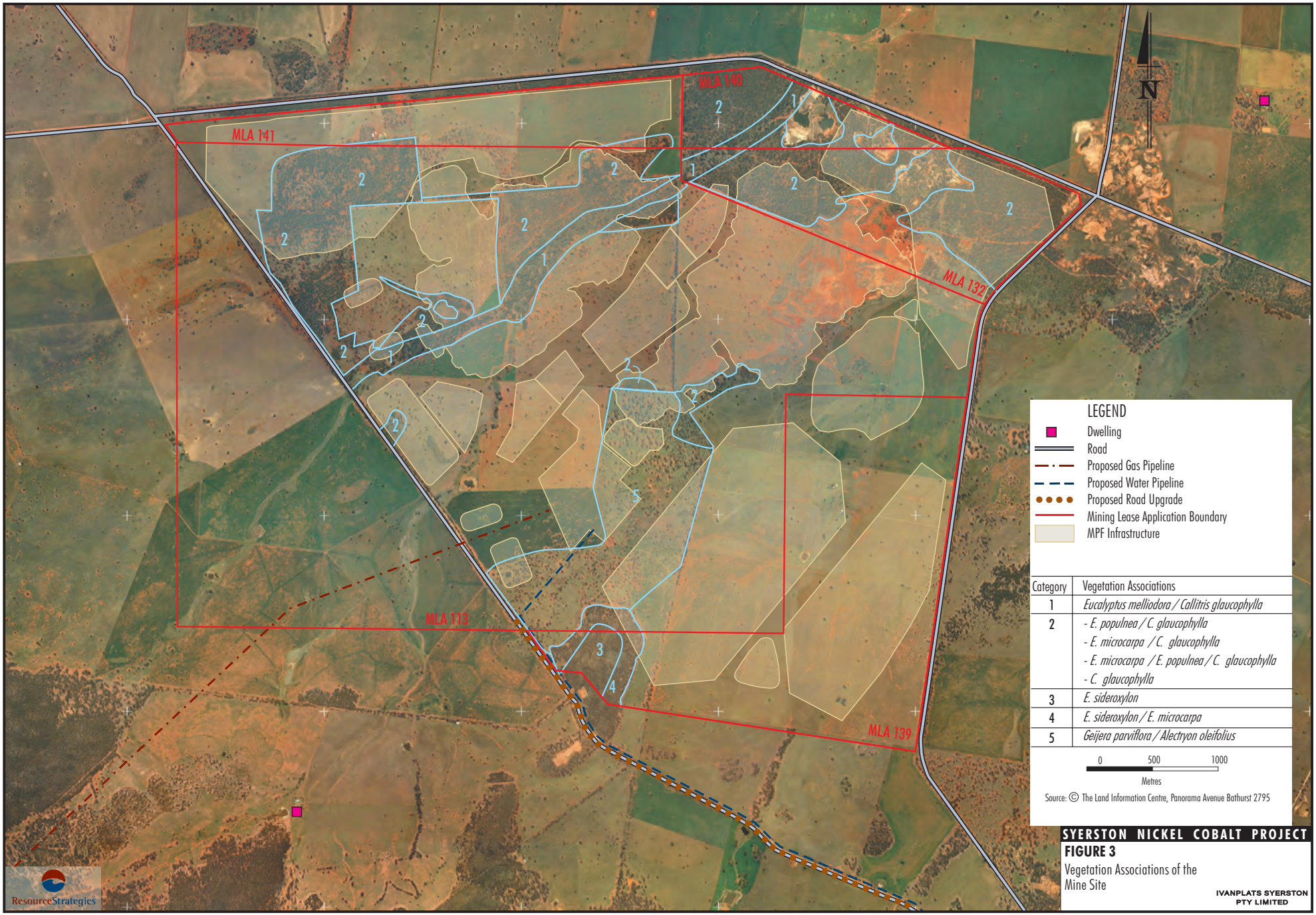

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FIGURE 3

Vegetation Associations of the Mine Site

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IVP-04-01_006A

The information provided suggests that habitat for the Brown Treecreeper (eastern sub-species) is adequately represented in conservation reserves (or other similar protected areas) in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

The Project may also involve the removal of dead wood and dead trees. Removal of dead wood and dead trees is recognised as a threatening process in Schedule 3 of the TSC Act.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

The eastern sub-species of the Brown Treecreeper is distributed throughout central NSW on the western side of the Great Dividing Range (NSW Scientific Committee, 2001a). Scattered populations also exist on the east of the Divide in drier areas such as the Cumberland Plain of Western Sydney and in parts of the Hunter, Clarence, Richmond and Snowy River valleys (NSW Scientific Committee, 2001a). On the western boundary of the distribution of *C. picumnus victoriae,* which runs through Wagga Wagga, Temora, Forbes, Dubbo and Inverell, this subspecies intergrades with the western subspecies *C. picumnus picumnus* (Schodde and Mason, 1999 in NSW Scientific Committee, 2001a).

Considering the above, the Project area is located within the distribution for the Brown Treecreeper (*C. picumnus victoriae*) and does not represent a distributional limit for this species.

3.1.2 Speckled Warbler (*Pyrrholaemus sagittatus*)

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Speckled Warbler (*Pyrrholaemus sagittatus*) typically breeds between August and January (Pizzey and Knight, 1999) and approximately three to four eggs are laid (Schodde and Tidemann, 1997). Domed nests are made from grass and bark shreds and are lined with fur and feathers. The nest is usually hidden in a slight hollow predominantly on the ground (Gardner, 2002), however it can also be placed in a low shrub or tree trunk (Schodde and Tidemann, 1997; Pizzey and Knight, 1999).

P. sagittatus forages on the ground for arthropods and seeds (Blakers *et al*., 1984 in Garnett and Crowley, 2000; Ford *et al*., 1986 in NSW Scientific Committee, 2001b). Preferred foraging habitat of the Speckled Warbler includes areas with a combination of open grassy patches, leaf litter and shrub cover (NSW Scientific Committee, 2001b). The Speckled Warbler is sedentary, living in pairs or trios and the home range of this species can vary from 6 to 12 ha (NSW Scientific Committee, 2001b).

Threats relevant to the Speckled Warbler include habitat clearance and fragmentation, as well as the removal of dead timber (NSW Scientific Committee, 2001b). The Speckled Warbler appears to be extinct in districts where no fragments larger than 100 ha remain (NSW Scientific Committee, 2001b). Nesting on the ground also makes this species particularly susceptible to predation from cats and foxes (Gardner, 2002). Remnant vegetation which occurs within the Project area, offers potential foraging, roosting and breeding habitat resources for the Speckled Warbler. The Project will involve the removal/modification of a portion of potential habitat resources for this species and may disrupt foraging, roosting and breeding resources (were this species to occur).

The Speckled Warbler has been recorded at 28 locations in the region (ie. Boona Mount, Tullamore, Peak Hill, Condobolin and Bogan Gate 1:100,000 map sheets) the closest of which is located approximately 18 kilometres (km) north of the Project area (DEC, 2005a). This species has also been recorded by Birds Australia (2005) in a search area of approximately 200 ha surrounding the Project area. This species has not been recorded during fauna surveys within the Project area and surrounds (Mount King Ecological Surveys, 2000).

It is possible that a local population of the Speckled Warbler exists within the Project area given the occurrence of potential habitat resources and records of this species near the Project area. However, the removal/modification of a portion of habitat for the Speckled Warbler is unlikely to disrupt the lifecycle such that a local viable population of this species would be placed at risk of extinction given the localised nature of the Project area disturbance and the occurrence of proximal known and potential habitat resources to the Project area.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

The Speckled Warbler inhabits a wide range of eucalypt and cypress dominated vegetation which have a grassy understorey, often on ridges or in gullies (Garnett and Crowley, 2000; NSW Scientific Committee, 2001b).

As stated in Section 2.2, the Project is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion. In the Cobar Peneplain Bioregion, potential habitat for the Speckled Warbler occurs in the following vegetation types (after NPWS, 2003a):

- Mulga (*A. aneura*) and Poplar Box (*E. populnea bimbil*) which are dominant in the north of the bioregion.
- Poplar Box (*E. populnea bimbil*), Gum Coolibah (*E. intertexta*) and White Cypress Pine (*C. glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) on watercourses are limited.
- Mallee is widespread on rocky ridges and sandplains.

In the NSW South Western Slopes Bioregion, potential habitat for the Speckled Warbler occurs in the following vegetation types (after NPWS, 2003a):

- White Box (*E. albens*) woodlands in the eastern hill country.
- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Grey Box (*E. microcarpa*) woodlands, with Yellow Box (*E. melliodora*), White Cypress Pine (*C. glaucophylla*) and Belah (*C. pauper*) occupying lower areas in the western half of the bioregion.
- Red Stringybark (*E. macrorhynca*) on higher slopes with Dwyer's Red Gum (*E. dwyeri*) in the western half of the bioregion.
- Black Cypress Pine (*C. endlicheri*), Kurrajong (*B. populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- Poplar Box (*E. populnea*), Kurrajong, Wilga (*G. parviflora*) and Red Box (*E. intertexta*) occur in the north-west of the bioregion.
- Mallee (including Bull Mallee (*E. behriana*), Blue Mallee (*E. polybractea*), Green Mallee (*E. viridis*) and Congoo Mallee (*E. dumosa*)) occur in limited areas of the central west.
- River Red Gum (*E. camaldulensis*) lining the larger central and western watercourses.

Recent vegetation mapping covering the Project area and wider region was produced by the DLWC (2002) for the Boona Mount, Tullamore, Condobolin Bogan Gate, Tottenhan and Dandaloo 1:100,000 map sheets. These vegetation maps along with other large scale vegetation mapping in NSW (eg. Sivertson and Metcalfe, 1995) were used by Keith (2004) to produce a compilation map of NSW vegetation. Despite available mapping, the vegetation of the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion has not yet been fully mapped to a standard that is suitable for quantitative bioregional assessment of the habitat for the Speckled Warbler.

As previously stated, the Speckled Warbler appears to be extinct in districts where no fragments larger than 100 ha remain (NSW Scientific Committee, 2001b). The abundance of this species has been found to decrease with decreasing area of woodland (Barrett *et al*., 1994 in NSW Scientific Committee, 2001b). Previous vegetation clearing in NSW has resulted in a reduction in the area and fragmentation of the potential habitat types listed above, particularly habitat which occurs on the plains (Benson, 1999).

No known habitat for this species will be modified or removed for the Project since this species has not been identified in the Project area. Approximately 420 ha of native vegetation will be cleared or modified for the MPF, of which only a portion is potential habitat for the Speckled Warbler.

In relation to the regional distribution of known or potential habitat for this species it is considered that the area to be removed or modified for the Project does not constitute a significant area given the small scale of the habitat removal/modification required for the Project and the greater quantity and quality of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The habitat requirements for the Speckled Warbler and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. As previously established, potential habitat for the Speckled Warbler occurs within the Project area and surrounds.

The home range of this species can vary from 6-12 ha (NSW Scientific Committee, 2001b). Due to the species' mobility, all occurrences of potential habitat for this species in the Project area and surrounds are considered proximate habitat areas for this species.

The flatter terrain of the Project area has been cleared of native vegetation except for scattered remnant native trees, while the hillier sites retain a greater cover of native vegetation but have been thinned (Orchid Research, 2000). The remnant towards the north of the Project area has also been thinned due to past logging resulting in few old growth trees remaining (*ibid*.) (Figure 3).

Vegetation clearance associated with the Project may cause some fragmentation of current interconnecting habitat for the Speckled Warbler. However, an area of known (or potential) habitat is unlikely to become isolated from current interconnecting or proximate areas of habitat for the Speckled Warbler given the mobility of the species and the localised nature of the disturbance required for the Project.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

P. sagittatus is distributed from south-eastern Queensland, through central and eastern NSW to Victoria (NSW Scientific Committee, 2001b). In NSW, this species occurs predominantly on the western slopes and tablelands of the Great Dividing Range, and on the driest sections of the coast (Blakers *et al*., 1984; Schodde and Mason, 1999 in NSW Scientific Committee, 2001b). Records of this species are distributed throughout the NSW South Western Slopes Bioregion and southern half of the Cobar Peneplain Bioregion (DEC, 2005c).

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Speckled Warbler has been recorded from Cocopara National Park as well as six nature reserves in the Cobar Peneplain Bioregion, namely, Cocopara, Nombinnie, Pulletop, Round Hill, Woggoon and Yathong Nature Reserves (DEC, 2005b).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Atlas of NSW Wildlife (DEC, 2005c) indicates the Speckled Warbler has been recorded in ten protected areas in the NSW South Western Slopes Bioregion, namely Conimbla, Goobang, Nangar and Weddin Mountains National Parks and Boginderra Hills, Munghorn Gap, Tabletop, The Charcoal Tank, The Rock and Ulandra Nature Reserves.

In addition, management plans available for the protected areas in the bioregion indicate the species has been recorded in Benambra National Park and Downfall Nature Reserve (NPWS, 2004d; NPWS, 2003f).

It is recognised that potential habitat for this species occurs in Flagstaff Memorial Nature Reserve although this species has not previously been recorded in this reserve (NPWS, 2003b). In addition, some potentially suitable habitat may also occur in Livingstone, Minjary and Woomargama National Parks and Avisford, Big Bush, Buddigower, Copperhannia, Dapper, Ingalba, Narrandera, Nest Hill and Pucawan Nature Reserves (refer Tables 2a and 2b).

The information provided suggests that habitat for the Speckled Warbler may be adequately represented in conservation reserves (or other similar protected areas) in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

The Project may also involve the removal of dead wood and dead trees. Removal of dead wood and dead trees is recognised as a threatening process in Schedule 3 of the TSC Act.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

P. sagittatus is distributed from south-eastern Queensland, through central and eastern NSW to Victoria (NSW Scientific Committee, 2001b). In NSW, this species occurs predominantly on the western slopes and tablelands of the Great Dividing Range, and on the driest sections of the coast (Blakers *et al*., 1984; Schodde and Mason, 1999 in NSW Scientific Committee, 2001b).

Considering the above, the Project area is located within the distribution for the Speckled Warbler and does not represent a distributional limit for this species.

3.1.3 Black-chinned Honeyeater (eastern sub-species) (*Melithreptus gularis gularis*)

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Black-chinned Honeyeater (eastern sub-species) (*Melithreptus gularis gularis*) typically breeds between July and December (Pizzey and Knight, 1999). Approximately 1-2 eggs are laid, and incubated for 14-15 days (Schodde and Tidemann, 1997). Breeding can be communal, with additional members of the colony helping the senior parental pair feed their young (*ibid.*). Nests of the Black-chinned Honeyeater are a fragile cup made of bark-shreds, grass, wool and/or spiders web (Pizzey and Knight, 1999). This species typically nests high (approximately 3-15 meters [m]) in outer foliage (Schodde and Tidemann, 1997).

The Black-chinned Honeyeater feeds on insects, nectar and lerp (Blakers *et al*., 1984 in Garnett and Crowley, 2000). The Black-chinned Honeyeater has a large feeding territory and as a result, often appears locally and is seasonally nomadic (Pizzey and Knight, 1999; Schodde and Tidemann, 1997). Populations of the Black-chinned Honeyeater (eastern sub-species) appear to be unable to persist in areas which lack remnants of native vegetation larger than 200 ha (NSW Scientific Committee, 2001c). Threats relevant to the Black-chinned Honeyeater (eastern sub-species) include clearance and fragmentation of woodland habitat, increased competition (eg. Noisy Miner) and nest predation (eg. Pied Currawongs) (NSW Scientific Committee, 2001c).

Remnant vegetation which occurs within the Project area, offers potential foraging, roosting and breeding habitat resources for the Black-chinned Honeyeater (eastern sub-species). The Project will involve the removal/modification of a portion of potential habitat for this species and may disrupt foraging, roosting and breeding habitat resources (were this species to occur).

The Black-chinned Honeyeater has been recorded at three locations in the region (ie. Tullamore, Peak Hill and Bogan Gate 1:100,000 map sheets) the closest of which is located approximately 22 km south-east of the Project area (DEC, 2005a). In addition this species has been recorded by Birds Australia (2005) in a search area of approximately 200 ha surrounding the Project area. This species has not been recorded during fauna surveys within the Project area and surrounds (Mount King Ecological Surveys, 2000).

It is possible that a local population of the Black-chinned Honeyeater (eastern sub-species) exists within the Project area given the occurrence of potential habitat resources and records of this species proximal to the Project area. However, the removal/modification of a portion of habitat for the Black-chinned Honeyeater (eastern sub-species) is unlikely to disrupt the lifecycle such that a local viable population of this species would be placed at risk of extinction given the localised nature of the Project area disturbance and the occurrence of proximal known and potential habitat resources to the Project area.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

In NSW, the Black-chinned Honeyeater (eastern sub-species) is mainly found in woodlands containing Box-Ironbark woodland associations and River Red Gum (Garnett and Crowley, 2000; NSW Scientific Committee, 2001c).

As stated in Section 2.2, the Project is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion. In the Cobar Peneplain Bioregion, potential habitat for the Black-chinned Honeyeater (eastern sub-species) mainly occurs in the following vegetation types (after NPWS, 2003a):

- Mulga (*A. aneura*) and Poplar Box (*E. populnea bimbil*) which are dominant in the north of the bioregion.

- Poplar Box (*E. populnea bimbil*), Gum Coolibah (*E. intertexta*) and White Cypress Pine (*C. glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) on watercourses are limited.

In the NSW South Western Slopes Bioregion, potential habitat for the Black-chinned Honeyeater (eastern sub-species) mainly occurs in the following vegetation types (after NPWS, 2003a):

- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Black Cypress Pine (*C. endlicheri*), Kurrajong (*B. populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- River Red Gum (*E. camaldulensis*) lining the larger central and western watercourses.

Recent vegetation mapping covering the Project area and wider region was produced by the DLWC (2002) for the Boona Mount, Tullamore, Condobolin Bogan Gate, Tottenhan and Dandaloo 1:100,000 map sheets. These vegetation maps along with other large scale vegetation mapping in NSW (eg. Sivertson and Metcalfe, 1995) were used by Keith (2004) to produce a compilation map of NSW vegetation. Despite available mapping, the vegetation of the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion has not yet been fully mapped to a standard that is suitable for quantitative bioregional assessment of the habitat for the Black-chinned Honeyeater (eastern sub-species).

As previously stated, populations of the Black-chinned Honeyeater (sub-species) appear to be unable to persist in areas which lack remnants of native vegetation larger than 200 ha (NSW Scientific Committee, 2001c). Previous vegetation clearing in NSW has resulted in a reduction in the area and fragmentation of the potential habitat types listed above, particularly habitat which occurs on the plains (Benson, 1999).

No known habitat for this species will be modified or removed for the Project since this species has not been identified in the Project area. Approximately 420 ha of native vegetation will be cleared or modified for the MPF, of which only a portion is potential habitat for the Black-chinned Honeyeater (sub-species).

In relation to the regional distribution of known or potential habitat for this species it is considered that the area to be removed or modified for the Project does not constitute a significant area given the small scale of the habitat removal/modification required for the Project and the greater quantity and quality of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The habitat requirements for the Black-chinned Honeyeater (eastern sub-species) and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. As previously established, potential habitat for the Black-chinned Honeyeater (eastern sub-species) occurs within the Project area and surrounds.

The Black-chinned Honeyeater has a large feeding territory and as a result, often appears locally and seasonally nomadic (Pizzey and Knight, 1999; Schodde and Tidemann, 1997). Due to the species' mobility, all occurrences of potential habitat for this species within the Project area and surrounds are considered proximate habitat areas for this species.

The flatter terrain of the Project area has been cleared of native vegetation except for scattered remnant native trees, while the hillier sites retain a greater cover of native vegetation but have been thinned (Orchid Research, 2000). The remnant towards the north of the Project area has also been thinned due to past logging resulting in few old growth trees remaining (*ibid*.) (Figure 3).

Vegetation clearance associated with the Project may cause some fragmentation of current interconnecting habitat for the Black-chinned Honeyeater (eastern sub-species). However, an area of known (or potential) habitat is unlikely to become isolated from current interconnecting or proximate areas of habitat for the Black-chinned Honeyeater (eastern sub-species) given the mobility of the species and the localised nature of the disturbance required for the Project.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

The Black-chinned Honeyeater (eastern sub-species) is found predominately west of the Great Dividing Range in a narrow belt through NSW, extending north into southern Queensland, and south into Victoria and South Australia, where it occupies Eucalypt woodlands within an approximate annual rainfall range of 400-700 millimetres (mm) (Blakers *et al.*, 1984). Records of this species are distributed towards the east of the NSW South Western Slopes Bioregion with scattered locations west in the Cobar Peneplain Bioregion (DEC, 2005b).

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Black-chinned Honeyeater has been recorded from no national parks in the Cobar Peneplain Bioregion, and only one nature reserve, namely, Round Hill Nature Reserve (DEC, 2005b).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Atlas of NSW Wildlife (DEC, 2005c) indicates the Black-chinned Honeyeater has been recorded in eight protected areas, namely Weddin Mountains, Nangar, Conimbla and Goobang National Parks and Tabletop, Munghorn Gap, Ingalba and Copperhannia Nature Reserves.

In addition, this species has also been recorded in Pucawan, Big Bush and Downfall Nature Reserves (NPWS, 2004a; NPWS, 2004d).

It is recognised that potential habitat for this species occurs in Minjary and Benambra National Parks and Flagstaff Memorial Nature Reserve although this species has not previously been recorded in these reserves (DLWC, 2001; NPWS, 2003b, c and f). In addition, some potentially suitable habitat may also occur in Livingstone National Park and Boginderra Hills, Buddigower, Dapper, Narrandera, Nest Hill, The Rock, Ulandra and Wiesners Swamp Nature Reserves (refer Tables 2a and 2b).

The information provided suggests that habitat for the Black-chinned Honeyeater (eastern sub-species) is adequately represented in conservation reserves (or other similar protected areas) in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

The Black-chinned Honeyeater (eastern sub-species) is found predominately west of the Great Dividing Range in a narrow belt through NSW, extending north into southern Queensland, and south into Victoria and South Australia, where it occupies eucalypt woodlands within an approximate annual rainfall range of 400-700 mm (Blakers *et al.*, 1984).

Considering the above, the Project area is located within the distribution of the Black-chinned Honeyeater (eastern sub-species) and does not represent a distributional limit for this species.

3.1.4 Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*)

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*) feeds on the ground on insects and small lizards in areas with a mix of bare ground, ground cover and leaf litter (Garnett and Crowley, 2000; NSW Scientific Committee, 2001d).

The Hooded Robin breeds from July to December communally in groups of three or more individuals (Pizzey and Knight, 1999). The nest is an open cup made from bark-strips, rootlets, grass and / or spiders' web. The nest is built in a tree fork, crevice or hollow on or near dead wood, approximately 1-6 m above the ground (Pizzey and Knight, 1999; Schodde and Tidemann, 1997). Within these nests, two eggs are laid and incubated for approximately 14 days (Schodde and Tidemann, 1997).

This species is often observed in small family groups and sometimes in isolated pairs (NSW Scientific Committee, 2001d). The species is typically territorial and has a home range of approximately 10-20 ha (Schodde and Tidemann, 1997). Juveniles of this species are dispersive (Pizzey and Knight, 1999).

Threatening processes relevant to the Hooded Robin (south-eastern form) include vegetation clearance and fragmentation, the removal of dead timber, isolation of populations in small remnants, low population densities, habitat degradation by stock grazing, weed invasion and increased populations of nest predators (such as Pied Currawongs and Australian Ravens) (NSW Scientific Committee, 2001d). This species appears to be unable to survive in remnants smaller than 100-200 ha (NSW Scientific Committee, 2001d).

Remnant vegetation which occurs within the Project area, offers potential foraging, roosting and breeding habitat resources for the Hooded Robin. The Project will involve the removal/modification of a portion of potential habitat resources for this species and may disrupt foraging, roosting and breeding resources.

The Hooded Robin has been recorded at 14 locations in the region (ie. Boona Mount, Tullamore, Peak Hill and Bogan Gate 1:100,000 map sheets) the closest of which is located approximately 14 km south-west of the Project area (DEC, 2005a). In addition this species has been recorded by Birds Australia (2005) in a search area of approximately 200 ha surrounding the Project area. The Hooded Robin was recorded during fauna surveys within the Project area and surrounds (Mount King Ecological Surveys, 2000).

It is possible that a local population of the Hooded Robin (south-eastern form) exists within the Project area given that the species was recorded during past surveys, other records of this species proximal to the Project area and the occurrence of potential habitat resources. However, the removal/modification of a portion of habitat for the Hooded Robin (south-eastern form) is unlikely to disrupt the lifecycle such that a local viable population of this species would be placed at risk of extinction given the localised nature of the Project area disturbance and the occurrence of proximal known and potential habitat resources to the Project area.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

The Hooded Robin (south-eastern form) inhabits a wide range of Eucalypt woodlands, mallee, Acacia scrubland and open forests (Garnett and Crowley, 2000). In temperate woodlands, this species favours open areas which adjoin large areas of woodland, with areas of dead timber and sparse shrub cover (Fitri and Ford, 1997 in NSW Scientific Committee, 2001d).

As stated in Section 2.2, the Project is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion. In the Cobar Peneplain Bioregion, potential habitat for the Hooded Robin (south-eastern form) occurs in the following vegetation types (after NPWS, 2003a):

- Mulga (*A. aneura*) are more common in arid areas of the bioregion.
- Mulga (*A. aneura*) and Poplar Box (*E. populnea bimbil*) which are dominant in the north of the bioregion.
- Poplar Box (*E. populnea bimbil*), Gum Coolibah (*E. intertexta*) and White Cypress Pine (*C. glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) on watercourses are limited.
- Mallee is widespread on rocky ridges and sandplains.
- Shrublands consisting of *Eremophila*, *Dodonaea* and *Senna* spp are common.

In the NSW South Western Slopes Bioregion, potential habitat for the Hooded Robin (south-eastern form) occurs in the following vegetation types (after NPWS, 2003a):

- White Box (*E. albens*) woodlands in the eastern hill country.
- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Grey Box (*E. microcarpa*) woodlands, with Yellow Box (*E. melliodora*), White Cypress Pine (*C. glaucophylla*) and Belah (*C. pauper*) occupying lower areas in the western half of the bioregion.
- Red Stringybark (*E. macrorhynca*) on higher slopes with Dwyer's Red Gum (*E. dwyeri*) in the western half of the bioregion.
- Black Cypress Pine (*C. endlicheri*), Kurrajong (*B. populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- Poplar Box (*E. populnea*), Kurrajong, Wilga (*G. parviflora*) and Red Box (*E. intertexta*) occur in the north-west of the bioregion.
- Mallee (including Bull Mallee (*E. behriana*), Blue Mallee (*E. polybractea*), Green Mallee (*E. viridis*) and Congoo Mallee (*E. dumosa*)) occur in limited areas of the central west.
- River Red Gum (*E. camaldulensis*) lining the larger central and western watercourses.

Recent vegetation mapping covering the Project area and wider region was produced by the DLWC (2002) for the Boona Mount, Tullamore, Condobolin Bogan Gate, Tottenhan and Dandaloo 1:100,000 map sheets. These vegetation maps along with other large scale vegetation mapping in NSW (eg. Sivertson and Metcalfe, 1995) were used by Keith (2004) to produce a compilation map of NSW vegetation. Despite available mapping, the vegetation of the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion has not yet been fully mapped to a standard that is suitable for quantitative bioregional assessment of the habitat for the Hooded Robin (south-eastern form).

As previously stated, this species appears to be unable to survive in remnants smaller than 100-200 ha (NSW Scientific Committee, 2001d). Previous vegetation clearing in NSW has resulted in a reduction in the area and fragmentation of the potential habitat types listed above, particularly habitat which occurs on the plains (Benson, 1999).

Approximately 420 ha of native vegetation will be cleared or modified for the MPF, of which only a portion is known or potential habitat for the Hooded Robin (south-eastern form).

In relation to the regional distribution of known or potential habitat for this species it is considered that the area to be removed or modified for the Project does not constitute a significant area given the small scale of the habitat removal/modification required for the Project and the greater quantity and quality of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The habitat requirements for the Hooded Robin (south-eastern form) and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. As previously established, potential habitat for the Hooded Robin (south-eastern form) occurs within the Project area and surrounds.

The species is typically territorial and has a home range of approximately 10-20 ha (Schodde and Tidemann, 1997). Juveniles of this species are dispersive (Pizzey and Knight, 1999). Due to the species' mobility, all occurrences of potential habitat for this species in the Project area and surrounds are considered proximate habitat areas for this species.

The flatter terrain of the Project area has been cleared of native vegetation except for scattered remnant native trees, while the hillier sites retain a greater cover of native vegetation but have been thinned (Orchid Research, 2000). The remnant towards the north of the Project area has also been thinned due to past logging resulting in few old growth trees remaining (*ibid*.) (Figure 3).

Vegetation clearance associated with the Project may cause some fragmentation of current interconnecting habitat for the Hooded Robin (south-eastern form). However, an area of known (or potential) habitat is unlikely to become isolated from current interconnecting or proximate areas of habitat for the Hooded Robin (south-eastern form) given the mobility of the species and the localised nature of the disturbance required for the Project.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

The Hooded Robin (south-eastern form) is distributed throughout south-eastern Australia, from Central Queensland to the Spencer Gulf in South Australia (NSW Scientific Committee, 2001d). Records of this species are distributed throughout the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion (DEC, 2005b).

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Hooded Robin (south-eastern form) has been recorded from two national parks in the Cobar Peneplain Bioregion, namely, Cocopara and Gundabooka National Parks as well as seven nature reserves, namely, Cocopara, Nombinnie, Pulletop, Round Hill, Tollingo, Woggoon and Yathong Nature Reserves (DEC, 2005b).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Atlas of NSW Wildlife (DEC, 2005c) indicates the Hooded Robin (south-eastern form) has been recorded in 11 protected areas, namely Weddin Mountains, Nangar, Conimbla and Goobang National Parks and Buddigower, The Charcoal Tank, Tabletop, Munghorn Gap, Dapper, Copperhannia and The Rock Nature Reserves.

In addition, this species has also been recorded in Benambra National Park and Pucawan, Ingalba, Big Bush and Downfall Nature Reserves (NPWS, 2003e; NPWS, 2004a and d).

Potential habitat for this species occurs in Minjary National Park and Flagstaff Memorial Nature Reserve although this species has not previously been recorded in these reserves (NPWS, 2003b and c). In addition, some potentially suitable habitat may also occur in Livingstone and Woomargama National Parks and Avisford, Boginderra Hills, Ingalba, Narrandera, Nest Hill and Ulandra Nature Reserves (refer Tables 2a and 2b).

The information provided suggests that habitat for the Hooded Robin (south-eastern form) is adequately represented in conservation reserves (or other similar protected areas) in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

M. cucullata cucullata is distributed throughout south-eastern Australia, from Central Queensland to the Spencer Gulf in South Australia (NSW Scientific Committee, 2001d).

Considering the above, the Project area is located within the distribution for the Hooded Robin (south-eastern form) and does not represent a distributional limit for this species.

3.1.5 Grey-crowned Babbler (eastern sub-species) (*Pomatostomus temporalis temporalis*)

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Grey-crowned Babbler (eastern sub-species) (*Pomatostomus temporalis temporalis*) lives and breeds in a co-ordinated communal group which may include up to 12 individuals (Schodde and Tidemann, 1997). These extended family parties are essential for both the co-operative feeding of young and predator avoidance (King, 1980 in Garnett and Crowley, 2000).

The Grey-crowned Babbler typically breeds between July and February (Schodde and Tidemann, 1997). Pairs mate for life and are usually the only breeding birds within the group (Schodde and Tidemann, 1997). A domed nest, up to 500 mm wide (with a roomy cavity reached by a small tunnel) is made of strong twigs and lined with grass, fur or cow dung (*ibid.*). The nest is built in the fork of small branches usually about 4 m above the ground. Approximately 2-3 eggs are laid, and incubated for 18-23 days by the female (Schodde and Tidemann, 1997). Nests used for breeding have been found to be used afterwards as roosts, while some nests have been found to be used for roosting only (Dow and King, 1984).

P. temporalis temporalis feeds on invertebrates (spiders and insects) and lizards, foraging on the ground, in leaf litter, on the bark of trees and in shrubs and foliage (Schodde and Tidemann, 1997; NSW Scientific Committee, 2001e; Garnett and Crowley, 2000). Populations of the Grey-crowned Babbler are nomadic ground foragers (Flegg, 2002).

Threatening processes relevant to the Grey-crowned Babbler (eastern sub-species) include clearance and fragmentation of habitat, habitat degradation as a result of weed invasion and grazing, and increased abundance of competitors (eg. Noisy Miners) and nest predators (eg. Pied Currawong and Australian Raven) (Garnett and Crowley, 2000; NSW Scientific Committee, 2001e). Remnant vegetation which occurs within the Project area, offers potential foraging, roosting and breeding habitat resources for the Grey-crowned Babbler. The Project will involve the removal/modification of a portion of potential habitat for this species and may disrupt foraging, roosting and breeding habitat resources (were this species to occur).

The Grey-crowned Babbler has been recorded at 40 locations in the region (ie. Boona Mount, Tullamore, Peak Hill, Condobolin and Bogan Gate 1:100,000 map sheets) the closest of which is located approximately 7 km south of the Project area (DEC, 2005a). In addition this species has been recorded by Birds Australia (2005) in a search area of approximately 200 ha surrounding the Project area. This species has not been recorded during fauna surveys within the Project area and surrounds (Mount King Ecological Surveys, 2000).

It is possible that a local population of the Grey-crowned Babbler (eastern sub-species) exists within the Project area given the occurrence of potential habitat resources and records of this species proximal to the Project area. However, the removal/modification of a portion of habitat for the Grey-crowned Babbler (eastern sub-species) is unlikely to disrupt the lifecycle such that a local viable population of this species would be placed at risk of extinction given the localised nature of the Project area disturbance and the occurrence of proximal known and potential habitat resources to the Project area.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

The Grey-crowned Babbler (eastern sub-species) inhabits open forests, Acacia shrubland, open woodlands (dominated by mature eucalypts with regenerating trees, tall shrubs and an intact ground cover of grass and forbs) and adjoining farmland (Garnett and Crowley, 2000; Schodde and Tidemann, 1997).

As stated in Section 2.2, the Project is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion. In the Cobar Peneplain Bioregion, potential habitat for the Grey-crowned Babbler (eastern sub-species) occurs in the following vegetation types (after NPWS, 2003a):

- Mulga (*A. aneura*) are more common in arid areas of the bioregion.
- Mulga (*A. aneura*) and Poplar Box (*E. populnea bimbil*) which are dominant in the north of the bioregion.
- Poplar Box (*E. populnea bimbil*), Gum Coolibah (*E. intertexta*) and White Cypress Pine (*C. glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) on watercourses are limited.
- Mallee is widespread on rocky ridges and sandplains.
- Shrublands consisting of *Eremophila*, *Dodonaea* and *Senna* spp are common.

In the NSW South Western Slopes Bioregion, potential habitat for the Grey-crowned Babbler (eastern sub-species) occurs in the following vegetation types (after NPWS, 2003a):

- White Box (*E. albens*) woodlands in the eastern hill country.
- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Grey Box (*E. microcarpa*) woodlands, with Yellow Box (*E. melliodora*), White Cypress Pine (*C. glaucophylla*) and Belah (*C. pauper*) occupying lower areas in the western half of the bioregion.
- Red Stringybark (*E. macrorhynca*) on higher slopes with Dwyer's Red Gum (*E. dwyeri*) in the western half of the bioregion.

- Black Cypress Pine (*C. endlicheri*), Kurrajong (*B. populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- Poplar Box (*E. populnea*), Kurrajong, Wilga (*G. parviflora*) and Red Box (*E. intertexta*) occur in the north-west of the bioregion.
- Mallee (including Bull Mallee (*E. behriana*), Blue Mallee (*E. polybractea*), Green Mallee (*E. viridis*) and Congoo Mallee (*E. dumosa*)) occur in limited areas of the central west.
- River Red Gum (*E. camaldulensis*) lining the larger central and western watercourses.

Recent vegetation mapping covering the Project area and wider region was produced by the DLWC (2002) for the Boona Mount, Tullamore, Condobolin Bogan Gate, Tottenhan and Dandaloo 1:100,000 map sheets. These vegetation maps along with other large scale vegetation mapping in NSW (eg. Sivertson and Metcalfe, 1995) were used by Keith (2004) to produce a compilation map of NSW vegetation. Despite available mapping, the vegetation of the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion has not yet been fully mapped to a standard that is suitable for quantitative bioregional assessment of the habitat for the Grey-crowned Babbler (eastern sub-species).

No known habitat for this species will be modified or removed for the Project since this species has not been identified in the Project area. Approximately 420 ha of native vegetation will be cleared or modified for the MPF, of which only a portion is potential habitat for the Grey-crowned Babbler (eastern sub-species).

In relation to the regional distribution of known or potential habitat for this species it is considered that the area to be removed or modified for the Project does not constitute a significant area given the small scale of the habitat removal/modification required for the Project and the greater quantity and quality of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The habitat requirements for the Grey-crowned Babbler (eastern sub-species) and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. As previously established, potential habitat for the Grey-crowned Babbler (eastern sub-species) occurs within the Project area and surrounds.

Populations of the Grey-crowned Babbler are nomadic ground foragers (Flegg, 2002). However, these birds are reluctant to traverse tracts of cleared land (NSW Scientific Committee, 2001e). Accordingly, proximate habitat areas within the Project area and surrounds are considered to be occurrences of potential habitat when not separated by tracts of cleared land.

The flatter terrain of the Project area has been cleared of native vegetation except for scattered remnant native trees, while the hillier sites retain a greater cover of native vegetation but have been thinned (Orchid Research, 2000). The remnant towards the north of the Project area has also been thinned due to past logging resulting in few old growth trees remaining (*ibid*.) (Figure 3).

Vegetation clearance associated with the Project may cause some fragmentation of current interconnecting habitat for the Grey-crowned Babbler (eastern sub-species). However, an area of known (or potential) habitat is unlikely to become isolated from current interconnecting or proximate areas of habitat for the Grey-crowned Babbler eastern sub-species) given the localised nature of the disturbance required for the Project.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

In NSW, *P. temporalis temporalis* occurs on the western slopes and plains but is less common at higher altitudes of the tablelands (NSW Scientific Committee, 2001e). Isolated populations exist in coastal woodlands on the North Coast, in the Hunter Valley, and from the South Coast near Nowra (Blakers *et al*., 1984; Schodde and Mason, 1999 in NSW Scientific Committee, 2001e). Records of this species are distributed throughout the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion (DEC, 2005b).

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Grey-crowned Babbler (eastern sub-species) has been recorded from two national parks in the Cobar Peneplain Bioregion, namely, Cocopara and Gundabooka National Parks as well as six nature reserves, namely, Nombinnie, Pulletop, Quanda, Round Hill, Woggoon and Yathong Nature Reserves (DEC, 2005b).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Atlas of NSW Wildlife (DEC, 2005b) indicates the Grey-crowned Babbler (eastern sub-species) has been recorded in nine protected areas, namely Weddin Mountains, Conimbla and Goobang National Parks and Buddigower, The Charcoal Tank, Munghorn Gap, Ingalba, Flagstaff Memorial and Boginderra Hills Nature Reserves.

In addition, this species has also been recorded in Nangar National Park and Pucawan and Big Bush Nature Reserves (NPWS, 2004a and b).

Some potentially suitable habitat occurs in Benambra, Livingstone, Minjary, and Woomargama National Parks and Avisford, Copperhannia, Dapper, Downfall, Narrandera, Nest Hill, Tabletop, The Rock and Ulandra, Nature Reserves.

The information provided suggests that habitat for the Grey-crowned Babbler (eastern sub-species) is adequately represented in conservation reserves (or other similar protected areas) in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

P. temporalis temporalis formerly ranged throughout eastern Australia, from South Australia through NSW and central Queensland, and north to southern New Guinea (NSW Scientific Committee, 2001e). The species is now considered to be extinct in South Australia, coastal Victoria and the Australian Capital Territory. In NSW, *P. temporalis temporalis* occurs on the western slopes and plains but is less common at higher altitudes of the tablelands (*ibid*.). Isolated populations exist in coastal woodlands on the North Coast, in the Hunter Valley, and from the South Coast near Nowra (Blakers *et al*., 1984; Schodde and Mason, 1999 in NSW Scientific Committee, 2001e).

Considering the above, the Project area is located within the distribution for the Grey-crowned Babbler (eastern sub-species) and does not represent a distributional limit for this species.

3.1.6 Diamond Firetail (*Stagonopleura guttata*)

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Diamond Firetail (*Stagonopleura guttata*) typically breeds between August and January (Pizzey and Knight, 1999). Approximately four to seven eggs are laid, and incubated for 12-15 days (Schodde and Tidemann, 1997). Nests are placed in the thick foliage of mistletoe clumps, Eucalypt tree or shrub, up to 10 m above the ground (Schodde and Tidemann, 1997). The nests are bulky and bottle-shaped and are made from grass (Pizzey and Knight, 1999). After fledging, young birds spend about a week in the breeding area before joining a larger flock to forage wherever food sources are abundant (Schodde and Tidemann, 1997). Many young are nomadic during winter, moving to new areas as food sources become depleted (*ibid.*).

Diamond Firetails drink frequently throughout the day. The main food source of this species is seed, mostly from grasses (Read, 1994 in Garnett and Crowley, 2000), however their diet can also include insects (Blakers *et al*., 1984, Read, 1994 in NSW Scientific Committee, 2001f). At dusk, feeding flocks disperse to dense shrubbery or to specifically built nests to roost (Schodde and Tidemann, 1997). Roosting nests are made of coarse green and dry grasses and are smaller and built lower to the ground than breeding nests (*ibid.*).

Populations of the Diamond Firetail are sedentary (Pizzey and Knight, 1999), however many young exist as nomads during the winter months, not constructing roost nests and moving on as the food source becomes depleted (Schodde and Tidemann, 1997).

Threatening processes relevant to the Diamond Firetail include habitat removal, fragmentation and degradation (particularly overgrazing of the grass understorey) and increased abundance of predators (eg. Pied Currawong and Australian Ravens) (Garnett and Crowley, 2000; NSW Scientific Committee, 2001f). Further, populations of the Diamond Firetail appear to be unable to persist in areas which lack remnants of native vegetation larger than 200 ha (NSW Scientific Committee, 2001f). Remnant vegetation which occurs within the Project area, offers potential foraging, roosting and breeding habitat resources for the Diamond Firetail. The Project will involve the removal/modification of a portion of potential habitat for this species and may disrupt foraging, roosting and breeding habitat resources (were this species to occur).

The Diamond Firetail has been recorded at 28 locations in the region (ie. Boona Mount, Peak Hill, Condobolin and Bogan Gate 1:100,000 map sheets) the closest of which is located within the MPF (DEC, 2005a). In addition this species has been recorded by Birds Australia (2005) in a search area of approximately 200 ha surrounding the Project area. This species has not been recorded during fauna surveys within the Project area and surrounds (Mount King Ecological Surveys, 2000).

It is possible that a local population of the Diamond Firetail exists within the Project area given the occurrence of potential habitat resources and records of this species proximal to the Project area. However, the removal/modification of a portion of habitat for the Diamond Firetail is unlikely to disrupt the lifecycle such that a local viable population of this species would be placed at risk of extinction given the localised nature of the Project area disturbance and the occurrence of proximal known and potential habitat resources to the Project area.

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

The Diamond Firetail inhabits a wide range of eucalypt dominated vegetation communities that have a grassy understorey including woodland, forest and mallee (Garnett and Crowley, 2000). Water and trees are always near, for drinking and shelter (Schodde and Tidemann, 1997).

As stated in Section 2.2, the Project is located on the boundary between the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion. In the Cobar Peneplain Bioregion, potential habitat for the Diamond Firetail occurs in the following vegetation types (after NPWS, 2003a):

- Mulga (*A. aneura*) and Poplar Box (*E. populnea bimbil*) which are dominant in the north of the bioregion.
- Poplar Box (*E. populnea bimbil*), Gum Coolibah (*E. intertexta*) and White Cypress Pine (*C. glaucophylla*) which are common in the south-west of the bioregion.
- Poplar Box (*E. populnea bimbil*) and White Cypress Pine (*C. glaucophylla*) dominate the far south of the bioregion.
- Mugga Ironbark (*E. sideroxylon*), Hill Red Gum (*E. dealbata*) and Grey Box (*E. microcarpa*) woodlands occur on the eastern edges of the bioregion, extending into the NSW South West Slopes Bioregion.
- River Red Gum (*E. camaldulensis*) and Black Box (*E. largiflorens*) on watercourses are limited.
- Mallee is widespread on rocky ridges and sandplains.

In the NSW South Western Slopes Bioregion, potential habitat for the Diamond Firetail occurs in the following vegetation types (after NPWS, 2003a):

- White Box (*E. albens*) woodlands in the eastern hill country.
- Grey Box (*E. microcarpa*) and White Cypress Pine (*C. glaucophylla*) to the west and north of the bioregion.
- Grey Box (*E. microcarpa*) woodlands, with Yellow Box (*E. melliodora*), White Cypress Pine (*C. glaucophylla*) and Belah (*C. pauper*) occupying lower areas in the western half of the bioregion.
- Red Stringybark (*E. macrorhynca*) on higher slopes with Dwyer's Red Gum (*E. dwyeri*) in the western half of the bioregion.
- Black Cypress Pine (*C. endlicheri*), Kurrajong (*B. populneum*), Mugga Ironbark (*E. sideroxylon*), White Gum (*E. rossi*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) occupying the lower slopes.
- Poplar Box (*E. populnea*), Kurrajong, Wilga (*G. parviflora*) and Red Box (*E. intertexta*) occur in the north-west of the bioregion.
- Mallee (including Bull Mallee (*E. behriana*), Blue Mallee (*E. polybractea*), Green Mallee (*E. viridis*) and Congoo Mallee (*E. dumosa*)) occur in limited areas of the central west.
- River Red Gum (*E. camaldulensis*) lining the larger central and western watercourses.

Recent vegetation mapping covering the Project area and wider region was produced by the DLWC (2002) for the Boona Mount, Tullamore, Condobolin Bogan Gate, Tottenhan and Dandaloo 1:100,000 map sheets. These vegetation maps along with other large scale vegetation mapping in NSW (eg. Sivertson and Metcalfe, 1995) were used by Keith (2004) to produce a compilation map of NSW vegetation. Despite available mapping, the vegetation of the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion has not yet been fully mapped to a standard that is suitable for quantitative bioregional assessment of the habitat for the Diamond Firetail.

Populations of the Diamond Firetail appear to be unable to persist in areas which lack remnants of native vegetation larger than 200 ha (NSW Scientific Committee, 2001f). Previous vegetation clearing in NSW has resulted in a reduction in the area and fragmentation of the potential habitat types listed above, particularly habitat which occurs on the plains (Benson, 1999).

Approximately 420 ha of native vegetation will be cleared or modified for the MPF, of which only a portion is known or potential habitat for the Diamond Firetail.

In relation to the regional distribution of known or potential habitat for this species it is considered that the area to be removed or modified for the Project does not constitute a significant area given the small scale of the habitat removal/modification required for the Project and the greater quantity and quality of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The habitat requirements for the Diamond Firetail and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. As previously established, potential habitat for the Diamond Firetail occurs within the Project area and surrounds.

Populations of the Diamond Firetail are sedentary (Pizzey and Knight, 1999), however many young exist as nomads during the winter months, not constructing roost nests and moving on as the food source becomes depleted (Schodde and Tidemann, 1997). However, due to the species' mobility, all occurrences of potential habitat for this species within the Project area and close surrounds are considered proximate habitat areas for this species.

The flatter terrain of the Project area has been cleared of native vegetation except for scattered remnant native trees, while the hillier sites retain a greater cover of native vegetation but have been thinned (Orchid Research, 2000). The remnant towards the north of the Project area has also been thinned due to past logging resulting in few old growth trees remaining (*ibid*.) (Figure 3).

Vegetation clearance associated with the Project may cause some fragmentation of current interconnecting habitat for the Diamond Firetail. However, an area of known (or potential) habitat is unlikely to become isolated from current interconnecting or proximate areas of habitat for the Diamond Firetail given the localised nature of the disturbance required for the Project.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

In NSW, populations of *S. guttata* occur primarily west of the Great Dividing Range, although some occur in drier coastal areas such as the Cumberland Plains of western Sydney and the Hunter, Clarence, Richmond and Snowy River Valleys (Blakers *et al.,* 1984; Schodde and Mason, 1999 in NSW Scientific Committee, 2001f). Records of this species are distributed throughout the NSW South Western Slopes Bioregion and in scattered locations across the Cobar Peneplain Bioregion (DEC, 2005b).

A total of 12 protected areas are in whole or in part contained within the Cobar Peneplain Bioregion, including two national parks, nine nature reserves and one historic site (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Diamond Firetail has been recorded from two national parks in the Cobar Peneplain Bioregion, namely, Cocopara and Gundabooka National Parks as well as five nature reserves, namely, Cocopara, Gubbata, Pulletop, Round Hill and Woggoon Nature Reserves (DEC, 2005b).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). The Atlas of NSW Wildlife (NPWS, 2004) indicates the Diamond Firetail has been recorded in 13 protected areas, namely, Weddin Mountains, Nangar, Conimbla and Goobang National Parks and Buddigower, The Charcoal Tank, Pucawan, Munghorn Gap, Ingalba, Copperhannia, Tabletop, Big Bush and The Rock Nature Reserves.

In addition, this species has also been recorded in Benambra National Park and Flagstaff Memorial, Ulandra and Downfall Nature Reserves (NPWS, 2003b and f; NPWS, 1994; NPWS, 2004d).

Some potentially suitable habitat occurs in Livingstone, Minjary and Woomargama National Parks and Avisford, Boginderra Hills, Dapper, Narrandera, Nest Hill and Wiesners Swamp Nature Reserves (refer Tables 2a and 2b).

The information provided suggests that habitat for the Diamond Firetail is adequately represented in conservation reserves (or other similar protected areas) in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

(h) Whether any threatened species, population or ecological community is at the limit of its known distribution

S. guttata is distributed through central and eastern NSW, extending north into southern and central Queensland and south through Victoria to the Eyre Peninsula, South Australia (NSW Scientific Committee, 2001f). In NSW, populations of *S. guttata* occur primarily west of the Great Dividing Range, although some occur in drier coastal areas such as the Cumberland Plain of western Sydney and the Hunter, Clarence, Richmond and Snowy River valleys (Blakers *et al.,* 1984; Schodde and Mason, 1999 in NSW Scientific Committee, 2001f).

Considering the above, the Project area is located within the distribution for the Diamond Firetail and does not represent a distributional limit for this species.

3.2 ENDANGERED ECOLOGICAL COMMUNITIES

3.2.1 White Box, Yellow Box, Blakely's Red Gum Woodland

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at the risk of extinction.

Not applicable. Refer to Section 2.2(a).

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

White Box, Yellow Box, Blakely's Red Gum Woodland (also referred to as Grassy White Box Woodlands under the EPBC Act) includes woodlands where the characteristic tree species include one or more of the following species in varying proportions and combinations – White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*) or Blakely's Red Gum (*Eucalyptus blakelyi*) (NSW Scientific Committee, 2002; NPWS, 2002). In addition to the dominant tree species present, understorey species are key to whether or not particular remnants belong to the White Box, Yellow Box, Blakely's Red Gum Woodland endangered ecological community. Grass and herbaceous species generally characterise the ground layer, and shrubs are generally sparse or absent, though they may be locally common (NSW Scientific Committee, 2002; NPWS, 2002).

This woodland community typically occurs on soils that are moderately to highly fertile and as a result have been extensively cleared and modified in the past by thinning, clearing, grazing, pasture improvement and cultivation (NPWS, 2002).

The White Box, Yellow Box, Blakely's Red Gum Woodland was formerly a dominant and very widespread community in the NSW South Western Slopes Bioregion. As such there are many thousands of hectares of fragmented and disturbed remnants on farmland, roadsides, travelling stock routes and other lands.

The White Box, Yellow Box, Blakely's Red Gum Woodland does not occur in the Cobar Peneplain Bioregion (NSW Scientific Committee, 2002).

While the White Box, Yellow Box, Blakely's Red Gum endangered ecological community could possibly occur within the Project area, the comprehensive flora surveys and mapping conducted to date (Orchid Research, 2000) indicate that the components of the endangered ecological community are not present. Therefore, it is considered that a significant area of known habitat will not be modified or removed.

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population, or ecological community.

The habitat requirements for the White Box, Yellow Box, Blakely's Red Gum Woodland and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. No known or potential habitat for the White Box, Yellow Box, Blakely's Red Gum Woodland occurs within the Project area and surrounds. Therefore the Project will not isolate current interconnecting or proximate areas of habitat.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or similar protected areas) in the region.

As stated above, the White Box, Yellow Box, Blakely's Red Gum Woodland does not occur in the Cobar Peneplain Bioregion (NSW Scientific Committee, 2002).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2).

Within the NSW South Western Slopes Bioregion, the White Box, Yellow Box, Blakely's Red Gum Woodland has been recorded in the Goobang, Nangar and Conimbla National Parks and Tabletop and Flagstaff Memorial Nature Reserves (DEC, 2005b). However, these occurrences are generally small and the community is not regarded as adequately reserved.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

***(h) Whether any threatened species, population, or ecological community is at the limit of its known distribution*.**

This endangered ecological community occurs predominantly on the Tablelands and upper Western Slopes in NSW between about the 400 and 800 mm rainfall isohyets (NSW Scientific Committee, 2002). In NSW, this endangered ecological community is confined to the bioregions shown in Figure 4, *viz*.: New England Tableland, Nandewar, Brigalow Belt South, NSW North Coast, Sydney Basin, NSW South Western Slopes and South Eastern Highlands. The Project area is located in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion.

Figure 4
Extent of the White Box, Yellow Box, Blakely's Red Gum Woodland Endangered Ecological Community in NSW

Source: DEC (2005b)

Considering the above, it can be concluded that the Project is located on the western edge of the distribution of the White Box, Yellow Box, Blakely's Red Gum Woodland endangered ecological community and may represent a distributional limit for this community.

3.2.2 Fuzzy Box Woodland on Alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions

(a) In the case of a threatened species, whether the lifecycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at the risk of extinction.

Not applicable. Refer to Section 2.2(a).

(b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Not applicable. Refer to Section 2.2(b).

(c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions includes woodland or open woodland which is usually dominated by Fuzzy Box (*Eucalyptus conica*) (NSW Scientific Committee, 2004). In addition other dominant tree species which may be present include Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*) and Kurrajong (*Brachychiton populneus*) (*ibid*.).

This woodland community typically occurs on brown loam or clay, alluvial or colluvial soils on prior streams, abandoned channels or on slight depressions on undulating plains or flats (NSW Scientific Committee, 2004).

The Fuzzy Box was formerly a dominant and very widespread tree in the NSW South Western Slopes Bioregion. However, it is estimated that less than 5% of the Fuzzy Box Woodland currently remains compared to pre-European times (NSW Scientific Committee, 2004).

While the Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions could possibly occur within the Project area, the comprehensive flora surveys and mapping conducted to date (Orchid Research, 2000) indicate that the components of the endangered ecological community are not present. Therefore, it is considered that a significant area of known habitat will not be modified or removed.

The Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions does not occur in the Cobar Peneplain Bioregion (NSW Scientific Committee, 2004).

(d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population, or ecological community.

The habitat requirements for the Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions, and the occurrence of such habitat in the Cobar Peneplain Bioregion and NSW South Western Slopes Bioregion are discussed above. No known or potential habitat for the Fuzzy Box Woodland endangered ecological community occurs within the Project area and surrounds. Therefore the Project will not isolate current interconnecting or proximate areas of habitat.

(e) Whether critical habitat will be affected

Not applicable. Refer to Section 2.2(e).

(f) Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or similar protected areas) in the region.

As discussed above, the Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions does not occur in the Cobar Peneplain Bioregion (NSW Scientific Committee, 2004).

A total of 36 protected areas are in whole or in part contained within the NSW South Western Slopes Bioregion, including eight national parks, 25 nature reserves, two historic sites, three state conservation areas and one karst conservation reserve (DEC, 2005b; Environment Australia, 2002) (Figure 2). Within the NSW South Western Slopes Bioregion, Fuzzy Box Woodland is known from one small stand in Weddin Mountains National Park (NSW Scientific Committee, 2004). Therefore, the community is not regarded as adequately reserved.

(g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The Project will involve the removal of vegetation. Native vegetation clearance is recognised as a threatening process in the National Strategy for the Conservation of Australia's Biological Diversity (Department of the Environment, Sport and Territories, 1996), the NSW Biodiversity Strategy (NPWS, 1999) and in Schedule 3 of the TSC Act.

***(h) Whether any threatened species, population, or ecological community is at the limit of its known distribution*.**

The Fuzzy Box Woodland endangered ecological community occurs in the NSW South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions, predominantly around Dubbo, Narromine, Parkes and Forbes (NSW Scientific Committee, 2004). The Project area is located in the Cobar Peneplain and NSW South Western Slopes Bioregions.

Considering the above, it can be concluded that the Project is located on the western edge of the distribution of the Fuzzy Box Woodland endangered ecological community and may represent a distributional limit for this community.

4 CONCLUSION

This document has assessed the Project for significant effects on threatened species, populations, ecological communities, and their habitats in accordance with Section 5A of the EP&A Act and it has been determined that:

- No local populations of threatened species would be placed at risk of extinction.
- In relation to the regional distribution of habitat of a threatened species, it is considered that a significant area of known habitat would not be modified or removed by the Project.
- An area of known habitat is unlikely to become isolated from currently interconnecting or proximate areas of habitat for each threatened species or ecological community.

These determinations were supported by the following factors:

- The existing disturbed nature of the majority of the Project area due to past landuse.
- The occurrence of higher quality habitat proximal to the Project area.

Therefore, it is considered that the proposed development is unlikely to have a significant effect on any threatened species, populations, ecological communities or their habitats.

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