

SYERSTON PROJECT
SCANDIUM OXIDE MODIFICATION
ENVIRONMENTAL ASSESSMENT

MAY 2016
Project No. CTL-15-01
Document No. 00740462.docx

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1 INTRODUCTION

This document is an Environmental Assessment (EA) for a proposed modification to the Syerston Project (the Project), an approved nickel cobalt mining project. Scandium21 Pty Ltd (Scandium21), a wholly owned subsidiary of Clean TeQ Holdings Ltd (Clean TeQ), owns the rights to develop the Project.

This modification is sought under section 75W of the *Environmental Planning and Assessment Act, 1979* (EP&A Act).

1.1 OVERVIEW OF THE APPROVED PROJECT

The Project is situated approximately 350 kilometres (km) west-northwest of Sydney, near the village of Fifield, New South Wales (NSW) (Figure 1).

Development Consent DA 374-11-00 (Attachment 1) for the Project was issued under Part 4 of the EP&A Act in 2001.

Development Consent DA 374-11-00 has been modified on two occasions since it was issued:

- 2005 – to allow for the increase the run-of-mine (ROM) ore processing rate, limestone quarry extraction rate and adjustments to ore procession operations; and
- 2006 – to allow for the reconfiguration of the water supply borefield.

The Project includes the establishment and operation of the (Figure 1):

- nickel cobalt mine and processing facility (MPF);
- limestone quarry and processing facility (the limestone quarry);
- rail loading and unloading facility (the rail siding);
- natural gas pipeline;
- two water supply borefields and pipelines; and
- associated road infrastructure upgrades.

Open cut mining and processing of up to 2.5 million tonnes per annum (Mtpa) of ROM ore to produce up to approximately 53,000 tonnes per annum (tpa) of mixed nickel and cobalt sulphide precipitates is approved at the MPF.

Construction of the Project substantially commenced in 2006 with the construction of the water supply borefield, however Project operations are yet to commence.

The approved MPF general arrangement is provided on Figure 2.

1.2 OVERVIEW OF THE MODIFICATION

Since acquiring the rights to develop the Project, Scandium21 has investigated the potential for adjusting mining and processing operations at the MPF to initially focus on scandium oxide (Sc_2O_3) production in addition to nickel and cobalt precipitate production. This proposed adjustment to the MPF operations is referred to as the Scandium Oxide Modification (the Modification).

The Modification would involve an initial scandium oxide focussed production phase (the Initial Production Phase) prior to refocusing on nickel and cobalt precipitate production by developing the full Project with additional scandium oxide production (the Full Production Phase).

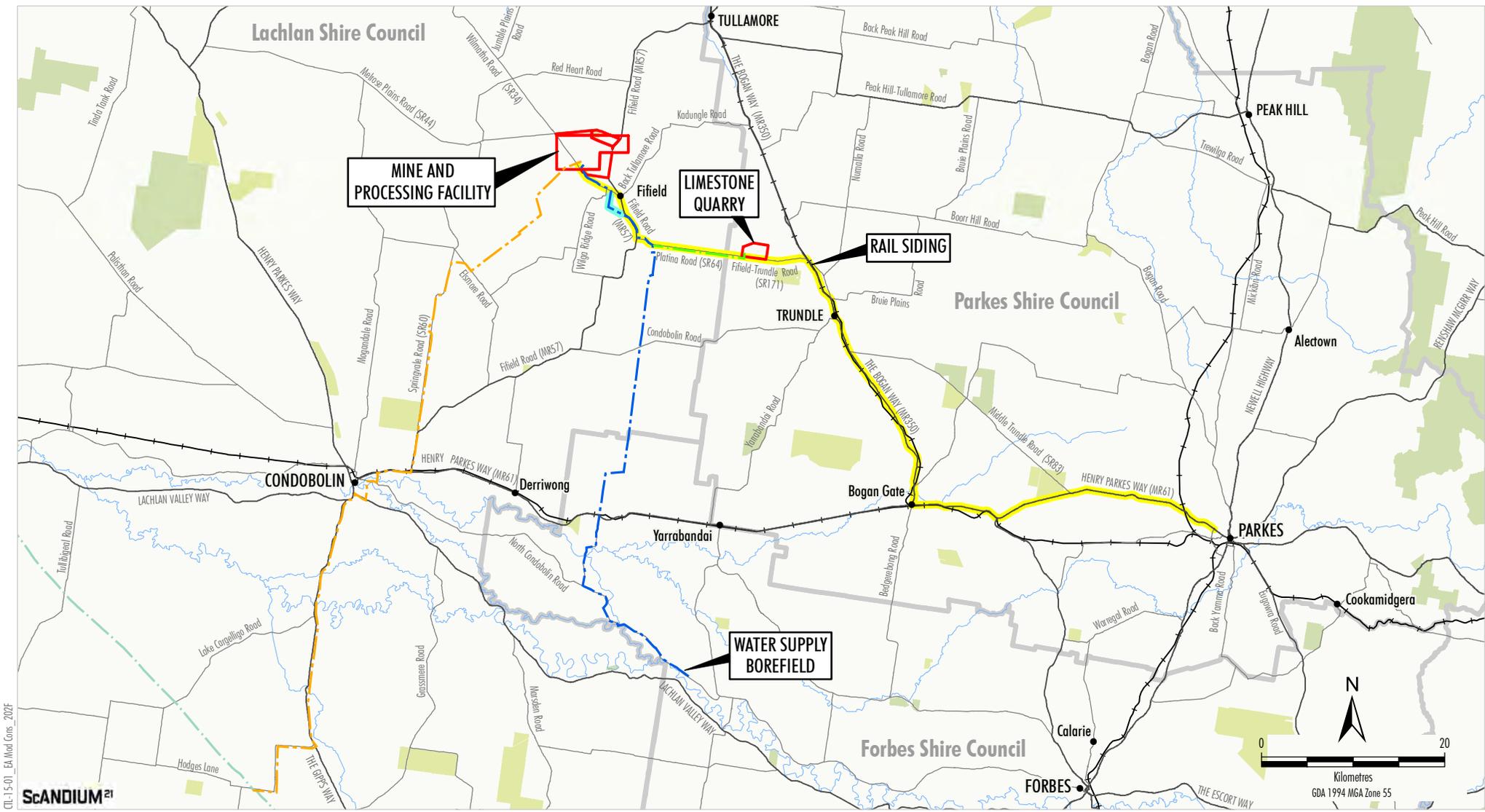
The Initial Production Phase would be a smaller-scale operation compared to the approved Project and would include:

- preferentially mining scandium-rich areas of the Syerston deposit, within the approved MPF surface development area, at a ROM ore production rate of 100,000 tpa; and
- minor adjustments to the processing operations to allow for the production of approximately 80 tpa of scandium oxide and up to 1,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products.

The modified Project would transition to the Full Production Phase once scandium-rich areas of the Syerston deposit are depleted or favourable market conditions prevail for larger scale nickel cobalt scandium production.

The Full Production Phase would generally be consistent with the approved Project.

Table 1 provides a comparative summary of the approved and proposed modified Project.



CL-15-01 - EA Mod Cons, 202F

ScANDIUM²¹

- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Lease Application Boundary
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

- Heavy Vehicle Access Route
- Fife Road Bypass

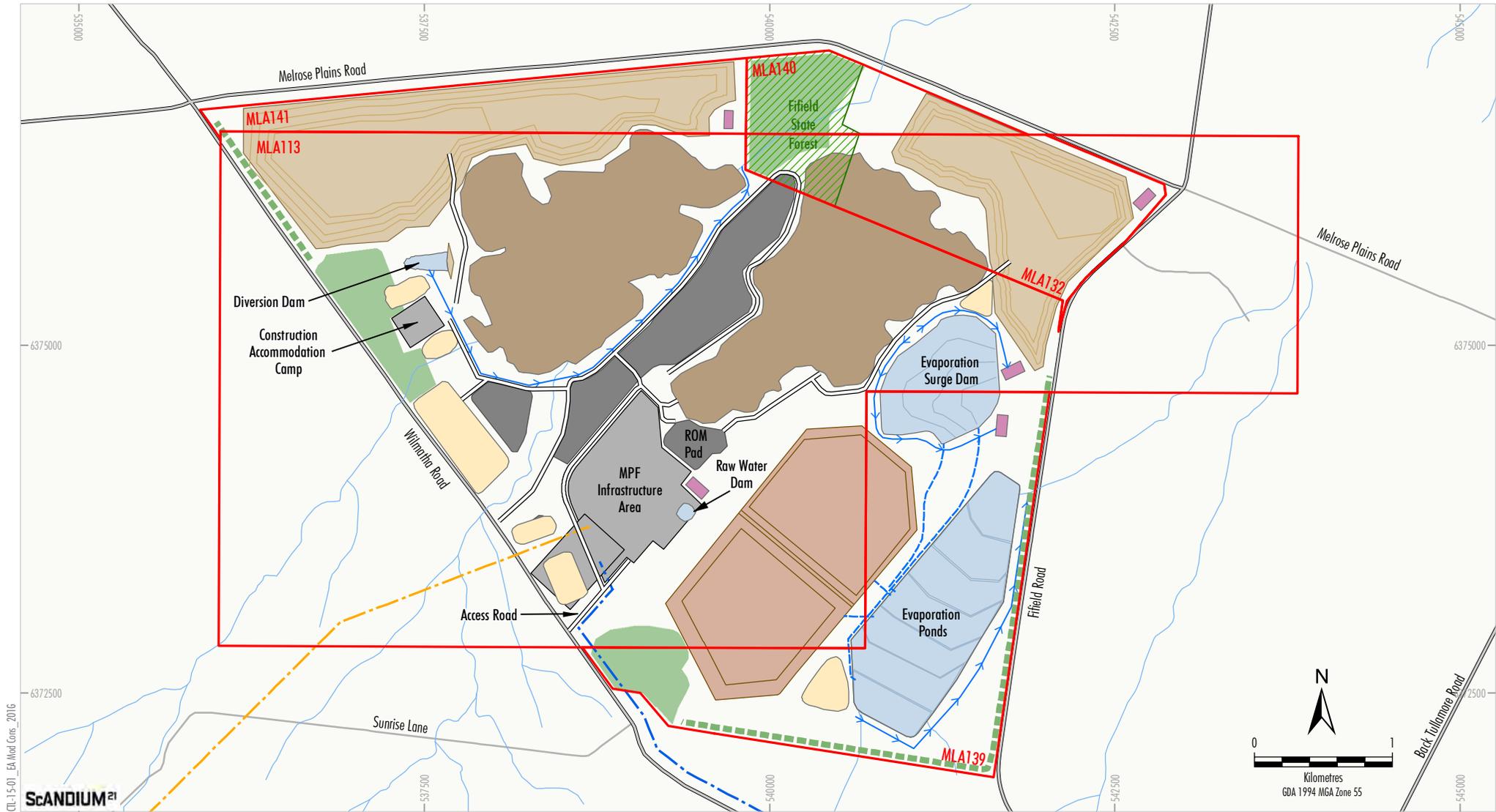
Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Fife Road Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
 ScANDIUM OXIDE MODIFICATION

Regional Location

Figure 1

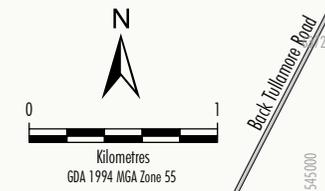


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ScANDIUM²¹

- LEGEND**
- State Forest
 - Mining Lease Application Boundary
 - Ore Stockpile
 - Open Cut Pit
 - Waste Rock Emplacement
 - Tailings Storage Facility
 - Topsoil Stockpile
 - Infrastructure Area
 - Sediment Dam
 - Water Storage
 - Diversion Structure
 - Key Site Water Pipeline
 - Vegetation Screening
 - Existing Open Woodland to be Maintained
 - Gas Pipeline
 - Water Supply Pipeline

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)



SYERSTON PROJECT
 SCANDIUM OXIDE MODIFICATION

Approved Mine and Processing Facility
 General Arrangement

Figure 2

Table 1
Comparative Summary of the Approved and Modified Project

Component	Approved Project ¹	Proposed Modification	
		Initial Production Phase	Full Production Phase
Project Life	<ul style="list-style-type: none"> 21 years. 	<ul style="list-style-type: none"> Unchanged. 	<ul style="list-style-type: none"> Unchanged².
Hours of Operation	<ul style="list-style-type: none"> 24 hours per day, seven days per week. 	<ul style="list-style-type: none"> Unchanged. 	<ul style="list-style-type: none"> Unchanged.
Open Cut Mining	<ul style="list-style-type: none"> Open cut mining at a rate of up to 2.5 Mtpa of ROM ore. 	<ul style="list-style-type: none"> Open cut mining at a rate of approximately 100,000 tpa of ROM ore. 	<ul style="list-style-type: none"> Unchanged.
Waste Rock Management	<ul style="list-style-type: none"> Waste rock deposited in open cut voids and in waste rock emplacements. 	<ul style="list-style-type: none"> Unchanged. 	<ul style="list-style-type: none"> Unchanged.
Mineral Processing	<ul style="list-style-type: none"> Process plant consists of: <ul style="list-style-type: none"> ore preparation circuit; acid leaching circuit; counter current decantation; tailings neutralisation circuit; solution neutralisation circuit; and sulphide precipitation circuits. 	<ul style="list-style-type: none"> Process plant consists of: <ul style="list-style-type: none"> ore preparation circuit; acid leaching circuit; resin-in pulp circuit; metals recover circuit; and tailings neutralisation circuit. 	<ul style="list-style-type: none"> Process plant would be unchanged or would consist of: <ul style="list-style-type: none"> ore preparation circuit; acid leaching circuit; resin-in pulp circuit; metals recover circuit; and tailings neutralisation circuit.
Product	<ul style="list-style-type: none"> Up to 53,000 tpa of nickel and cobalt sulphide precipitate³. 	<ul style="list-style-type: none"> Up to 80 tpa of scandium oxide. Up to 1,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products. 	<ul style="list-style-type: none"> Up to 180 tpa of scandium oxide. Up to 30,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products.
Tailings Management	<ul style="list-style-type: none"> Waste deposited in tailings storage facility and evaporation ponds. 	<ul style="list-style-type: none"> Unchanged. 	<ul style="list-style-type: none"> Unchanged.
Surface Facilities	<ul style="list-style-type: none"> Construction of surface facilities within the approved surface development area. 	<ul style="list-style-type: none"> Minor relocation of infrastructure components inside the approved surface development area. 	<ul style="list-style-type: none"> Unchanged.
Road Upgrades	<ul style="list-style-type: none"> Road upgrades described in Development Consent DA 374-11-00. 	<ul style="list-style-type: none"> Road upgrades in accordance with the Voluntary Planning Agreements (VPAs) (Section 2.14). 	<ul style="list-style-type: none"> To be determined in accordance with VPAs (Section 2.14).
Water Supply	<ul style="list-style-type: none"> Development of water supply borefield and water supply pipeline from the borefield to the MPF. 	<ul style="list-style-type: none"> Unchanged. 	<ul style="list-style-type: none"> Unchanged.
Limestone Supply	<ul style="list-style-type: none"> Development of a limestone quarry to extract up to 790,000 tpa of limestone. 	<ul style="list-style-type: none"> Limestone quarry not initially developed. Limestone transported to the MPF by road due to the significantly lower demand. 	<ul style="list-style-type: none"> Unchanged.
Natural Gas Supply	<ul style="list-style-type: none"> Development of a natural gas pipeline from an existing gas pipeline to the MPF. 	<ul style="list-style-type: none"> Natural gas pipeline not initially developed. Liquid natural gas (LNG) transported to the MPF by road due to the significantly lower demand. 	<ul style="list-style-type: none"> Unchanged.
Employees	<ul style="list-style-type: none"> Approximately 300 personnel during operation phase. 	<ul style="list-style-type: none"> Approximately 45 personnel. 	<ul style="list-style-type: none"> Unchanged.
Mining Tenements	<ul style="list-style-type: none"> Mining Lease Applications (MLA) 113, 132, 139, 140, 141 and Limestone Quarry MLA 162. 	<ul style="list-style-type: none"> Unchanged. 	<ul style="list-style-type: none"> Unchanged.

¹ Development Consent DA 374-11-00 (as modified).

² No change to the Project life is proposed given the uncertainty of the nickel, cobalt and scandium markets. The Project life would be dependent on the nickel, cobalt and scandium markets.

³ 53,000 tpa of nickel and cobalt sulphide precipitates is equivalent to 30,000 tpa of nickel and cobalt metal equivalents.

1.3 JUSTIFICATION FOR MODIFICATION

As described in Section 1.2, the Modification would involve an initial scandium oxide focussed production phase (the Initial Production Phase) prior to refocusing on nickel and cobalt precipitate production by developing the full Project with additional scandium oxide production (the Full Production Phase).

Scandium is a high value metal predominately used as a 'light-weighting' material (e.g. used in aluminium alloys). The global market for scandium is expected to significantly increase over the coming decades as the prevalence of lightweight materials increases in the automotive and aerospace industries.

The Initial Production Phase of the modified Project is a smaller scale and lower capital cost option (compared to the approved Project) which would allow for Project commencement under current market conditions.

The Initial Production Phase would involve the partial development of the approved Project to produce approximately 80 tpa of scandium oxide and up to 1,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products.

The Initial Production Phase production would contribute to NSW export income, State royalties and State and Commonwealth tax revenue.

The construction phase of the Initial Production Phase would require a construction workforce of up to approximately 300 people for approximately 12 months. An operational workforce of approximately 45 people would be required for the Initial Production Phase.

The Initial Production Phase would make contributions to regional and NSW output or business sales and household income. For example, Scandium21 would source limestone from an existing local limestone quarry for the Initial Production Phase.

The Initial Production Phase would also result in the commencement of payment of contributions to the Lachlan Shire Council (LSC), Parkes Shire Council (PSC) and Forbes Shire Councils (FSC) and the potential for community sponsorships by Scandium21 in the region.

Given the above, without the Modification, the Project is unlikely to commence under the current market conditions resulting in a delay to:

- up to 300 construction and approximately 45 operational employment opportunities and associated flow-on effects;
- tax revenue from the Project;
- royalties to the State of NSW;
- development of the Syerston deposit resource;
- economic benefits (e.g. increased business sales and household income) to the regional towns of Condobolin, Parkes and Forbes;
- Scandium21 community contributions and potential community sponsorships; and
- the potential environmental and social impacts of the modified Project.

The development of the Initial Production Phase would provide a platform for the rapid development of the Full Production Phase at a lower cost when suitable market conditions for larger nickel cobalt scandium production prevail.

1.4 CONSULTATION

Consultation has been conducted with key State and Commonwealth government agencies and the relevant local councils during the preparation of this EA. A summary of this consultation is provided below.

It is anticipated that consultation with these stakeholders will continue during the assessment of the Modification by the NSW Government.

State Government Agencies

Department of Planning and Environment

Scandium21 provided an initial briefing on the Modification to the Department of Planning and Environment (DP&E) on 6 February 2015.

Scandium21 attended a meeting with the DP&E on 28 January 2016 to provide an update on the Modification. Key assessment requirements and the proposed timing for EA lodgement were discussed.

Roads and Maritime Services

Scandium21 provided a briefing on the Modification to the Roads and Maritime Services (RMS) on 4 March 2016. The outcomes of the Road Transport Assessment for the Modification were explained and the proposed timing for EA lodgement was discussed.

Other State Government Agencies

The following State Government agencies were provided with a briefing package describing the Modification in April 2016:

- Environment Protection Authority;
- Department of Primary Industries – Water;
- Office of Environment and Heritage; and
- Division of Resources and Energy (within the NSW Department of Industry).

Commonwealth Department of the Environment

The Commonwealth Department of the Environment (DotE) was provided with a letter providing an outline of the Modification on 10 August 2015.

The DotE indicated on 19 August 2015 that it considered that the Modification would not change the potential impacts on matters of national environmental significance and therefore the modified Project does not need to be re-referred under the *Environmental Planning and Biodiversity Conservation Act, 1999* (EPBC Act).

Local Government*Lachlan Shire Council*

The MPF, Fifield bypass, natural gas pipeline and water supply pipeline components of the approved Project are located in the Lachlan Local Government Area (LGA).

The LSC was provided an initial briefing on the Modification on 3 February 2015.

Scandium21 has provided updates on the Modification to the LSC through negotiations regarding a VPA for the modified Project on 3 February 2016 and 12 February 2016.

A joint meeting with the LSC, PSC and FSC was held on 4 March 2016 to discuss the VPAs.

Subsequent to these negotiations, the LSC provided a letter of support for the Modification which included in-principle agreement to the terms of the VPA (Attachment 2).

Parkes Shire Council

The limestone quarry and rail siding components of the approved Project are located in the Parkes LGA.

The PSC was provided an initial briefing on the Modification on 4 February 2015.

Scandium21 has provided updates on the Modification to the PSC through negotiations regarding a VPA for the modified Project on 4 February 2016 and 11 February 2016.

A joint meeting with the PSC, LSC and FSC was held on 4 March 2016 to discuss the VPAs.

Subsequent to these negotiations, the PSC provided a letter of support for the Modification which included in-principle agreement to the terms of the VPA (Attachment 2).

Forbes Shire Council

The water supply borefields and water supply pipeline components of the approved Project are located in the Forbes LGA.

The FSC was provided an initial briefing on the Modification on 4 February 2015.

Scandium21 has provided updates on the Modification to the FSC through negotiations regarding a VPA for the modified Project on 2 February 2016 and 18 February 2016.

A joint meeting with the FSC, PSC and LSC was held on 4 March 2016 to discuss the VPAs.

Subsequent to these negotiations, the FSC provided a letter of support for the Modification which included in-principle agreement to the terms of the VPA (Attachment 2).

Landholders

Scandium21 provided briefing packages describing the modification to landholders (including Forestry Corporation NSW) in April 2016. Consultation with these landholders would be ongoing.

1.5 STRUCTURE OF THIS DOCUMENT

This EA comprises a main text component and supporting study. An overview of the main text sections is presented below:

- | | |
|-----------|---|
| Section 1 | Provides an overview of the approved Project and the Modification, a justification for the Modification, and the consultation undertaken in relation to the Modification. |
| Section 2 | Provides a description of the approved Project and the Modification. |
| Section 3 | Provides an environmental assessment of the Modification. |
| Section 4 | Describes the general statutory context of the Modification. |
| Section 5 | References. |

Attachments 1 to 2 and Appendix A provide supporting information as follows:

- | | |
|--------------|--|
| Attachment 1 | Syerston Project Consolidated Development Consent. |
| Attachment 2 | Letters of support for the Modification from the LSC, PSC and FSC. |
| Appendix A | Road Transport Assessment. |

2 MODIFICATION OVERVIEW

A description of the Modification is provided in this section, including a comparison of the modified Project to the approved Project.

A complete description of the approved Project is provided in the approval documentation listed in Condition 1.1(a), Schedule 2 of Development Consent DA 374-11-00.

2.1 MINERAL RESOURCE

At the Syerston deposit the nickel-cobalt lateritic mineralisation is largely confined within goethite and siliceous goethite zones at depths of 10 metres (m) to 60 m from the surface in deposits up to 40 m in thickness (Black Range Minerals, 2000).

Scandium mineralisation at the Syerston deposit is developed throughout the lateritic profile, mainly within the overburden, alluvial, and goethite zones on the periphery of the main nickel cobalt deposit (Clean TeQ, 2015).

The Initial Production Phase of the modified Project would include preferentially mining these scandium-rich areas of the Syerston deposit. The average depth of the scandium-rich areas is approximately 1 m to 30 m below surface but tend to be variable across the area dependent upon the lateritic profile (Clean TeQ, 2015).

The mineral resource developed as part of the Full Production Phase of the modified Project would remain unchanged from the approved Project.

2.2 GENERAL ARRANGEMENT

2.2.1 Approved Project

The general arrangement of the approved Project includes the following main components:

- the MPF site, including:
 - open cut pits;
 - waste rock emplacements;
 - ROM pad and low and high-grade ore stockpiles;
 - process plant;
 - reagent production plants and storage areas;
 - gas-fired power plant;
 - tailings storage facility;

- evaporation ponds;
- evaporation surge dam;
- sediment dams, diversion dams, raw water dam, diversions, pumps, pipelines and other water management equipment and structures;
- construction accommodation camp;
- concrete batch plant;
- gravel and clay borrow pits;
- offices, workshops, laboratory and store buildings and car parking facilities;
- fuel storage areas;
- potable water treatment plant;
- wastewater (including sewage) treatment plant;
- laydown areas;
- topsoil stockpiles;
- access road, internal roads and haul roads; and
- other associated minor infrastructure, plant, equipment and activities;
- limestone quarry;
- rail siding;
- natural gas pipeline;
- two water supply borefields and pipelines (including the limestone quarry water supply pipeline); and
- associated road infrastructure upgrades.

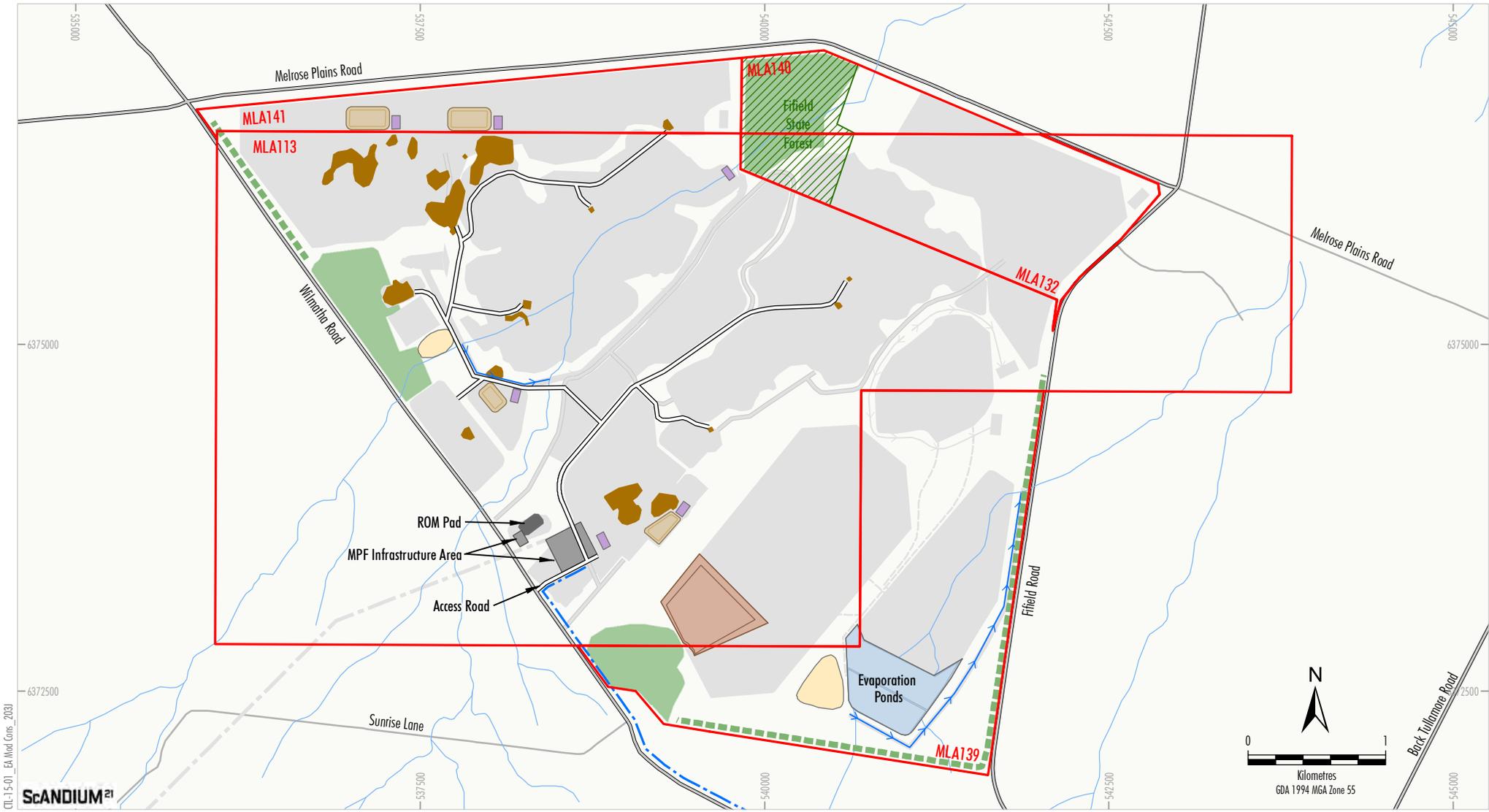
The approved Project general arrangement is shown on Figure 1 and the approved MPF general arrangement is shown on Figure 2.

2.2.2 Modified Project

The Initial Production Phase of the modified Project would include preferentially mining scandium-rich areas of the Syerston deposit. This would require the development of multiple small-scale open cut pits inside the approved MPF surface development area (Figure 3).

As two of the small-scale open cut pits are located inside the approved MPF infrastructure area, components of the MPF infrastructure area would need to be relocated within the approved surface development area for the modified Project (Figure 3).

The access road and a small internal section of the water supply pipeline would be relocated as part of the modified MPF infrastructure area (Figure 3).



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ScANDIUM²¹

- LEGEND**
- State Forest
 - Mining Lease Application Boundary
 - Approved Mine and Processing Facility
 - Open Cut Pit
 - Waste Rock Emplacement
 - Topsoil Stockpile
 - Tailings Storage Facility
 - ROM Pad
 - Infrastructure Area
 - Sediment Dam
 - Water Storage
 - Diversion Structure
 - Water Supply Pipeline
 - Vegetation Screening
 - Existing Open Woodland
- Source: Black Range Minerals (2000);
NSW Department of Industry (2015);
NSW Land & Property Information (2015)

SYERSTON PROJECT
SCANDIUM OXIDE MODIFICATION
Modified Mine and Processing Facility
(Initial Production Phase)
General Arrangement
Figure 3

The remaining small-scale open cut pits would be located inside approved open cut pit, waste rock emplacement, haul road and topsoil stockpiles areas (i.e. within the approved surface development area). These small-scale open cut pits would only result in minor changes to the approved general arrangement as they would be backfilled or incorporated into the larger open cut pits during the Full Production Phase (Section 2.4) (Figure 4).

The modified MPF general arrangements during the Initial Production Phase and the Full Production Phase are shown on Figures 3 and 4, respectively.

The Fifield Bypass (Figure 1) would not be constructed during the Initial Production Phase (Section 2.14.2).

The general arrangement of the limestone quarry; rail siding; natural gas pipeline; and two water supply borefields and pipelines would remain unchanged for the modified Project.

2.3 CONSTRUCTION ACTIVITIES

2.3.1 Approved Project

The following provides a summary of the main construction activities associated with the approved Project:

- the MPF site, including:
 - construction accommodation camp;
 - process plant;
 - reagent production plants;
 - gas-fired power plant;
 - tailings storage facility;
 - evaporation ponds;
 - evaporation surge dam;
 - sediment dams, diversion dams, raw water dam, diversions, pumps, pipelines and other water management equipment and structures;
 - concrete batch plant;
 - gravel and clay borrow pits;
 - offices, workshops and store buildings and car parking facilities;
 - wastewater (including sewage) treatment plant; and
 - access road, internal roads and haul roads;
- limestone quarry;
- rail siding;
- natural gas pipeline;
- two water supply borefields and pipelines; and
- associated road infrastructure upgrades.

Construction activities are anticipated to last approximately two years and will be undertaken during the approved construction hours outlined in Condition 6.3.2, Schedule 2 of Development Consent DA 374-11-00.

2.3.2 Modified Project

The construction phase for the Initial Production Phase of the modified Project would be focussed at the MPF site and the water supply borefield and pipeline, as the limestone quarry; limestone quarry water supply pipeline; rail siding; natural gas pipeline would not be required.

At the MPF site, the majority of approved Project components would initially be constructed at a smaller scale than the approved Project during the Initial Production Phase (e.g. the tailings storage facility would initially be smaller given the lower production rate).

Road network upgrades would also be required for the Initial Production Phase (Section 2.14.2).

The construction phase for the Initial Production Phase is anticipated to last approximately two years.

A second construction phase to fully develop all Project components would be required prior to the commencement of the Full Production Phase of the modified Project. It is anticipated that the second construction phase would last approximately two years.

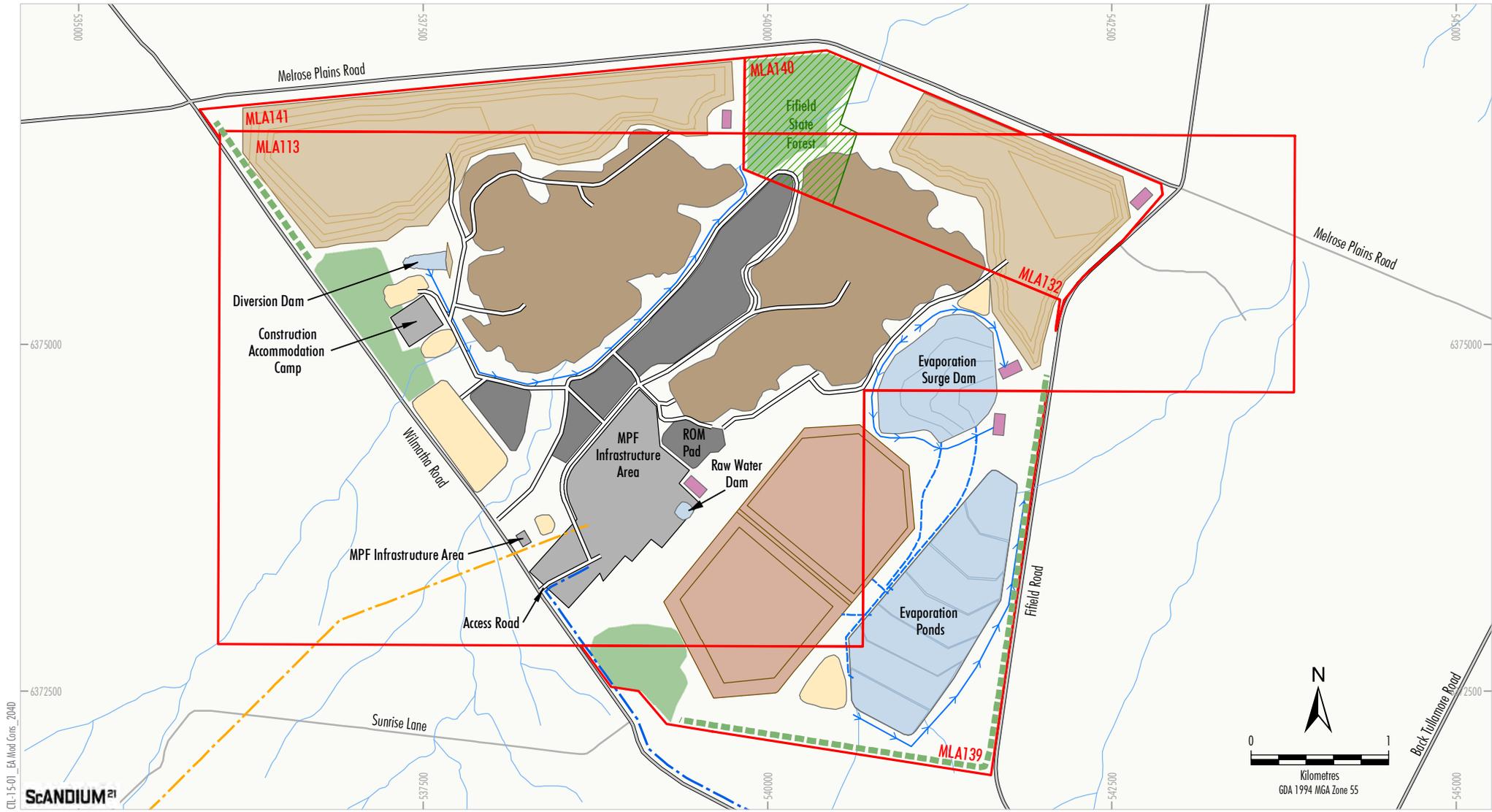
The construction hours for the modified Project would be unchanged from the approved construction hours (Section 2.3.1).

2.4 MINING OPERATIONS

2.4.1 Approved Project

Conventional open cut mining methods at a rate of up to 2.5 Mtpa of ROM ore will be used to develop the Syerston deposit.

Up to 11 open cut pits will be developed to target shallow high grade ore during the initial stages of mining. These initial open cut pits will then be expanded to form two open pits (Figure 2).



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ScANDIUM²¹

- LEGEND**
- State Forest
 - Mining Lease Application Boundary
 - Ore Stockpile
 - Open Cut Pit
 - Waste Rock Emplacement
 - Tailings Storage Facility
 - Topsoil Stockpile
 - Infrastructure Area
 - Sediment Dam
 - Water Storage
 - Diversion Structure
 - Key Site Water Pipeline
 - Vegetation Screening
 - Existing Open Woodland to be Maintained
 - Gas Pipeline
 - Water Supply Pipeline

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

SYERSTON NICKEL COBALT PROJECT
 ScANDIUM OXIDE MODIFICATION
 Modified Mine and Processing Facility
 (Full Production Phase)
 General Arrangement

Figure 4

The open cut pits will have an average depth of 35 m with localised deeper areas up to approximately 55 m.

Hydraulic excavators, haul trucks, dozers, graders and front end loaders will be used during mining operations.

Ore will be loaded directly to haul trucks for transfer to the ROM pad or ore stockpiles for processing.

Waste rock management is described in Section 2.5.1.

Mining operations will be conducted 24 hours per day, seven days per week.

2.4.2 Modified Project

The mining method for the modified Project would be unchanged from the approved Project (i.e. conventional open cut mining method).

During the Initial Production Phase of the modified Project, multiple small-scale open cut pits inside the approved MPF surface development area (Figure 3) would be developed to target scandium-rich areas of the Syerston deposit. The small-scale open cut pits would have relatively small footprints (Figure 3) and be up to 30 m deep.

The small-scale open cut pits would be either incorporated into the larger approved open cut pits or backfilled during the Full Production Phase of the modified Project (Figure 4).

The rate of open cut mining during the Initial Production Phase would be up to approximately 100,000 tpa of ROM ore which is significantly lower than the approved open cut mining rate (i.e. 2.5 Mtpa).

Given the significantly lower open cut mining rate for the Initial Production Phase, the mine fleet would consist of fewer and smaller capacity mobile equipment compared to the approved Project.

Mining operations would be conducted on a campaign basis (i.e. would not occur every day of the year) during the Initial Production Phase given the significantly lower open cut mining rate. Consistent with the approved Project, mining operations would be conducted 24 hours per day, seven days per week during each campaign.

Ore would be loaded directly to haul trucks for transfer to the ROM pad or ore stockpiles for processing.

Modified waste rock management is described in Section 2.5.2.

During the Full Production Phase, open cut mining would be conducted as per the approved open cut mining operations (Section 2.4.1).

2.5 WASTE ROCK MANAGEMENT

2.5.1 Approved Project

Waste rock material generated during the approved Project will be placed in two waste rock emplacements adjacent the open cut pits (Figure 2).

The waste rock emplacements will be up to approximately 20 m and 30 m high. The overall batter slopes of the waste rock emplacements will be 1V:4H with reverse graded berms at approximately 10 m intervals. Intermediate batter slopes will be constructed to 1V:3H grades.

The waste rock material is highly weathered, oxidised and non-acid forming (Black Range Minerals, 2000).

2.5.2 Modified Project

Waste rock material generated at the modified Project would be either placed in waste rock emplacements or placed in the small-scale open cut pits located outside the approved open cut pit areas (Figure 3).

During the Full Production Phase, waste rock management would be conducted as per the approved Project (Section 2.5.1).

2.6 PROCESSING OPERATIONS

2.6.1 Approved Project

The process plant will process 2.5 Mtpa of ore to produce up to 53,000 tpa of nickel and cobalt sulphide precipitates¹. In summary, the ore processing involves the following stages:

- **Ore preparation circuit** – removal of oversize material and production of an ore slurry suitable for acid leaching;

¹ 53,000 tpa of nickel and cobalt sulphide precipitates is equivalent to 30,000 tpa of nickel and cobalt metal equivalents.

- **Acid leach circuit** – leaching of nickel and cobalt from the ore slurry by application of sulphuric acid under high pressure and temperature in an autoclave to produce an autoclave slurry containing acid and soluble nickel and cobalt sulphates²;
- **Counter current decantation circuit** – separation of free acid and soluble nickel and cobalt sulphates from residue solids (tailings) contained in the autoclave slurry;
- **Tailings neutralisation and thickening circuit** – neutralisation of residue solids slurry (tailings) with a limestone slurry prior to thickening and transfer to the tailings storage facility (Section 2.9);
- **Solution neutralisation circuit** – neutralisation of free acid and soluble nickel and cobalt solution from the counter current decantation circuit; and
- **Sulphide precipitation circuit** – precipitate a high grade nickel and cobalt product from the neutralised nickel and cobalt solution.
- **Resin-in pulp circuit** – a two stage process that first separates scandium and then nickel and cobalt from residue solids (tailings) contained in the autoclave slurry using ion exchange resin;
- **Tailings neutralisation and thickening circuit** – as per the approved Project; ; and
- **Metals recovery circuit** – recovery of:
 - scandium oxide from the loaded resin by desorption with sodium carbonate followed by precipitation and calcination; and
 - nickel and cobalt sulphates from the loaded resin by desorption with sulphuric acid followed by solvent extraction³ and precipitation.

During the Full Production Phase of the modified Project, the process plant would include either:

- the same stages as the approved Project (Section 2.6.1); or
- would include the same stages as the Initial Production Phase (i.e. ore preparation; acid leaching; resin-in pulp; metals recover; and tailings neutralisation circuits).

A conceptual ore processing flowsheet for the approved Project is provided on Figure 5.

A summary of the approved process inputs, atmospheric emissions and liquid waste streams is provided in Table 2.

Processing operations will be conducted 24 hours per day, seven days per week.

2.6.2 Modified Project

During the Initial Production Phase of the modified Project, the process plant would process 100,000 tpa of ore to produce up to 80 tpa of scandium oxide and up to up to 1,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products.

The process plant for the Initial Production Phase would include the following stages:

- **Ore preparation circuit** – as per the approved Project;
- **Acid leach circuit** – as per the approved Project;

Irrespective of the process plant circuits adopted, up to 180 tpa of scandium oxide and up to 30,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products would be produced.

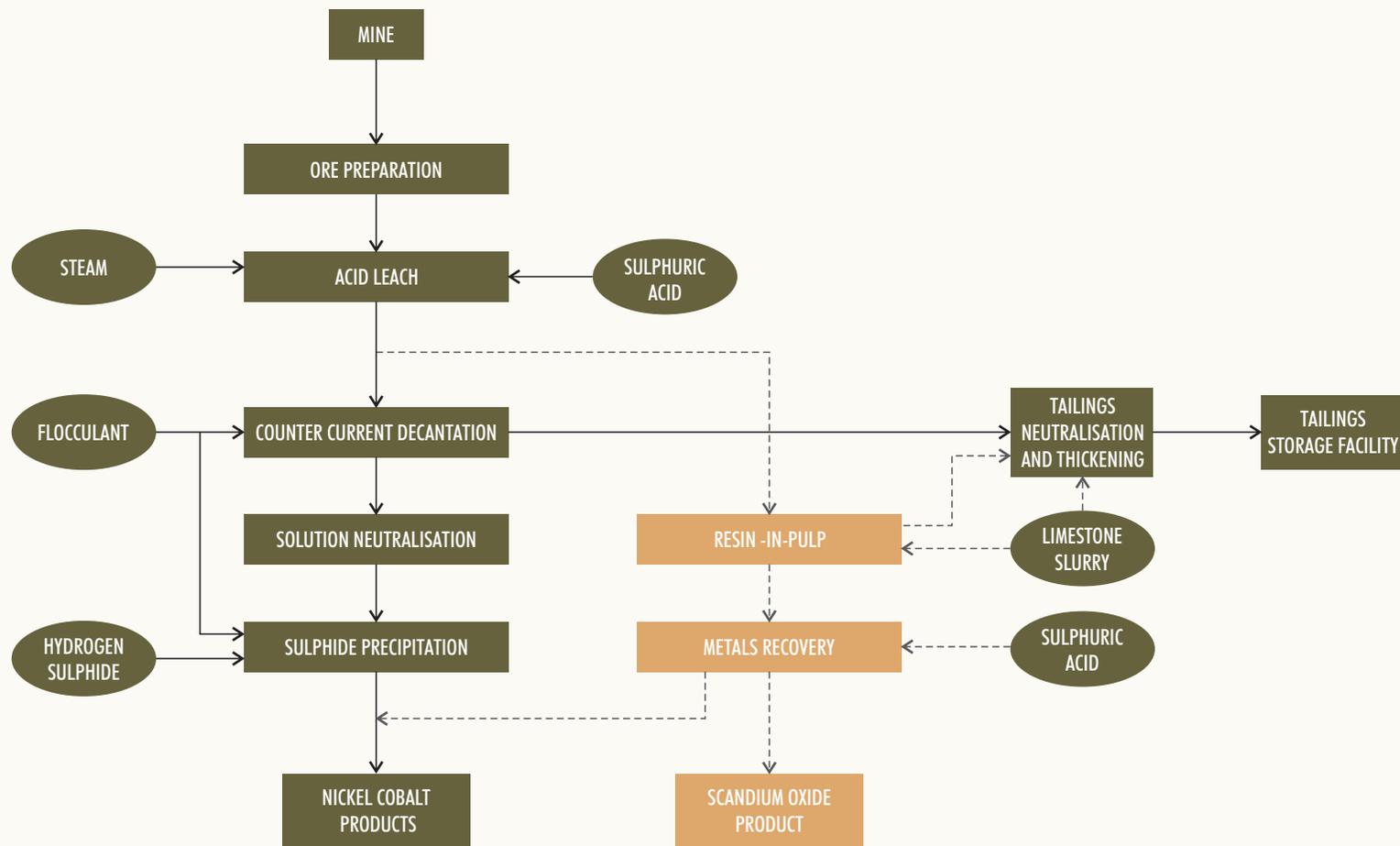
A conceptual ore processing flowsheet for the modified Project is provided on Figure 5.

The process inputs, atmospheric emissions and liquid waste streams for the modified Project are summarised in Table 2.

The process plant operational hours for the modified Project would be unchanged from the approved operational hours (i.e. 24 hours per day, seven days per week).

² It is noted that although not described in the Environmental Impact Statement (Black Range Minerals, 2000) scandium will have also been leached during this component of the approved process plant.

³ Solvent extraction formed part of the originally approved Project described in the Environmental Impact Statement (Black Range Minerals, 2000).



LEGEND
 Approved
 Proposed

Source: After SNC-Lavalin (2000); BRM (2000)

SYSTERTON NICKEL COBALT PROJECT
 SCANDIUM OXIDE MODIFICATION

Modified Conceptual Ore Processing
 Flowsheet

Figure 5

Table 2
Summary of Approved and Modified Process Facility Process Inputs, Process Input Production, Atmospheric Emissions and Liquid Waste Streams

Project Component	Approved Project	Modified Project	
		Initial Production Phase	Full Production Phase
Process Input Requirements			
Sulphur	260,000 tpa	-	Unchanged.
Sulphuric Acid	-	30,000 tpa	-
Limestone	790,000 tpa	25,000 tpa	Unchanged.
Flocculant	1,100 tpa	20 tpa	Unchanged
Caustic soda	100 tpa	1,000 tpa	2,300 tpa
Extractant ¹	-	200 litres per annum (Lpa)	3,000 Lpa
Modifier ¹	-	100 Lpa	1,500 Lpa
Diluent ¹	-	1,000 Lpa	15,000 Lpa
Sodium Carbonate	-	4,800 tpa	10,500 tpa
Minor reagents (hydrated lime, mill balls, coagulant, diatomaceous earth, hydrochloric acid)	Used in ore preparation, thickening and tailings neutralisation, sulphuric acid plant and water treatment plant.	80% decrease in consumption of hydrated lime, mill balls and coagulant. No diatomaceous earth required.	Unchanged.
Process Input Production			
Sulphuric Acid	700,000 tpa	-	Unchanged.
Hydrogen Sulphide	88 tonnes per day (tpd)	-	Unchanged ² .
Hydrogen	5 tpd	-	Unchanged ² .
Nitrogen	For plant purging.	90% decrease production of nitrogen.	Unchanged.
Atmospheric Emissions			
Carbon Dioxide	9.35 kilogram per second (kg/s)	0.38 kg/s	Unchanged.
Extraction Fan over Sulphide Filter Vent (H ₂ S)	5.3 Normal cubic metres (Nm ³ /s) (dry, 273 Kelvin [K], 101.3 kiloPascals [kPa])	-	Unchanged ³ .
Sulphuric Acid Plant Stack (H ₂ SO ₄ , SO ₃ and SO ₂)	19.2 Nm ³ /s (dry, 273K, 101.3 kPa)	-	Unchanged.
Flare Stack (H ₂ S, SO ₂ , NO ₂ and NO)	0.65 Nm ³ /s (dry, 273K, 101.3 kPa)	-	Unchanged ³ .
Hydrogen Reformer Stack (NO ₂ and NO)	1.42 Nm ³ /s (dry, 273K, 101.3 kPa)	-	Unchanged ³ .
Power Plant HRSG (NO ₂ and NO)	18.4 Nm ³ /s (dry, 273K, 101.3 kPa)	0.74 Nm ³ /s (dry, 273K, 101.3 kPa)	Unchanged.
Liquid Wastes			
Liquid Waste Streams	Waste liquid streams associated with tailings neutralisation.	Geochemical nature of tailings remains unchanged.	Geochemical nature of tailings remains unchanged.

¹ Process input required for the originally approved Project described in the Environmental Impact Statement (Black Range Minerals, 2000).

² Process input not required if the Initial Production Phase process plant is maintained for the Full Production Phase.

³ Atmospheric emission not produced if the Initial Production Phase process plant is maintained for the Full Production Phase.

2.7 PROCESS INPUT PRODUCTION

2.7.1 Approved Project

The following process plant inputs will be manufactured at the MPF:

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

These process plant inputs will be manufactured in reagent production plants located adjacent the process plant inside the MPF infrastructure area (Figure 2). A summary of the process input production is provided in Table 2.

2.7.2 Modified Project

The minor adjustments proposed to the processing operations for the Initial Production Phase of the modified Project (Section 2.6.2) negate the requirement for hydrogen and hydrogen sulphide inputs. In addition, the smaller-scale processing operation during the Initial Production Phase would not justify the manufacture of sulphuric acid and nitrogen at the MPF.

Given the above, only the lime slurry production plant would be developed during the Initial Production Phase. The limestone for the lime slurry production plant would be sourced from a local supplier rather than from the limestone quarry during the Initial Production Phase. A summary of the process input production for the Initial Production Phase is provided in Table 2.

During the Full Production Phase of the modified Project, all of the approved reagent production plants would be developed.

2.8 PRODUCT TRANSPORT

2.8.1 Approved Project

The nickel and cobalt sulphide precipitates produced at the MPF will be transported by road to the rail siding for transport by rail.

2.8.2 Modified Project

As product transport requirements would be significantly reduced as a result of the reduced production rate during the Initial Production Phase, scandium oxide and nickel and cobalt sulphide or sulphate precipitates would be transported from the MPF by road (i.e. rail transport would not be used).

During the Full Production Phase of the modified Project, scandium oxide and nickel and cobalt sulphide or sulphate precipitates would be transported by road and rail as per the approved Project (Section 2.8.1).

2.9 TAILINGS MANAGEMENT

2.9.1 Approved Project

Tailings generated in the process plant will be deposited in the tailings storage facility.

Two adjoining tailings storage cells will be constructed in the south-east of the MPF (Figure 2) and will be of conventional sub-aerial design.

The saline nature of the tailings water (principally magnesium sulphate) prevents the re-use of it in the process plant and an evaporative system is required to remove excess supernatant water from the tailings storage facility.

The evaporative system will consist of seven adjoining evaporation ponds and an evaporation surge dam (Figure 2). The evaporative system provides appropriate storage capacity for the tailings storage facility rainfall event design criteria (i.e. 1 in 100 year annual recurrence interval).

2.9.2 Modified Project

Tailings management for the modified Project would be unchanged from the approved Project.

The tailings storage facility and evaporative system during the Initial Production Phase would be smaller than the approved tailings storage facility and evaporative system due to the lower production rate (Figure 3). The modified evaporative system during the Initial Production Phase would provide appropriate storage capacity for the tailings storage facility rainfall event design criteria (i.e. 1 in 100 year annual recurrence interval).

The tailings storage facility and evaporative system would be developed to the approved size during the Full Production Phase (Figure 4).

2.10 WATER MANAGEMENT

2.10.1 Approved Project

Water Demand and Supply

The main water usage for the MPF will be associated with the process plant. Other water supply requirements include cooling water, dust suppression, and potable and non-potable uses in the MPF infrastructure area.

The total raw water demand for the MPF is estimated to be up to approximately 17.5 million litres per day.

Water for the MPF will be sourced primarily from the water supply borefield. Water will also be sourced from internal runoff collection and mine dewatering (although this is expected to be negligible).

Site Water Management

The overall objective of the water management system is to control runoff from the development/construction areas and the operation areas, while diverting upstream water around these areas.

The water management system will include both permanent features that will continue to operate post-closure (e.g. diversion dam, northern and southern diversion channels) and temporary structures during mining operations.

The water management system will be progressively developed during the construction and operation as diversion and containment requirements change.

Some existing drainage paths will require diversion around the northern open cut pit and evaporation ponds into exiting drainage lines by development of the northern and southern diversion structures, respectively (Figure 2). These diversion channels will be designed for long term stability as well as compatibility with existing hydrological features, landforms and vegetation.

An internal drainage system will be constructed to collect and contain water generated within the development/construction areas and operation areas.

Sediment control structures such as sediment dams and sediment fences will be employed where necessary within and downstream of disturbance areas.

2.10.2 Modified Project

Water Demand and Supply

The water demand for the Initial Production Phase of the modified Project would be significantly lower than the approved Project due to lower processing rate.

Water would be supplied from the same sources as the approved Project (Section 2.10.1).

Site Water Management

Site water management for the modified Project would be generally unchanged from the approved Project.

2.11 GAS PIPELINE AND POWER REQUIREMENTS

2.11.1 Approved Project

Power requirements of the MPF of approximately 25 megawatts (MW) will be provided by an on-site natural gas fired co-generation plant. Emergency power requirements will be provided by three one megawatt diesel generators.

Gas will be supplied to the MPF via the gas pipeline from the existing Moomba to Sydney Gas Pipeline (Figure 1). Approximately 270 gigajoules per hour of natural gas will be required.

2.11.2 Modified Project

The power demand for the Initial Phase of the modified Project (approximately 6 MW) would be significantly lower than the approved Project due to the lower processing rate.

Power would be supplied from the same sources during the Initial Production Phase as the approved Project (Section 2.11.1).

The natural gas for the power generation plant would however be transported to the MPF as LNG via road during the Initial Production Phase as the relatively small quantity of natural gas required (6 gigajoules per hour) does not justify the development of the gas pipeline.

The gas pipeline would be developed during the Full Production Phase of the modified Project.

2.12 LIMESTONE QUARRY

2.12.1 Approved Project

The MPF requires approximately 790,000 tpa of crushed limestone to predominately neutralise process liquids and slurries following acid leaching. The limestone quarry located approximately 20 km south-east of the MPF will provide this limestone (Figure 1).

Conventional open cut pit drill and blast methods will be used at the limestone quarry. The limestone will be crushed before being transported by road to the MPF.

2.12.2 Modified Project

The limestone quarry would not be utilised during the Initial Production Phase of the modified Project as the relatively small quantities of limestone required do not justify the development of the limestone quarry.

The limestone quarry would be developed during the Full Production Phase of the modified Project.

2.13 RAIL SIDING

2.13.1 Approved Project

A rail siding will be constructed on the Tottenham to Bogan Gate Railway and will be used to deliver consumables and product to and from the Project. The rail siding will be located approximately 25 km south-east of the MPF (Figure 1).

The rail siding will include container loading and unloading facilities, office, equipment compound, fuel storage, and short-term container storage facilities.

2.13.2 Modified Project

The rail siding would not be utilised during the Initial Production Phase of the modified Project as the relatively small quantities of deliveries and product transport required do not justify the development of the rail siding.

The rail siding would be developed during the Full Production Phase of the modified Project.

2.14 ROAD UPGRADES

2.14.1 Approved Project

Development Consent DA 374-11-00 outlines road upgrade requirements for the approved Project and these are summarised in Table 3.

2.14.2 Modified Project

The Project related road transport movements for the Initial Production Phase of the modified Project would be less due to the smaller-scale operations and workforce (Appendix A). Given the above, changes to the approved road upgrade requirements are proposed for the Initial Production Phase (Table 3 and Figures 6a and 6b).

These modified upgrades are based on recommendations of the Road Transport Assessment prepared by GTA Consultants (2016) provided in Appendix A and consultation undertaken with the relevant councils. These modified upgrades are consistent with the terms of the VPAs that the relevant councils have provided in-principle support for.

In accordance with the terms of the VPAs that the relevant councils have provided in-principle support for, a road safety audit would be conducted prior to the commencement of the commissioning of the limestone quarry and/or rail siding to determine appropriate road upgrade requirements for the Full Production Phase.

Prior to the commissioning of the limestone quarry and/or rail siding, Scandium21 would pay for the road upgrades identified in the road safety audit.

2.15 WORKFORCE

2.15.1 Approved Project

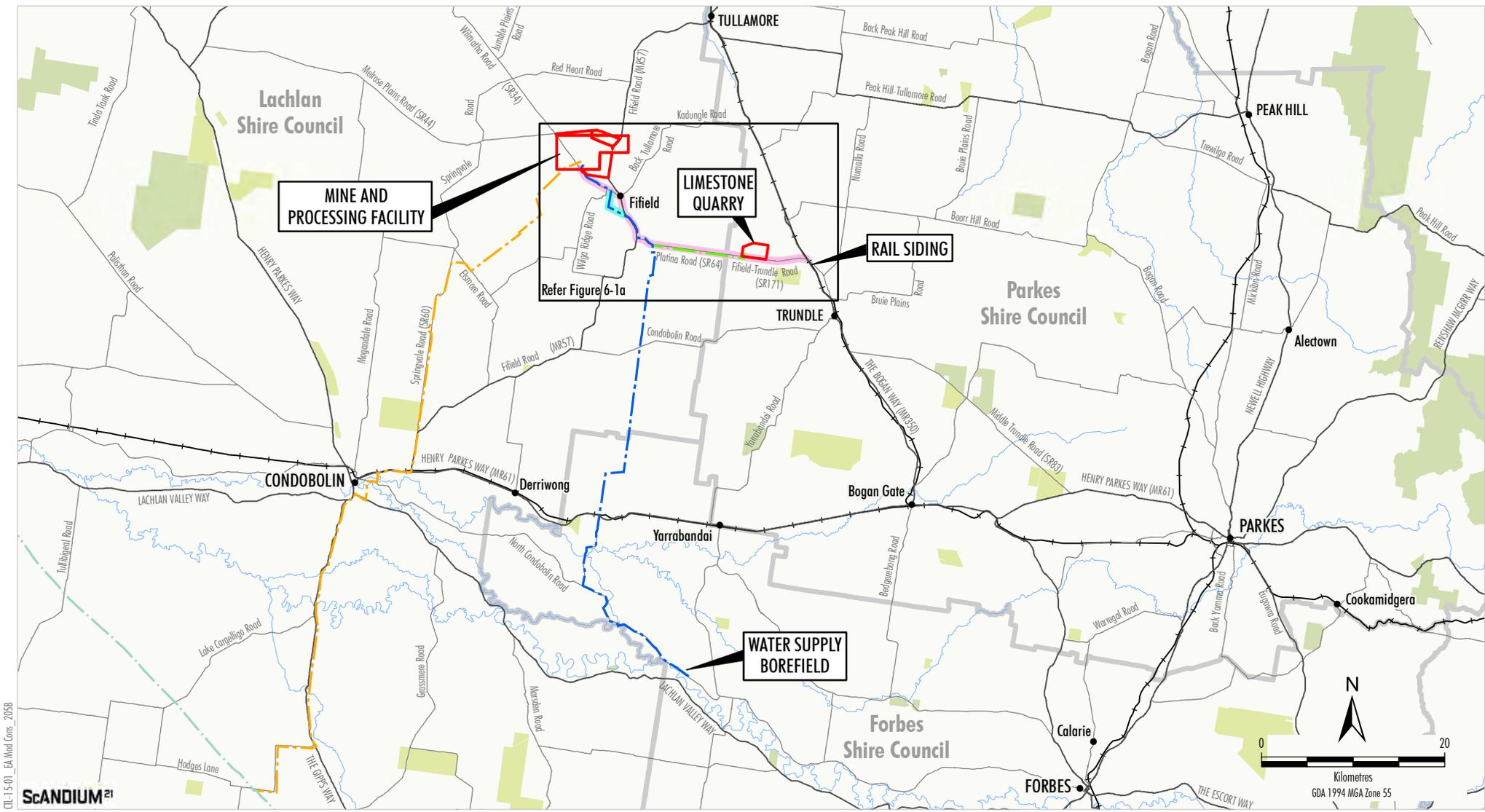
The Project will require an average construction workforce of approximately 600 personnel (peaking at 1,000 personnel). The construction workforce will predominately reside in the construction accommodation camp.

During operations, an average workforce of approximately 300 personnel will be required. It is expected that the operational workforce will reside in surrounding towns.

Table 3
Summary of Modified Road Upgrades

Upgrade		Proposed Timing ¹
Roads		
1	MPF to Rail Siding Road Upgrade <i>Conditions 7.2(b)(i), 7.2(b)(iv), 7.3(h), 7.3(k), 7.4(a) and 7.4(b)</i>	<ul style="list-style-type: none"> Initial Production Phase (prior to the commissioning of the MPF).
2	Fifield Bypass <i>Conditions 7.2(b)(i) and 7.2(b)(iv)</i>	<ul style="list-style-type: none"> Not proposed for the Initial Production Phase due to lower traffic volumes. Requirement for the Fifield Bypass to be re-assessed prior to the Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
3	The Bogan Way <i>Conditions 7.2(d)</i>	<ul style="list-style-type: none"> Not proposed for the Initial Production Phase due to lower traffic volumes and improved condition of The Bogan Way. Requirement for upgrades to be re-assessed prior to the Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
4	Middle Trundle Road <i>Conditions 7.2(c)</i>	<ul style="list-style-type: none"> Not proposed for the Initial Production Phase as no Project-related heavy vehicles would use this road, lower light vehicle traffic volumes and improved condition of Middle Trundle Road. Requirement for upgrades to be re-assessed prior to the Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
5	Melrose Plains Road <i>Conditions 7.2(b)(i) and 7.2(b)(iv)</i>	<ul style="list-style-type: none"> Not proposed for the Initial Production Phase as these roads are no longer likely to be the key route between the MPF and Condobolin as Fifield Road has recently been upgraded and is now expected to be the key route between the MPF and Condobolin. Requirement for upgrades to be re-assessed prior to the Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
6	Wilmatha Road <i>Conditions 7.2(b)(i) and 7.2(b)(iv)</i>	
7	Springvale Road <i>Conditions 7.2(f)</i>	
Intersections		
8	The Bogan Way/Fifield Trundle Road <i>Condition 7.2(b)(iii) and 7.4(c)</i>	<ul style="list-style-type: none"> Initial Production Phase (prior to the commissioning of the MPF).
9	Platina Road/Fifield Road <i>Condition 7.2(b)(iii)</i>	
10	Fifield Road/Slee Street	
11	Slee Street/Wilmatha Road/Fifield Road	
12	Fifield Trundle Road/ Limestone Quarry Access Road <i>Condition 7.2(b)(iii)</i>	<ul style="list-style-type: none"> Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
13	Fifield Bypass/Fifield Road <i>Condition 7.2(b)(iii)</i>	<ul style="list-style-type: none"> Not proposed for the Initial Production Phase as the Fifield Bypass is not proposed to be constructed (refer to Upgrade 2 above). Requirement for upgrades to be re-assessed prior to the Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
14	Fifield Bypass/Wilmatha Road <i>Condition 7.2(b)(iii)</i>	
15	Henry Parkes Way/ Middle Trundle Road <i>Condition 7.4(d)</i>	<ul style="list-style-type: none"> Not proposed for the Initial Production Phase due to lower traffic volumes. Requirement for upgrades to be re-assessed prior to the Full Production Phase (prior to the commissioning of the limestone quarry and/or rail siding).
16	Henry Parkes Way/The Bogan Way <i>Condition 7.2(b)(iii)</i>	
17	The Bogan Way/Middle Trundle Road <i>Condition 7.4(d)</i>	
18	Henry Parkes Way/ Fifield Road <i>Condition 7.2(b)(iii)</i>	
19	Springvale Road/ Fifield Road <i>Condition 7.2(b)(iii)</i>	

¹ In accordance with the VPAs that the relevant councils have provided in-principle support for.



CLC-15-01 - EA/Mad Cons. 20598

ScANDIUM²¹

- LEGEND**
- Nation Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

- Extent of Road Upgrade
- Fifeild Bypass

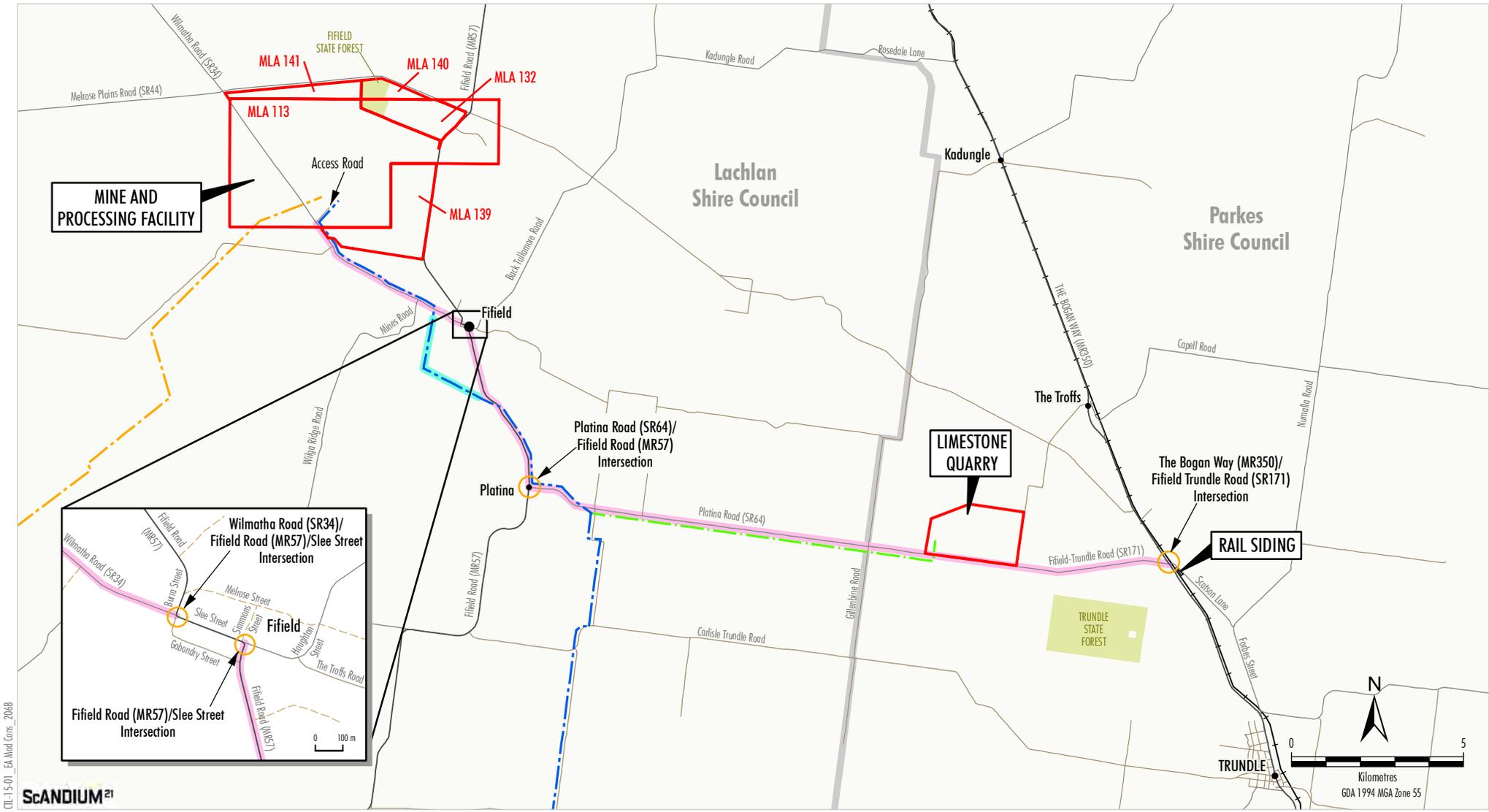
Source: Black Range Minerals (2000);
NSW Department of Industry (2015);
NSW Land & Property Information (2015)

Note: The Fifeild Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
SCANDIUM OXIDE MODIFICATION

Road Upgrades

Figure 6a



CLU-15-01 - Ek-Mad Cons_20688

ScANDIUM²¹

- LEGEND**
- State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Extent of Road Upgrade
 - Fifield Bypass

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Fifield Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
 SCANDIUM OXIDE MODIFICATION

Road Upgrades Inset

Figure 6b

2.15.2 Modified Project

For the Initial Production Phase, the construction workforce would be expected to be smaller than the approved construction workforce size at approximately 300 personnel (peak).

The operational workforce for the Initial Production Phase would be approximately 45 personnel due to the smaller-scale operation.

During the Full Production Phase of the modified Project, the operational workforce would be as per the approved Project (Section 2.15.1).

- construct stable landforms that cater for the long term containment of mining wastes in a manner that conforms with regulatory requirements and land use objectives;
- prevent detrimental effects on the water quality of downstream watercourses into the long term;
- provide vegetative cover to reduce the potential for erosion; and
- provide visual enhancement of post-mining landforms and rehabilitated infrastructure areas.

The following rehabilitation principles form the basis for rehabilitation planning and design at the MPF:

2.16 COMMUNITY ENHANCEMENT CONTRIBUTIONS

2.16.1 Approved Project

Condition 12(vi), Schedule 2 of Development Consent DA 374-11-00 outlines community enhancement contributions for the Project:

The community enhancement plan 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 of the mine and processing facility. ...

- Rehabilitation of MPF landforms is to be progressive and conducted in accordance with approved Mining Operations Plan.
- The stability of newly prepared (i.e. topsoiled) 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.
- Where possible, revegetated landforms are to form an expansion of, and be continuous with, existing woodland areas.

2.16.2 Modified Project

The terms of the VPAs, that the councils have provided in-principle support for include both construction and annual operational community enhancement contributions.

Scandium21 would make community enhancement contributions in accordance with the terms of the VPAs that the councils have provided in-principle support to for the modified Project.

Final Landform Concepts

The preferred final landform concepts for the MPF will be revised and refined throughout the life of the Project, utilising the outcomes of ongoing consultation with relevant authorities, stakeholders and the results of rehabilitation trials.

2.17 REHABILITATION

Revegetation Strategy

The general revegetation strategy for the MPF aims to re-establish woodland, shrub and grassland communities that are endemic to the region and evident in remnant patches.

2.17.1 Approved Project

Rehabilitation Objectives and Principles

The rehabilitation objectives of the approved MPF are to:

- provide acceptable post-mine landforms with a diversity of plant species suitable for the proposed final landuse targets of grazing pastures and endemic woodland;

2.17.2 Modified Project

The Modification would not require a material change to the rehabilitation programme presented in the *Syerston Nickel Cobalt Project Environmental Impact Statement* (Black Range Minerals, 2000) (Section 2.17.1).

3 ENVIRONMENTAL REVIEW

3.1 IDENTIFICATION OF KEY ISSUES

The following approved components of Project would be unchanged by the Modification (Section 2):

- overall life of the mine;
- hours of operation;
- surface development area;
- mining method;
- mining and processing rate;
- process plant emissions;
- waste rock management;
- tailings management;
- water supply or demand;
- power supply or demand;
- transport operations; and
- major surface infrastructure.

In addition, the Modification would not materially result in any additional demand for employees/contractors.

Therefore, there would be no material alteration to the approved impacts of the Project on the following aspects:

- land resources;
- groundwater and surface water resources;
- biodiversity;
- Aboriginal and historic heritage;
- noise;
- air quality;
- greenhouse gas emissions;
- visual amenity; and
- population and community infrastructure demand.

The key potential impacts of the Modification are related to the proposed road upgrades for the Initial Production Phase of the modified Project. A discussion of the predicted road transport impacts is provided in Section 3.2.2.

Section 3.3.2 discusses potential impacts of the Modification on hazards and risk.

3.2 ROAD TRANSPORT

A Road Transport Assessment for the Modification was undertaken by GTA Consultants (2016) and is presented as Appendix A.

The assessment was prepared in accordance with the *Guide to Traffic Generating Developments* (NSW Roads and Traffic Authority [RTA], 2002), and where relevant, makes reference to the RTA's (1996) *Road Design Guide* and Austroads standards.

Section 3.2.1 provides a description of the existing road network and traffic volumes. Section 3.2.2 provides an assessment of the potential impacts of the Modification on the road network in the vicinity of the Project and Section 3.2.3 provides relevant mitigation and management measures for road transport.

3.2.1 Background

Road Hierarchy

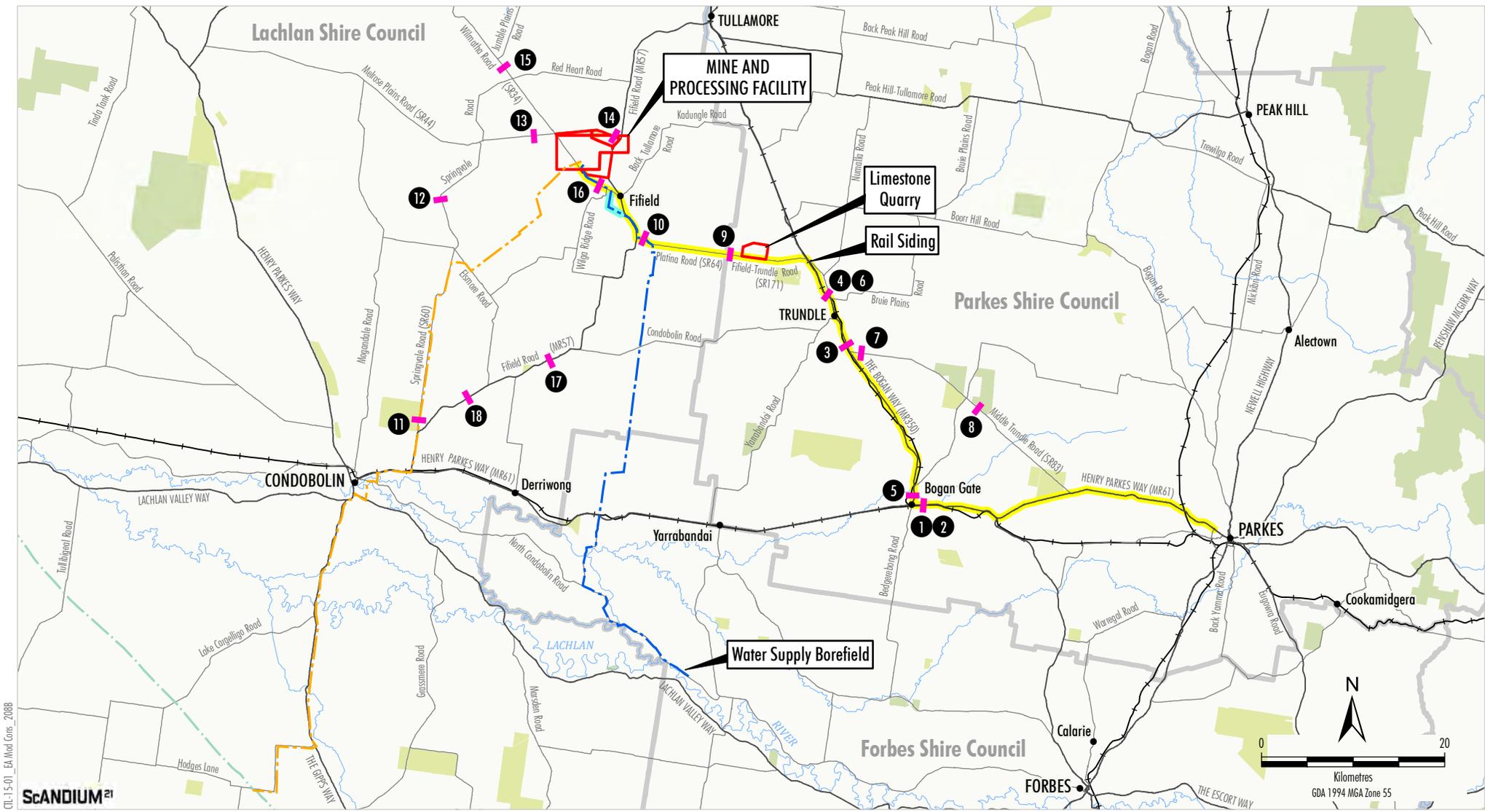
The following key roads are of relevance to the Project (Figure 7):

- Henry Parkes Way (MR61) – extends between Orange and Condobolin through Parkes.
- The Bogan Way (MR350) – extends north from Forbes to Tullamore. The Bogan Way intersects Henry Parkes Way at Bogan Gate.
- Fifield Trundle Road (SR171)/Platina Road (SR64) – provides an east-west link between The Bogan Way near Trundle to Fifield Road (MR57) south of Fifield.
- Fifield Road (MR57) – extends between Henry Parkes Way east of Condobolin to Tullamore.
- Wilmatha Road (SR34) – extends north-west from Fifield and past the MPF site.
- Middle Trundle Road (SR83) – links Henry Parkes Way approximately halfway between Parkes and Bogan Gate to The Bogan Way south of Trundle.

Existing Traffic Volumes

Traffic survey data in the Project area are summarised in Table 4 and the traffic survey locations are shown on Figure 7.

Further details on the road survey data are provided in Appendix A.



CLC-15-01 - EA Mod Cons, 2088

ScANDIUM²¹

- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

- Heavy Vehicle Access Route
- Fifield Bypass
- Traffic Survey Location

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Fifield Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
 SCANDIUM OXIDE MODIFICATION

Traffic Survey Locations

Figure 7

Table 4
Surveyed Average Traffic

Site ¹	Road	Survey Location	Peak Hour (vehicles per hour)	Daily (vehicles per day)	Heavy Vehicles (%)	Survey Timing
1	Henry Parkes Way	East of Bogan Gate	88	986	20.0	December 2014
2		East of Bogan Gate	90	1,024	20.4	November 2014
3	The Bogan Way	North of Middle Trundle Road	35	376	14.3	August 2015
4		North of Trundle	47	506	16.1	December 2014
5		North of Henry Parkes Way	44	467	20.1	November 2014
6		North of Trundle	48	479	32.9	October 2014
7	Middle Trundle Road	East of The Bogan Way	11	98	6.8	October 2014
8		North-west of Henry Parkes Way	8	93	9.0	September 2014
9	Fifield Trundle Road	At Parkes Shire Boundary	7	85	27.3	September 2015 to November 2015
10	Platina Road	East of Fifield Road	6	54	18.7	July 2010
11	Springvale Road	North of Fifield Road	3	26	5.7	July 2010
12		North of Fifield Road	3	21	44.4	February 2014 to March 2014
13	Melrose Plains Road	West of Wilmatha Road	2	21	39.1	December 2010 to January 2011
14		West of Fifield Road	1	8	14.4	May 2010 to June 2010
15	Wilmatha Road	North of Red Heart Road	2	17	21.8	December 2010 to January 2011
16		West of Wilga Ridge Road	3	26	31.3	November 2010
17	Fifield Road	North of Henry Parkes Way	12	123	27.7	May 2013 to June 2013
18		North of Raynella Road	19	234	38.9	February 2014 to April 2014

Source: After Appendix A.

¹ Refer to Figure 7 for locations.

Review of the data indicates that existing daily and peak hour traffic volumes are low and the peak periods occur in mid to late afternoon (Appendix A).

The proportion of heavy vehicles varies significantly across road network (6.8% to 44.4%). The total number of heavy vehicles on the road network is low, however, as the background traffic volumes are low (Appendix A).

Roadway Capacity

Austrroads (2013) defines theoretical capacities for two-way two lane rural roads. Taking into account the proportion of heavy vehicles, the peak hourly flows on the road network around the Project are very low in comparison to the Austrroads (2013) theoretical capacities and a detailed assessment of midblock road capacity is not warranted (Appendix A).

Intersection Performance

There are no intersection operation capacity concerns in the vicinity of the Project (Appendix A).

Road Safety

A review of RMS accident data in the vicinity of the Project during the period 1 January 2010 to 11 November 2015 was undertaken by GTA Consultants (Appendix A). This review indicated that:

- no accidents were reported on Springvale Road, Wilmatha Road, Platina Road, Fifield Trundle Road or Melrose Plains Road;
- accident rates on Henry Parkes Way, The Bogan Way and Fifield Road are below accident rates described as being typical by the RMS for rural roads (RTA, 2004); and
- accident rates on Middle Trundle Road are above accident rates described as being typical by the RMS for rural roads (RTA, 2004).

3.2.2 Potential Impacts

Potential traffic impacts of the Modification on traffic generation, roadway capacity and safety are assessed in Appendix A and summarised below.

Road Upgrades

The proposed road upgrades for the Initial Production Phase of the modified Project are outlined in Table 3 and shown on Figures 6a and 6b.

As described in Section 2.14.2, these modified upgrades are based on recommendations of GTA Consultants (2016) and consultation undertaken with the relevant councils. These modified upgrades are consistent with the terms of the VPAs that the relevant councils have provided in-principle support for.

Project Traffic Generation

Table 5 summarises the approved and estimated predicted Modification daily vehicle movements (traffic in both directions).

Table 5
Approved Project and Predicted Modified
Two-way Weekday Traffic

Scenario	Daily (vehicles per day)		
	Light	Heavy	Total
Approved Project	263	207	470
Initial Production Phase	103	36	139

Source: After Appendix A.

Project traffic generation during the Initial Production of the modified Project is expected to significantly lower than the approved Project (Table 5).

Cumulative Traffic Increases

In order to conservatively consider the potential impacts of the Modification in the context of potential background traffic growth, an annual baseline growth rate has been considered.

Based on the traffic survey data (Table 4), a 2% per annum baseline traffic growth rate was applied to the existing traffic volumes (Appendix A).

GTA Consultants (2016) conducted a review of other significant proposed and approved projects in the area and considered that traffic from these projects did not need to be added to potential background traffic growth.

Table 6 presents the predicted traffic flows on key roads including additional Project traffic flows and estimated background traffic growth. Figure 8 shows the locations of traffic forecast sites.

The road network would satisfactorily accommodate the Initial Production Phase of the modified Project (Appendix A).

Roadway Capacity

For the Initial Production Phase, the predicted peak hourly flows on the road network around the Project are very low in comparison to the Austroads (2013) theoretical capacities and a detailed assessment of midblock road capacity is not warranted (Appendix A).

Intersection Performance

GTA Consultants (2016) considered that formal peak hour intersection analysis for key intersections was not warranted given the low predicted traffic volumes.

No capacity concerns regarding the operation of key intersections are expected for the Initial Production Phase (Appendix A).

Road Safety

The Initial Production Phase of the modified Project would not result in significant impacts on the safety of the road network with implementation of management and mitigation measures (Section 3.2.3 and Appendix A).

Table 6
Predicted Cumulative Two-way Weekday Traffic

Site ¹	Road	Location	Daily (vehicles per day)			
			Background		Initial Production Phase	
			Light	Heavy	Light	Heavy
A	Henry Parkes Way	East of Bogan Gate	999	256	999	291
B		East of Middle Trundle Road	999	256	1,070	291
C	The Bogan Way	North of Henry Parkes Way	457	115	457	150
D		North of Middle Trundle Road	389	65	460	100
E		North of Trundle	520	99	591	134
F	Fifield Road	North of Henry Parkes Way	177	113	209	114
G		North of Fifield-Trundle Road	177	113	280	149
H		North of Wilmatha Road	177	113	177	113
I	Middle Trundle Road	East of The Bogan Way	112	9	183	9
J	Fifield-Trundle Road	West of The Bogan Way	74	28	145	63
K	Platina Road	East of Fifield Road	74	28	145	63
L	Wilmatha Road	West of Fifield Road	24	11	127	47
M	MPF Access Road	East of Wilmatha Road	0	0	103	36

Source: After Appendix A.

¹ Refer to Figure 8 for locations.

3.2.3 Mitigation Measures and Management

Road Upgrades

The proposed road upgrades for the Initial Production Phase of the modified Project are outlined in Table 3.

In accordance with the terms of the VPAs that the relevant councils have provided in-principle support for, a road safety audit would be conducted prior to the commencement of the commissioning of the limestone quarry and/or rail siding to determine appropriate road upgrade requirements for the Full Production Phase.

Prior to the commissioning of the limestone quarry and/or rail siding, Scandium21 would pay for the road upgrades identified in the road safety audit.

Road Maintenance

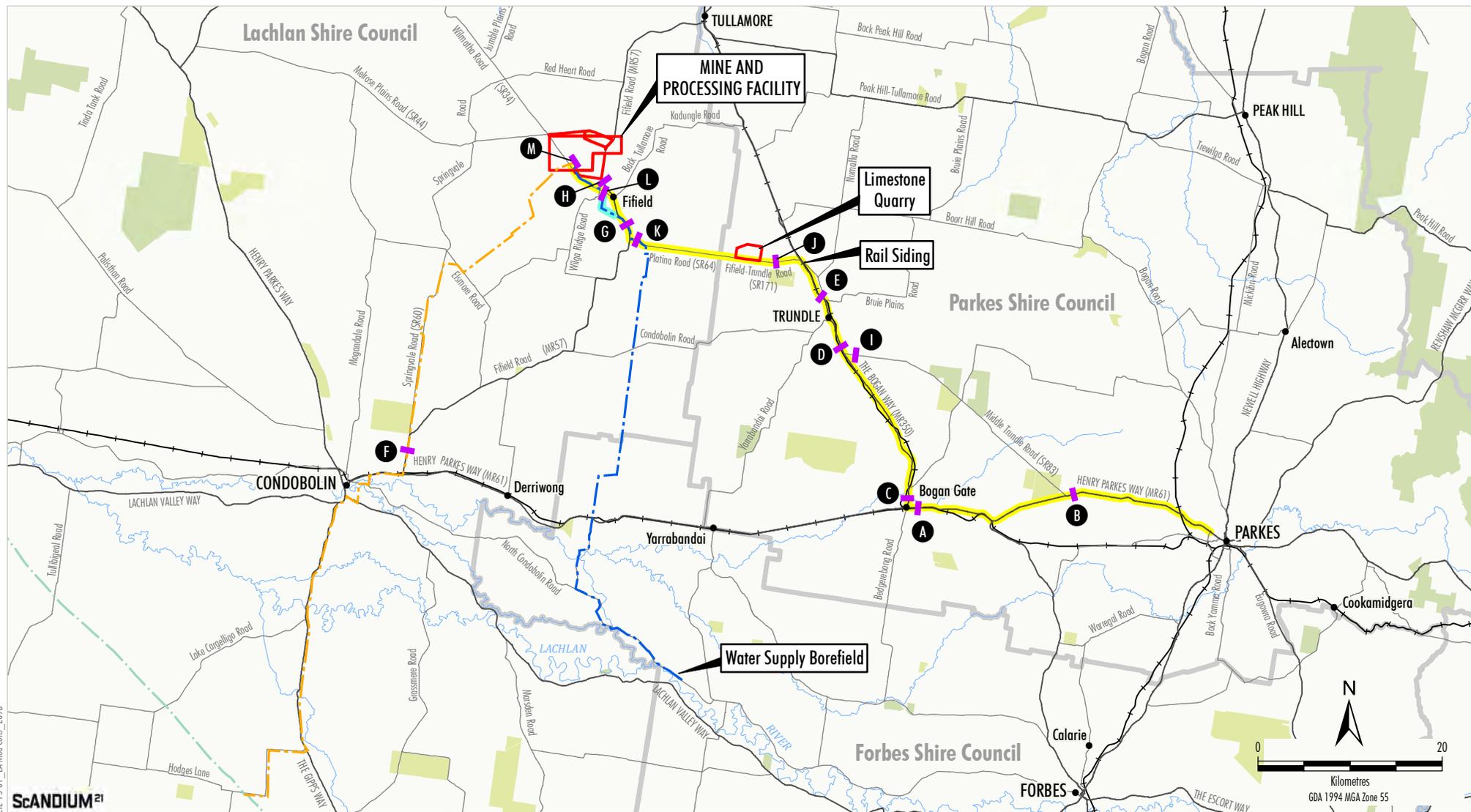
Scandium21 would contribute to the maintenance of the following roads consistent with the terms of the VPAs that the relevant councils have provided in-principle support for (Figure 9):

- Henry Parkes Way (between Jones Lane [eastern outskirts of Condobolin] and Fifield Road) and between Westlime Road [western outskirts of Parkes] and The Bogan Way);
- Middle Trundle Road (between Henry Parkes Way and The Bogan Way);

- The Bogan Way (between Henry Parkes Way and Fifield-Trundle Road [SR171]);
- Fifield-Trundle Road (between The Bogan Way and the Parkes Shire boundary).
- Platina Road (between the Lachlan Shire boundary and Fifield Road);
- Fifield Road (between Henry Parkes Way and Red Heart Road);
- Slee Street [in Fifield Village] (between Fifield Road and Wilmatha Road); and
- Wilmatha Road (between Slee Street [in Fifield Village] and the MPF access road).

Traffic Code of Conduct

In accordance with Condition 7.1 of Development Consent DA 374-11-00 a Traffic Code of Conduct would be prepared for the modified Project.



CLC-15-01 - EA Mod Cons. 2018

ScANDIUM²¹

- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

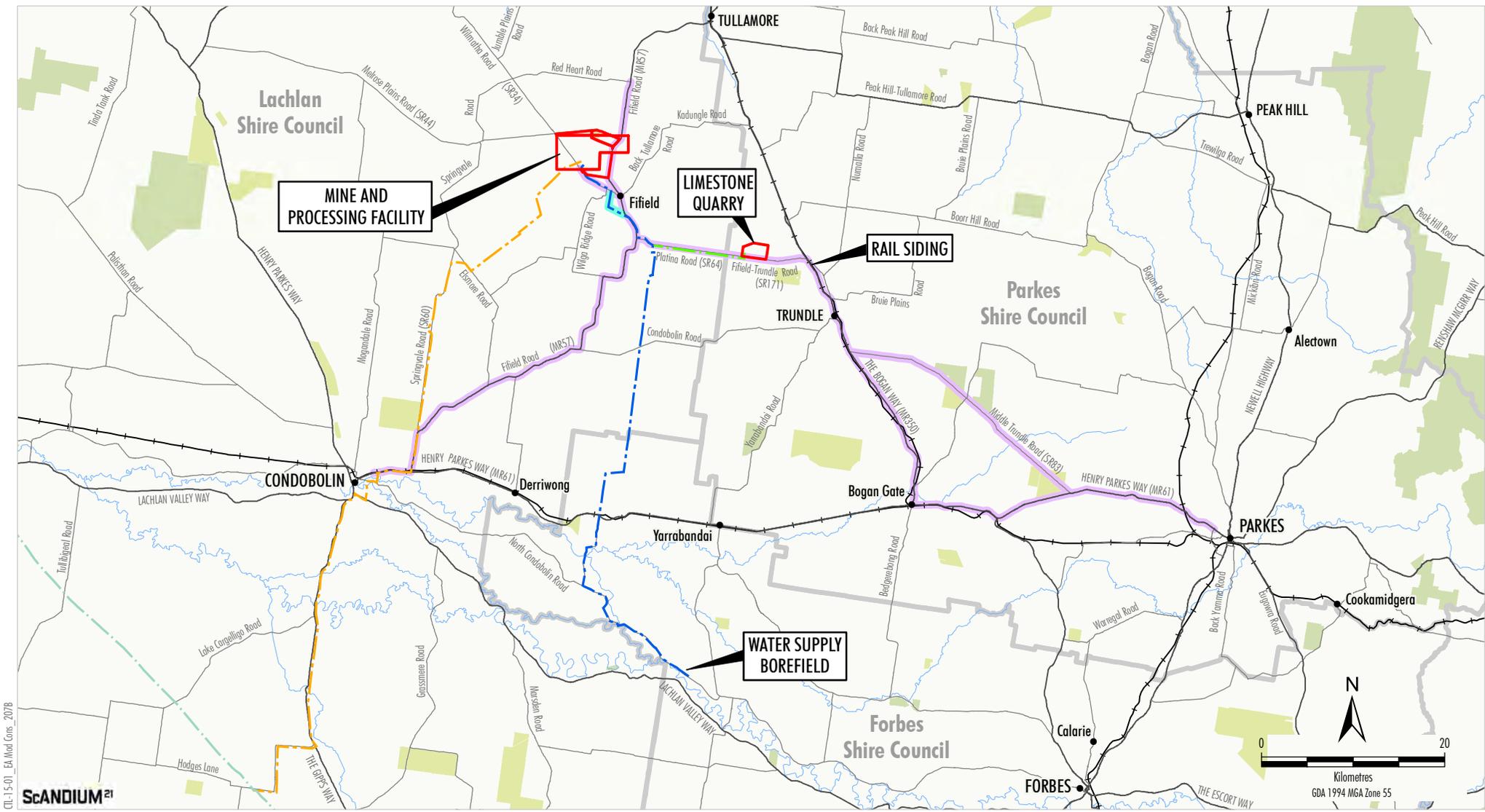
- Heavy Vehicle Access Route
 - Fifield Bypass
 - Traffic Forecast Location
- Source: Black Range Minerals (2000);
NSW Department of Industry (2015);
NSW Land & Property Information (2015)

Note: The Fifield Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
SCANDIUM OXIDE MODIFICATION

Traffic Forecast Locations

Figure 8



CLC-15-01 - EA Mod Cons, 2018

ScANDIUM²¹

- LEGEND**
- Nation Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline
 - Extent of Road Maintenance Contribution
 - Fifield Bypass

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Fifield Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
 ScANDIUM OXIDE MODIFICATION
 Extent of Road Maintenance Contributions

Figure 9

3.3 HAZARDS AND RISK

3.3.1 Background

A Preliminary Hazard Analysis (SHE Pacific, 2000) was prepared for the Project in accordance with the general principles of risk evaluation and assessment provided in *Hazardous Industry Planning Advisory Paper No. 4* (Department of Urban Affairs and Planning, 1992).

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 (SHE Pacific, 2000).

The main potential risk areas identified in the Preliminary Hazard Analysis included (SHE Pacific, 2000):

- 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 Preliminary Hazard Analysis concluded 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).

3.3.2 Potential Impacts

Although the Modification would include adjustments to the processing operations, these adjustments are minor and include components that were included in the originally approved Project and were therefore considered in the Preliminary Hazard Analysis.

The Modification would not materially change the potential risks and hazards associated with the approved Project.

3.3.3 Mitigation Measures and Management

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

In addition to these mitigation measures, Development Consent DA 374-11-00 requires the preparation of the following management plans and studies which aim to reduce the likelihood and/or consequences of potentially hazardous incidents:

- Pre-construction:
 - Fire Safety Study (Condition 5.2[a][i]);
 - Hazard and Operability Study (Condition 5.2[a][ii]);
 - Final Hazard Analysis (Condition 5.2[a][iii]);
 - Construction Safety Study (Condition 5.2[a][iv]);
- Pre-commissioning:
 - Transport of Hazardous Materials Study (Condition 5.2[b][i]);
 - Emergency Plan (Condition 5.2[b][ii]); and
 - Safety Management System (Condition 5.2[b][iii]).

These management plans and studies would be prepared for the modified Project in accordance with Development Consent DA 374-11-00.

4 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the Modification. It also provides a consideration of the Modification against the objects of the EP&A Act.

4.1 APPLICABILITY OF SECTION 75W OF ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

The Project was approved under Part 4 of the EP&A Act in 2001 (Development Consent DA 374-11-00).

Clause 12 of Schedule 6A of the EP&A Act provides that section 75W of Part 3A of the EP&A Act continues to apply to modification of development consents referred to in clause 8J(8) of the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) following the repeal of Part 3A.

The Project was approved under Part 4 of the EP&A Act in 2001 by development consent under Division 4 of Part 4 of the EP&A Act (relating to State significant development). Therefore Development Consent DA 374-11-00 is a development consent that falls within clause 8J(8)(c) of the EP&A Regulation. That is, section 75W of the EP&A Act continues to apply to modifications to Development Consent DA 374-11-00, notwithstanding its repeal⁴.

Approval for the Modification will be sought as a modification to Development Consent DA 374-11-00 under section 75W of the EP&A Act. Section 75W of the EP&A Act relevantly provides:

75W Modification of Minister's approval

(1) *In this section:*

Minister's approval means an approval to carry out a project under this Part, and includes an approval of a concept plan.

Modification of approval means changing the terms of a Minister's approval, including:

- (a) *Revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
- (b) *Changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*

- (2) *The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
- (3) *The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
- (4) *The Minister may modify the approval (with or without conditions) or disapprove of the modification...*

4.2 GENERAL STATUTORY REQUIREMENTS

4.2.1 Environmental Planning Instruments

Local environmental plans and state environmental planning policies that may be relevant to the Modification are discussed below.

Lachlan Local Environmental Plan 2013

The MPF, Fifield bypass, natural gas pipeline and water supply pipeline components of the approved Project are located in the Lachlan LGA.

No changes to the Fifield bypass, natural gas pipeline or water supply pipeline are proposed for the Modification.

The following identifies the provisions in the *Lachlan Local Environmental Plan 2013* (Lachlan LEP) which may have relevance to the Modification.

The majority of the MPF site is located in land zoned "RU1" (Primary Production) under the Lachlan LEP. Under the Lachlan LEP, open cut mining is listed as permissible activity with consent on lands zoned "RU1" (Primary Production).

The remaining section of the MPF site is located within land zoned "RU3" (Forestry) under the Lachlan LEP. Under the Lachlan LEP, uses authorised under the *Forestry Act, 2012* are permissible without consent on lands zoned "RU3" (Forestry).

⁴ Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply for the Project. The description and quotations of relevant references to clauses of Part 3A in this document are as if Part 3A of the EP&A Act is still in force.

The *Forestry Act, 2012* provides for the dedication, reservation, control and use of State forests, timber reserves and Crown lands for forestry and other purposes.

The Project (approved and modified) would involve activities within Fifield State Forest, which is dedicated as a State Forest pursuant to the *Forestry Act, 2012*.

Section 21 of the *Forestry Act, 2012* provides that land within a State Forest is subject to the provisions of the *Mining Act, 1992* and that the exercise of any right under the *Mining Act, 1992* within a State Forest is subject to conditions relating to forestry or the purpose of the reserve.

For the portion of the Project within the Fifield State Forest, Scandium21 has lodged MLAs (MLA 132 and MLA 140). Activities within Fifield State Forest would be conducted in accordance with the conditions of the relevant mining tenement.

The effect of section 21 of the *Forestry Act, 2012* and the mining tenements to be issued under the *Mining Act, 1992* is that the Project and the Modification are permissible under the Lachlan LEP.

Clause 2.3(2) of the Lachlan LEP provides:

The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.

The consent authority for the Modification is the Minister for Planning (Section 4.1).

The objectives of the “RU1” (Primary Production) zone include:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage the diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

The objectives of the “RU3” (Forestry) zone include:

- *To enable development for forestry purposes.*
- *To enable other development that is compatible with forestry land uses.*

The Modification is consistent with the general objectives of the “RU1” (Primary Production) and “RU3” (Forestry) zones as mining is a primary industry and the Modification would enhance the productivity of the existing mining operations at Project.

The Modification is not expected to change the approved potential impacts on the Fifield State Forest.

The Modification would not significantly alter the compatibility of Project with adjoining land uses.

Forbes Local Environmental Plan 2013

The water supply borefields and water supply pipeline components of the approved Project are located in the Forbes LGA.

No changes to the water supply borefields or water supply pipeline are proposed for the Modification.

Parkes Local Environmental Plan 2012

The limestone quarry and rail siding components of the approved Project are located in the Parkes LGA.

No changes to the limestone quarry or rail siding are proposed for the Modification.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries)* (Mining SEPP) regularises the various environmental planning instruments that previously controlled mining activities and aims to provide for the proper management of and development of mineral resources.

Clause 5(3) of the Mining SEPP gives it primacy where there is an inconsistency between the provisions of the Mining SEPP and the provisions of any other environmental planning instrument (except the *State Environmental Planning Policy (Major Development) 2005*, *State Environmental Planning Policy No. 14 [Coastal Wetlands]* and *State Environmental Planning Policy No. 26 [Littoral Rainforest]*).

Clause 2

Clause 2 sets out the aims of the Mining SEPP as follows:

- (a) *to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
- (b) *to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
- (b1) *to promote the development of significant mineral resources, and*
- (c) *to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and*
- (d) *to establish a gateway assessment process for certain mining and petroleum (oil and gas) development:*
 - (i) *to recognise the importance of agricultural resources, and*
 - (ii) *to ensure protection of strategic agricultural land and water resources, and*
 - (iii) *to ensure a balanced use of land by potentially competing industries, and*
 - (iv) *to provide for the sustainable growth of mining, petroleum and agricultural industries.*

Clause 7

Clause 7(1) of the Mining SEPP states that development of any of the following purposes may be carried out only with development consent:

- (b) *mining carried out:*
 - (i) *on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or*

The modified MPF site activities are on land where development for the purposes of agriculture or industry is permissible under the Lachlan LEP. Therefore the Modification activities are permissible with development consent.

Clause 12

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

- (a) *consider:*
 - (i) *the existing uses and approved uses of land in the vicinity of the development, and*
 - (ii) *whether or not the development is likely to have significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*
 - (iii) *any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and*
- (b) *evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and*
- (c) *evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).*

Land use in the vicinity of the Project is characterised by agricultural land uses.

As described in Section 3.1, the Modification would not materially change the approved potential impacts of the Project on land resources, biodiversity, Aboriginal and non-Aboriginal heritage and groundwater and surface water resources.

Scandium21 would implement a range of measures to avoid or minimise potential incompatibility of the modified Project with existing and future land uses in the area. This would be achieved through the implementation of an environmental management strategy that would be prepared for the modified Project prior to commencement of the Initial Production Phase.

Clause 14

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

- (a) *that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
- (b) *that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
- (c) *that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable state or national policies, programmes or guidelines concerning greenhouse gas emissions.

As described in Section 3.1, the Modification would not materially change the approved potential impacts of the Project on groundwater and surface water resources, biodiversity, and air quality (including greenhouse gas emissions).

Scandium21 would implement a range of measures to avoid or minimise impacts of the modified Project on groundwater and surface water resources, biodiversity and minimise greenhouse gas emissions.

Clause 15

Clause 15 of the Mining SEPP requires that:

- (1) *Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*
- (2) *Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*

- (3) *The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

It is in Scandium21's financial interest to maximise the efficiency of ore recovery and minimise the generation of process wastes that require disposal.

Clause 16

Clause 16(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining or extractive industry that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions that do any or more of the following:

- (a) *require that some or all of the transport of materials in connection with the development is not to be by public road,*
- (b) *limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,*
- (c) *require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.*

The potential impacts of the Modification on the road transport network are considered in Section 3.2.2.

The Road Transport Assessment, conducted by GTA Consultants, concluded that no significant impacts on the performance capacity, efficiency and safety of the road network are expected to arise as a result of the Initial Production Phase of the modified Project (Appendix A).

Clause 17

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.

In particular, the consent authority must consider whether conditions of the consent should:

- (a) *require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*

- (b) *require waste generated by the development or the rehabilitation to be dealt with appropriately, or*
- (c) *require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or*
- (d) *require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

The rehabilitation of the Project incorporating the Modification would generally be conducted in accordance with the approved rehabilitation strategy.

At the cessation of mining at the Project, a rehabilitation programme would be implemented. The proposed management of tailings is discussed in Section 2.9 and the management of waste rock material is described in Section 2.5.

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

Clause 13 of the *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33) requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

- (c) *in the case of development for the purpose of a potentially hazardous industry-a preliminary hazard analysis prepared by or on behalf of the applicant, and*
- (d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application),*

...

As described in Section 3.3.2, the Modification would not materially change the potential risks and hazards associated with the approved Project.

A range of management plans and studies would be prepared for the modified Project (Section 3.3.3).

State Environmental Planning Policy No. 55 (Remediation of Land)

State Environmental Planning Policy No. 55 (Remediation of Land) (SEPP 55) aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

A consent authority must consider the following under clause 7(1):

- (a) *it has considered whether the land is contaminated, and*
- (b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
- (c) *if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further, under clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

Because the Modification activities are within the Project Development Application area in Development Consent DA 374-11-00, no change of use is proposed and no preliminary land contamination investigation is required.

4.2.2 NSW Government Policy

In September 2012, the NSW Government released the following policy documents potentially relevant to the Modification:

- *Strategic Regional Land Use Policy* (NSW Government, 2012a); and
- *Aquifer Interference Policy (AIP)* (NSW Government, 2012b).

The Framework for Biodiversity Assessment, the NSW Biodiversity Offset Policy for Major Projects and the Voluntary Land Acquisition and Mitigation Policy apply to State Significant Development and do not apply to this Modification under section 75W of the EP&A Act.

Strategic Regional Land Use Policy

As part of the *Strategic Regional Land Use Policy* (NSW Government, 2012a), the NSW Government introduced a 'Gateway Process' for the upfront assessment of the impacts of State Significant mining and coal seam gas proposal on Strategic Agricultural Land.

The Modification would not change the approved Project surface development area and is wholly contained within existing Project MLAs which were submitted in either 1998 or 1999 and are expected to be issued. A Site Verification Certificate or Gateway Certificate is not required for existing mining tenements (clause 20 of Schedule 6A of the EP&A Act).

Notwithstanding the above, the MPF site would not be Strategic Agricultural Land as defined in the *Interim protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government, 2013) because the MPF site is not considered to have a reliable water supply as it is located outside:

- reliable rainfall areas mapped by the DPI-Water;
- highly productive groundwater resource areas mapped by the DPI-Water; and
- highly reliable surface water supply mapped by the DPI-Water.

The Mining SEPP includes mapping of lands identified as Strategic Agricultural Land and none is mapped in the MPF site.

Aquifer Interference Policy

The AIP has been developed by the NSW Government as a component of the NSW Government's Strategic Regional Land Use Policy.

The AIP applies State-wide and details water licence and impact assessment requirements.

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP also aims to enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The Modification does not propose any material changes to the existing water supply or demand for the Project (Section 2.10).

The AIP requires all water taken by aquifer interference activities to be accounted for within the extraction limits set by the relevant Water Sharing Plan. Scandium21 would obtain and hold appropriate volumetric licenses in accordance with the requirements of the relevant Water Sharing Plan for the modified Project.

4.2.3 Commonwealth Legislation

Proposals that are likely to have a significant impact on a matter of environmental significance are defined as a controlled action under the EPBC Act. Proposals that are, or may be, a controlled action are required to be referred to the DotE to determine whether or not the action is a controlled action.

The DotE was provided with a letter providing an outline of the Modification on 10 August 2015.

The DotE indicated on 19 August 2015 that it considered that the Modification would not change the potential impacts on matters of national environmental significance and therefore the modified Project does not need to be re-referred under the EPBC Act.

4.2.4 Other Statutory Requirements

In addition to the EP&A Act, the following NSW Acts may be applicable to the modified Project:

- *Contaminated Land Management Act, 1997;*
- *Crown Lands Act, 1989;*
- *Dams Safety Act, 1978;*
- *Dangerous Goods (Road and Rail Transport) Act, 2008;*
- *Forestry Act, 2012;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974;*
- *Native Vegetation Act, 2003;*
- *Noxious Weeds Act, 1993;*
- *Protection of the Environment Operations Act, 1997;*
- *Roads Act, 1993;*
- *Threatened Species Conservation Act, 1995;*
- *Water Act, 1912;*
- *Water Management Act, 2000; and*
- *Work Health and Safety Act, 2011.*

The following approvals would be obtained before the modified Project commences:

- modification of the Development Consent DA 374-11-00 issued under the EP&A Act, and any relevant secondary approvals under the Development Consent conditions (e.g. management plans);
- Mining Leases under the *Mining Act, 1992*;
- Mining Operations Plan prepared under the conditions of the mining leases;
- an Aboriginal Heritage Impact Permit under section 90 of the *National Parks and Wildlife Act, 1974*;
- an Environment Protection Licence under the *Protection of the Environment Operations Act, 1997*;
- necessary occupation permits for activities that would be conducted as a component of the Project within Fifield State Forest under the *Forestry Act, 2012*; and
- relevant water access licences, and water supply works and use approvals under the *Water Management Act, 2000* where applicable.

6 REFERENCES

- Austrroads (2013) *Guide to Traffic Management Part 3: Traffic Studies and Analysis*.
- Black Range Minerals (2000) *Syerston Nickel Cobalt Project Environmental Impact Statement*.
- Clean TeQ Holdings (2015) *Syerston Scandium Mine Scoping Study Report*.
- Department of Urban Affairs and Planning (1992) *Hazardous Industry Planning Advisory Paper No. 4*.
- GTA Consultants (2016) *Syerston Nickel Cobalt Project Scandium Oxide Modification Road Transport Assessment*.
- New South Wales Government (2012a) *Strategic Regional Land Use Policy*.
Released September 2012.
- New South Wales Government (2012b) *Aquifer Interference Policy*.
Released September 2012.
- New South Wales Government (2013) *Interim protocol for site verification and mapping of biophysical strategic agricultural land*.
- NSW Roads and Traffic Authority (1996) *Road Design Guide*.
- NSW Roads and Traffic Authority (2002) *Guide to Traffic Generating Developments*.
- NSW Roads and Traffic Authority (2004) *Road Safety Update 22: Rural Road Crash Rates by Road Stereotype*.
- SHE Pacific (2000) *Preliminary Hazard Analysis Syerston Nickel-Cobalt Project*.

Attachment 1

Syerston Project
Consolidated
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,

2001

FILE No.S98/01078

Schedule 1

Red type represents 2005 Modification

Blue type represents 2006 Modification

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), store(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 6 DP 598735 Lots 24 and 103 DP 752106

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

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
$L_{A10(15 \text{ minute})}$	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 <i>Water Act 1912</i> .

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;
- (iv) **Statement of Environmental Effects in support of a Section 96(2) application for the Syerston Nickel Cobalt Project, dated May 2005, prepared by Resource Strategies Pty Ltd;**

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) **This consent shall lapse 21 years after the date of commencement of mining operations.**

(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 2.5 million tonnes of ore per annum unless otherwise agreed by the Director-General.
- (b) Production of limestone from the quarry shall not exceed 790,000 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 sulphides	53,000

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.
- (f) **Notwithstanding any other condition of this consent, the Applicant shall prepare the applicable management plans, studies and reports in accordance with the timing in Table 24 of the Statement of Environmental Effects dated May 2005.**

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). ¹The 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. 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.

¹ NPWS GTAs

- 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 continuous 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 continuous 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 reforestation 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) ²All 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) ⁴Methods 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

² DLWC GTAs

³ EPA GTAs

⁴ DLWC GTAs

- (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

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. ⁵measures 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*;
- v. ⁶Managing 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;

⁵ EPA GTAs

⁶ EPA GTAs

⁷ EPA GTAs

- (c). ⁷Prior 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 waste 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 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 triennially, 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) ⁹Due 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 referable 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

⁸ EPA GTAs

⁹ DLWC GTAs

¹⁰ DLWC GTAS

¹¹ DLWC GTAS

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- 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.
 - (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) ¹²The 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) ¹³The 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.

¹² DLWC GTAs

¹³ DLWC GTAs

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- (e) ¹⁴Within 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) ¹⁵The works shall be located at least:
- 200 metres from any boundary of the property, except when specifically authorised by DLWC.
 - 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) ¹⁶The 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) ¹⁷All 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) ¹⁸If 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) ¹⁹Any 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) ²⁰Upon 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

¹⁴ DLWC GTAs

¹⁵ DLWC GTAs

¹⁶ DLWC GTAs

¹⁷ DLWC GTAs

¹⁸ DLWC GTAs

¹⁹ DLWC GTAs

²⁰ DLWC GTA

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
 - 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) ²¹If 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.

²¹ DLWC GTA

²² EPA GTA

4.1.2. Pollution of Waters

²²Except 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

- (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. ²⁴measures 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. ²⁵measures 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. ²⁶the 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;

²³ EPA GTA

²⁴ EPA GTA

²⁵ EPA GTA

²⁶ EPA GTA

- 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:

- (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) ²⁷prepare 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. ²⁸ensuring 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. ²⁹incorporates 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 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 2.

²⁷ EPA GTAs

²⁸ EPA GTAs

²⁹ EPA GTAs

Table 2

Pollutant	Point number	Sampling type	Frequency
Arsenic	13	Grab	Monthly
Cadmium	13	Grab	Monthly
Chromium	13	Grab	Monthly
Copper	13	Grab	Monthly
Lead	13	Grab	Monthly
Mercury	13	Grab	Monthly
Selenium	13	Grab	Monthly
Suspended Solids	12,13	Grab	Monthly
Zinc	13	Grab	Monthly
Salt	12	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, CO₂, 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 CO₂ at the time of sampling;
 - total dissolved solids, total alkalinity and methyl orange alkalinity;
 - major cations (Ca, Mg, Na, K) and major anions (Cl, SO₄, F, NO₃);
 - metals including Fe²⁺, Fe³⁺, 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-decommissioning 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) ³⁰The 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) ³¹Bund(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) ³²A 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) ³³Waste 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.

³⁰ EPA GTAs

³¹ EPA GTAs

³² EPA GTAs

³³ DLWC GTAs

- (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;
- (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 (H₂S) and sulphur dioxide (SO₂) 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 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) ³⁴The 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
- (c). ³⁵The Tailings Storage Facility, Evaporation Basin and Surge Dam must be designed and operated to minimise seepage of tailings water through 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 1×10^{-9} m/s (or equivalent) or a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1×10^{-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). ³⁶The 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). ³⁷The 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.

³⁴ EPA GTA

³⁵ EPA GTAs

³⁶ EPA GTAs

³⁷ EPA GTAs

- (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) ³⁸Monitoring of groundwater at the boundary of the premises and between the Tailings Storage Facility and Evaporation Basin and the boundary of the facility
- (h) ³⁹The placement of groundwater monitoring points to ensure the presence of tailings water of any contamination of groundwater from tailings water will be detected, particularly at any preferential flow paths such as paleochannels, recharge areas or fracture zones.
- (i) ⁴⁰Prior 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

⁴¹Any 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.

³⁸ EPA GTAs

³⁹ EPA GTA

⁴⁰ EPA GTA

⁴¹ EPA GTA

(c). Laboratory waste

⁴²All 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

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 (PM₁₀, 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.

⁴² EPA GTA

⁴⁴ EPA GTA

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 PM₁₀ 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;
- 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/m²/month for deposited dust and µg/m³ for TSP and PM₁₀ which shall be plotted in the AEMR.

(b) ⁴⁴The 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	¹Location	Method¹	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. ⁴⁵All 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. ⁴⁶The EPA considers that suspended and deposited particulate are critical parameters in determining amenity air impacts. However Particulate Matter (PM₁₀) 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 PM₁₀ 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

⁴⁵ EPA GTA

⁴⁶ EPA GTA

⁴⁷ EPA GTA

background levels of air pollutants.

- (d) ⁴⁸All 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 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) ⁴⁹Activities occurring at the mine/quarry must be carried out in a manner that will minimise emissions of dust from the site.

⁴⁸ EPA GTA

- (b) ⁵⁰Air 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.

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

⁵¹The 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

⁵²For 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.

⁴⁹ EPA GTA

⁵⁰ EPA GTA

⁵¹ EPA GTA

⁵² EPA GTA

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 ₂ SO 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
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	5.3	dry, 273 K, 101.3 kPa
Hydrogen sulfide (H ₂ S)	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 µg/m³ at the nearest sensitive receptor.

Point 5 - Sulfuric Acid Plant.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm ³ /s	19.2	dry, 273 K, 101.3 kPa
Sulfuric acid mist (H ₂ SO 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 7 - Flare Stack.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm ³ /s	0.65	dry, 273 K, 101.3 kPa
Hydrogen sulfide (H ₂ S)	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 8 - Hydrogen Reformer Stack.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm ³ /s	1.42	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 9 - Power Plant and HRSG.

Pollutant	Units of measure	100 % limit	Reference conditions
Volumetric flow rate	Nm ³ /s	18.4	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 10 - 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 11 - 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 ₂ SO 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 7) must be operated to ensure no visible emissions.

6.1.5. Emissions monitoring

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

⁵³Monitoring 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 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) ⁵⁴The 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	"	"	Vent From Extraction Fan Over Sulfide Filter
5	"	"	Sulfuric Acid Plant
6		"	Limestone Wet Scrubber
7	"	"	Flare Stack
8	"	"	Hydrogen Reformer Stack
9	"	"	Power Plant & HRSG
10	"	"	Auxiliary Boiler
11	"	"	Diesel Generators

⁵³ EPA GTAs

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: ⁵⁶Source Emissions Sampling and Analysis Requirements.

POLLUTANT	EPA Identification Point	Method ¹	Frequency
Sulfuric acid mist (H ₂ SO ₄) or sulfur trioxide (SO ₃) or both (as SO ₃ equivalent)	1,5,11	TM-3	Post commissioning, quarterly
Sulphur dioxide (SO ₂)	11	TM-4	Post commissioning, quarterly
Nitrogen dioxide (NO ₂) or nitric oxide (NO) or both (as NO ₂ equivalent)	7,8,9,10,11	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, 11	TM-15	Post commissioning, quarterly

PARAMETER	EPA Identification Point	METHOD ¹	FREQUENCY
VELOCITY	1,4,5,7,8,9,10,11	TM-2	POST COMMISSIONING, QUARTERLY
VOLUMETRIC FLOW RATE	1,4,5,7,8,9,10,11	TM-2	POST COMMISSIONING, QUARTERLY
TEMPERATURE	1,4,5,7,8,9,10,11	TM-2	POST COMMISSIONING, QUARTERLY
MOISTURE	1,4,5,7,8,9,10,11	TM-22	POST COMMISSIONING, QUARTERLY
DRY GAS DENSITY/MOLECULAR WEIGHT OF STACK GASES	1,4,5,7,8,9,10,11	TM-23	POST COMMISSIONING, QUARTERLY
CARBON DIOXIDE IN STACK GASES	1,4,5,7,8,9,10,11	TM-24	POST COMMISSIONING, QUARTERLY
OXYGEN	1,4,5,7,8,9,10,11	TM-25	POST COMMISSIONING, QUARTERLY

OTHER	EPA Identification Point	METHOD ¹	FREQUENCY
SELECTION OF SAMPLING POSITIONS	1,4,5,7,8,9,10,11	TM-1	-

- (d) ⁵⁷Continuous 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	4,7	GEM-7	Continuous

⁵⁵ EPA GTA

⁵⁶ EPA GTA

⁵⁷ EPA GTA

Sulphur dioxide (SO ₂)	5,7	CEM-2	Continuous
Opacity	7	CEM-1	Continuous

PARAMETER	Point number	Method	Frequency
Temperature	4,5,7	Method approved by the EPA in writing	Continuous
Moisture	4,5,7	Method approved by the EPA in writing	Continuous
Volumetric flow rate	4,5,7	CEM-6	Continuous
Oxygen	4,5,7	CEM-3	Continuous

Notes: (a) All methods are specified in the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW 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 the 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) ⁵⁸The 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
7	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 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
5	Sulfuric Acid Plant	80	1.17
7	Flare Stack	80	0.5
8	Hydrogen Reformer Stack	36	0.43
9	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

⁵⁸ EPA GTA

⁵⁹ EPA GTA

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 Identification Point	Pollutant	Design Ground-Level Concentration Criteria (µg/m3)	Averaging Time	Percentile
1,11	Sulfuric Acid	33	3 minute	99.9
11	Sulfur Dioxide	500	10 minute	99.9
10,11	Nitrogen Dioxide	246	1 hour	99.9
1	Nickel or Compounds Containing Nickel	0.004	Annual	100
1,11	Solid Particles	330	3 minute	99.9

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 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

⁶⁰ EPA GTA

⁵⁸ EPA GTA

⁵⁹ EPA GTA

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). ⁶⁰The 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 Identification Point	Pollutant	Design Ground-Level Concentration Criteria ($\mu\text{g}/\text{m}^3$)	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

- (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 1,4,5,7,8,9,10,11; and where relevant
 - the plant and equipment design parameters specified in Tables 7 and 8.
- (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 1,4,5,7,8,9,10,11 for which a volumetric flow rate has not been specified.

6.2. Blast Management And Monitoring

⁶⁰ EPA GTA

⁶¹ EPA GTA

⁶² EPA GTA

6.2.1 Blast Management

Overpressure

⁶³The 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

⁶⁴Ground 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.

(b) ⁶⁶The 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;

⁶³ EPA GTA

⁶⁴ EPA GTA

⁶⁵ EPA GTA

⁶⁶ EPA GTA

- 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) ⁶⁷The Applicant must monitor ground vibration and overpressure of all quarry blasts.
- (b) ⁶⁸For 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

6.3.1 Noise Level Criteria

(a) Noise Impact Assessment 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 – NOISE IMPACT ASSESSMENT CRITERIA – MINE AND PROCESSING FACILITY

LOCATION	DAY	EVENING	NIGHT
	L _{Aeq} (15 minute) dB(A)	L _{Aeq} (15 minute) dB(A)	L _{Aeq} (15 minute) dB(A)
CURRAJONG PARK	35	39	40
BROOKLYN, ROSEHILL, FLEMINGTON, SUNRISE, WANDA BYE, GLENBURN, FIFIELD, WARRAWINDI, SLAPDOWN	35	35	35

⁶⁷ EPA GTA

⁶⁸ EPA GTA

⁶⁹ EPA GTA

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- Notes:
 - a) In the above table:
 - (i) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and public holidays;
 - (ii) Evening is defined as the period 6pm to 10pm; and
 - (iii) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and public holidays.
 - b) The criteria above apply to noise emissions under the following weather conditions:
 - (i) wind speed up to 3 m/s; and
 - (ii) Pascall stability classes A,B,C,D and F (and 'E' for Tables 12-15 below).
 - c) The criteria do not apply where the Applicant and the affected landowner have reached a negotiated agreement in regard to noise, and a copy of the agreement has been forwarded to the Director-General and DEC.
 - d) Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the $L_{Aeq(15\text{ minute})}$ noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
 - e) These notes apply equally to Tables 11-15, in so far as they are applicable.

Limestone quarry

The Applicant shall ensure that the noise emissions 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: NOISE IMPACT ASSESSMENT CRITERIA – LIMESTONE QUARRY

LOCATION	DAY	EVENING	NIGHT
	L_{Aeq} (15 minute) dB(A)	L_{Aeq} (15 minute) dB(A)	L_{Aeq} (15 minute) dB(A)
MOORELANDS	42	35	35
LESBINA, EASTBOURNE	38	35	35
GILLENBINE	37	35	35
REAS FALLS, HILLSDALE, THE TROFFS	35	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 noise limits in Table 12 at all non-project related residences.

TABLE 12: NOISE IMPACT ASSESSMENT CRITERIA – RAIL SIDING

LOCATION	DAY	EVENING	NIGHT
	L_{Aeq} (15 minute) dB(A)	L_{Aeq} (15 minute) dB(A)	L_{Aeq} (15 minute) dB(A)
GLEN ROCK, BALLANRAE, SPRING PARK	37	35	35

(b) Land Acquisition Criteria

Mine and processing facility

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: Land acquisition criteria – mine and processing facility.

LOCATION	DAY	EVENING	NIGHT
	L _{Aeq} (15 minute) dB(A)	L _{Aeq} (15 minute) dB(A)	L _{Aeq} (15 minute) dB(A)
BROOKLYN, CURRAJON PARK, ROSEHILL	45	40	40
FLEMINGTON	41	44	40
SUNRISE	45	45	40
WANDA BYE, GLENBURN	44	46	40
FIFIELD	41	40	40
WARRAWINDI	41	44	40
SLAPDOWN	41	44	40

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: Land acquisition criteria – limestone quarry

LOCATION	NOISE AFFECTATION LIMITS DAY	NOISE AFFECTATION LIMITS EVENING AND NIGHT
MOORELANDS, REAS FALLS, GILLENBINE, HILLSDALE	42	40
LESBINA, THE TROFFS, EASTBOURNE	41	40

Rail Siding

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: Land acquisition criteria – rail siding

LOCATION	NOISE AFFECTATION LIMITS DAY	NOISE AFFECTATION LIMITS EVENING AND NIGHT
GLEN ROCK, BALLEENRAE, SPRING PARK	42	40

Additional Procedures

- (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 10, 11 or 12, 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 exceedances 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.
- (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
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) ⁷²Condition 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) ⁷³The 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 $L_{Aeq(15\text{ minute})}$ 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;
 - (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

⁷² EPA GTA

⁷³ EPA GTA

⁷⁴ EPA GTA

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) ⁷⁴The 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
 - 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.

- (e) The noise management plans required under Condition 6.3.3(a)-(c) above shall be prepared in consultation with the DEC, and to the satisfaction of the Director-General.

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 AUSTRROADS 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) ⁷⁵Prior 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) ⁷⁶Environmental 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) ⁷⁷Road and intersection designs are to be in accordance with the RTA’s “Road Design Guide” 1999 (or its latest version) and/or AUSTRROADS – Guide to Traffic Engineering Practice series.
- d) ⁷⁸Intersections shall be designed in accordance with AUSTRROADS – Guide to Traffic Engineering Practice Part 5. In adopting intersection configurations as per AUSTRROADS, the curve returns, storage lengths and taper distances should reflect the maximum size vehicle expected to use the facility, and the design should accommodate the sweep path generated by such vehicles.
- e) ⁷⁹Detailed engineering drawings and specifications shall be in accordance with LSC, PSC and FSC requirements as applicable, and/or AUSTRROAD Specifications.
- f) ⁸⁰Traffic Control Plans are to be in accordance with Australian Standard 1742.3 and/or the RTA’s Manual “Traffic Control at Work Sites”, 1998 (or its latest version).

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

⁷⁹ LSC, PSC, FSC General Terms of Approval

⁸⁰ LSC, PSC, FSC General Terms of Approval

- 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 seal. 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 AUSTRROADS 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.
- 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.

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

⁸⁶ LSC, PSC, FSC General Terms of Approval

7.4 Road Construction

- (a).⁸⁷The 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 AUSTRROADS Specifications.
- (b).⁸⁸The 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).⁸⁹The 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 AUSTRROADS 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;
 - ⁹¹provide 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

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. ⁹⁵The 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

⁹⁶The 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 LSC or 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 LSC or 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 of the mine and processing facility, 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 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 of the mine and processing facility. 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.

⁹⁷Except 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.
-

⁹⁷ EPA GTA

Attachment 2

Letters of Support
for the Modification from
Lachlan Shire Council,
Parkes Shire Council
and Forbes Shire Council



The Heart of NSW

Contact Person: Robert Hunt
Reference No:

12th April 2016

John Carr, General Manager
Scandium21 Pty Ltd
PO Box 227
MULGRAVE VIC 3170

Re: Proposed Syerston Project

Dear John,

Thank you for Scandium21's recent efforts to consult with the Lachlan Shire Council (LSC) about Scandium21 Pty Ltd's (Scandium21) proposal to develop the Syerston Project (the Project). LSC appreciates that Scandium21 proposes to develop the Project with an initial focus on a scandium oxide product and that Scandium21 is proposing to modify the existing Development Consent DA 374-11-00 to authorise this. LSC also appreciates that Scandium21 proposes a Voluntary Planning Agreement (VPA) with LSC in accordance with Section 93F of the *Environmental Planning and Assessment Act* to address community contributions in light of the proposed modified Project. LSC offers this letter of in-principle support for the terms of the proposed VPA.

LSC proposes to execute the VPA upon the Minister for Planning's approval of Scandium21's modification application for the modified Project. LSC is of the view that execution must await this approval to provide certainty for the need for a VPA and to confirm that the terms of the VPA as proposed are appropriate. LSC is happy for Scandium21 to share this letter with the Department of Planning and Environment as a demonstration of in-principle support should the need arise.

Background

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the *Environmental Planning and Assessment Act* in 2001. The Project includes the establishment and operation of the:

- nickel cobalt mine and processing facility (MPF);
- limestone quarry and processing facility (the limestone quarry);
- rail loading and unloading facility (the rail siding);
- natural gas pipeline;
- two water supply borefields and pipelines; and
- associated road infrastructure upgrades.

The MPF, the natural gas pipeline and sections of the water supply pipeline are located in the Lachlan Shire.

Lachlan Shire Council

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The Heart of NSW

Proposed Modification

Scandium21 has indicated to the LSC that it intends to lodge an application to modify the Development Consent DA 374-11-00 to adjust mining and processing operations at the MPF to initially focus on scandium oxide (Sc_2O_3) production in addition to mixed nickel and cobalt sulphide production (the Modification).

The Modification would involve an initial scandium oxide focussed production phase (the *Initial Production Phase*) prior to refocusing on mixed nickel and cobalt precipitate production by developing the full Project (the *Full Production Phase*). The modified Project would transition to the Full Production Phase once favourable market conditions for nickel and cobalt prevail.

Voluntary Planning Agreement

The LSC has been consulting with Scandium21 in regard to the proposed Modification since mid-2015. As part of this consultation process, Scandium21 proposed replacing the existing road transport and community contributions requirements of Development Consent DA 374-11-00 with commitments which are similar but are proposed to be changed to reflect the proposed modified Project via a separate VPA with the LSC in accordance with Section 93F of the *Environmental Planning and Assessment Act*.

The LSC supports this proposal and this is reflected through our recent negotiations with Scandium21 regarding the terms of the VPA. The terms of the VPA are provided in Attachment 1 to this letter and have been approved by Council.

The LSC is satisfied with the VPA terms and structure (Attachment 1) and considers that they are fair and reasonable considering the potential impacts of the Project on the Lachlan Shire community.

Should you require any further information please do not hesitate to contact me on (02) 6895 1900.

Yours sincerely,

Robert Hunt

General Manager

Lachlan Shire Council

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**Proposed Voluntary Planning Agreement Framework
Syerston Nickel Cobalt Project
Lachlan Shire Council**

COMMUNITY ENHANCEMENT

1. The owner of the Syerston Mine (the owner) shall pay the following construction community enhancement contribution to the Lachlan Shire Council (LSC) for the provision of infrastructure and services generated by the development within six months of the commencement of construction of the mine and processing facility.

Construction Community Enhancement Contribution (\$) = \$200,000

2. From the commencement of operation of the processing facility until mining operations cease on the site, the owner shall pay the following annual contribution to the LSC for the provision of infrastructure and services generated by the development.

Annual Operations Community Enhancement Contribution (\$) =

$\$100,000 +$
 $\$300,000 \times Em \div 335 \times WF_{LSC}$

Notes:

- *Em = the number of full-time equivalent employees/contractors at the Project.*
- *WF_{LSC} = the percentage of the workforce residing in Forbes Shire, Lachlan Shire and Parkes Shire that resides in Lachlan Shire as determined by employment records held by the owner.*
- *Em and WF_{LSC} are to be calculated for the first time within three months of the commencement of operation of the processing facility, and then recalculated on the same date each following year.*
- *The \$100,000 shall be indexed according to the CPI at the time of payments after the initial payment.*
- *The \$300,000 shall be indexed according to CPI at the time of payments from a base year of 2001.*
- *The fixed \$100,000 component shall be reviewed between the owner and LSC every 5 years from the date of commencement of operation of the processing facility.*

The owner shall pay the first annual operations community enhancement contribution within six months of the commencement of operation of the processing facility, and then paid on the same date each following year until mining operations cease on the site.

Recognition of the owner's contribution to the potential supply of borefield water to the Fifield township will be discussed and agreed between the owner and LSC.

ROAD UPGRADES

3. Prior to the commissioning of the mine and processing facility, the owner shall pay for the following upgrades:
- road pavement (8.0 m sealed pavement and 1.0 m gravel shoulders); and
 - all private access roads (3.5 m sealed private access road approach and 3.0 m gravel shoulders along road 30 m either side of all private access roads).

to the following roads (Figures 1a and 1b):

- **Platina Road [SR64]** (between the Lachlan Shire boundary and Fifield Road [MR57]);
- **Fifield Road [MR57]** (between Platina Road [SR64] and Slee St [in Fifield Village]); and
- **Wilmatha Road [SR34]** (between Slee St [in Fifield Village] and the mine and processing facility access road).

In addition, prior to the commissioning of the mine and processing facility, the owner shall pay for the following intersection upgrades (Figure 1b):

- **Platina Road [SR64] /Fifield Road [MR57] Intersection** – upgrade signage and line marking in accordance with relevant Austroads requirements.
 - **Fifield Road [MR57] /Slee Street [in Fifield Village] Intersection** – upgrade signage and line marking in accordance with relevant Austroads requirements.
 - **Slee Street [in Fifield Village]/Wilmatha Road [SR34]/Fifield Road Intersection** – upgrade signage and line marking in accordance with relevant Austroads requirements (including installation of advance warning signs on the Slee Street [in Fifield Village], Fifield Road [MR57] and Wilmatha Road [SR34] approaches).
4. The owner shall prepare a road construction programme detailing the timing and scheduling of road upgrades required by Condition 3 above. The programme shall be prepared by the owner in consultation with LSC, prior to commencement of construction of the mine and processing facility. The road upgrades described in Condition 3 above shall be undertaken in accordance with the road construction programme unless otherwise agreed with LSC. The road upgrades can be undertaken by the LSC or an alternative appropriately qualified contractor.

Attachment 1

5. Prior to the commissioning of the limestone quarry and/or rail siding, the owner shall pay for a road safety audit to determine road upgrade requirements on the following roads (including intersections and rail crossings) (Figures 1a and 1b):

- **Henry Parkes Way [MR61]** (between Jones Lane [eastern outskirts of Condobolin] and Fifield Road [MR57]);
- **Fifield Road [MR57]** (between Henry Parkes Way [MR61] and Slee St [in Fifield Village] and between Slee St [in Fifield Village] and Red Heart Road [SR41]);
- **Platina Road [SR64]** (between the Lachlan Shire Boundary and Fifield Road [MR57]);
- **Slee St [in Fifield Village]** (between Fifield Road [MR57] and Wilmatha Road [SR34]);
and
- **Wilmatha Road [SR34]** (between Slee St [in Fifield Village] and Melrose Plains Road [SR44]);
- **Springvale Road [SR60]** (between Fifield Road [MR57] and Melrose Plains Road [SR44]);
- **Melrose Plains Road [SR44]** (between Springvale Road [SR60] and 4.65 km after the Melrose Plains Road [SR44]/Back Tullamore Road [SR1151] Intersection).

The road safety audit must also determine if the Fifield Bypass is required.

6. Prior to the commissioning of the limestone quarry and/or rail siding, the owner shall pay for the road upgrades identified in the road safety audit and agreed with the LSC, described in Condition 5 above.

ROAD MAINTENANCE

7. The owner shall make annual contributions to LSC towards the maintenance of the following roads associated with the heavy vehicle transport route (Figures 2a and 2b):

- **Platina Road [SR64]** (between the Lachlan Shire boundary and Fifield Road [MR57]);
and
- **Fifield Road [MR57]** (between Platina Road [SR64] and Red Heart Road);
- **Slee St [in Fifield Village]** (between Fifield Road [MR57] and Wilmatha Road [SR34]);
and
- **Wilmatha Road [SR34]** (between Slee St [in Fifield Village] and the mine and processing facility access road).

The owner shall also make annual contributions to LSC towards the maintenance of the following roads that are likely to experience additional light vehicle traffic (Figures 2a and 2b):

- **Fifield Road [MR57]** (between Henry Parkes Way [MR61] and Platina Road [SR64]); and
- **Henry Parkes Way [MR61]** (between Jones Lane [eastern outskirts of Condobolin] and Fifield Road [MR57]).

The first annual contribution is to be made within 12 months of the commencement of construction of the mine and processing facility, and then paid on the same date each following year until mining operations cease on the site.

The owner and LSC are to agree on the annual maintenance monitoring programme for the above listed roads prior to implementation and review this programme every year.

Each contribution is to be calculated as follows:

Annual ongoing maintenance contribution (\$) =

$$\begin{aligned} & VM\%_{SR64} \times \text{Annual Expenditure}_{SR64} + \\ & VM\%_{MR57} \times \text{Annual Expenditure}_{MR57} \\ & VM\%_{Slee\ St} \times \text{Annual Expenditure}_{Slee\ St} + \\ & VM\%_{SR34} \times \text{Annual Expenditure}_{SR34} + \\ & VM\%_{MR57} \times \text{Annual Expenditure}_{MR57} + \\ & VM\%_{MR61} \times \text{Annual Expenditure}_{MR61} \end{aligned}$$

Notes:

- *Annual Expenditure is the total annual standard road maintenance expenditure carried out by LSC on the above listed sections of road as evidenced by LSC records. Standard road maintenance expenditure must be associated with maintenance activities required to maintain the roads at the Levels as defined in the latest approved version of Lachlan Shire Council's Transport Services – Roads Asset Management Plan (unless otherwise agreed between the owner and the LSC).*
- *VM% = percentage of Syerston Mine vehicle axle counts to the total number of vehicle axle counts on the relevant sections of road listed above in the relevant 12 month period, as agreed with LSC.*
- *The owner shall prepare and implement a Traffic Monitoring Programme in consultation with LSC, which contains suitable monitoring measures to accurately determine both the annual VM% and total annual vehicle axle counts on the above listed roads.*



PARKES SHIRE COUNCIL

Progress, opportunities and a quality lifestyle for our residents

LF:MC

Contact Person: Michael Carter

6 April 2016

Mr John Carr
General Manager
Scandium21 Pty Ltd
PO Box 227
MULGRAVE VIC 3170

Dear John

**PROPOSED VOLUNTARY AGREEMENT FRAMEWORK BETWEEN SCANDIUM21
PTY LTD AND PARKES SHIRE COUNCIL IN RELATION TO THE SYERSTON
PROJECT AT FIFIELD**

Thank you for your recent efforts to consult with Parkes Shire Council about Scandium21 Pty Ltd's (Scandium21) proposal to develop the Syerston Project at Fifield, which is located in the Lachlan Shire and in close proximity to the Parkes Shire.

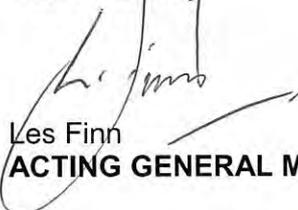
Parkes Shire Council appreciates that Scandium21 proposes to develop the Syerston Project at Fifield with an initial focus on a scandium oxide product. Council also appreciates that Scandium21 proposes a Voluntary Planning Agreement (VPA) with Council in accordance with Section 93F of the *Environmental Planning and Assessment Act 1979*, to address community contributions, road upgrades and maintenance in light of the proposed modified project.

Parkes Shire Council offers this letter of in-principle support for the terms of the proposed VPA, as presented to Council in various meetings and confirmed in your last email dated 1 April 2016.

Council proposes to execute the VPA prior to the Minister for Planning's approval of Scandium21's modification application for the modified project.

Please feel free to share this letter with the Department of Planning and Environment as a demonstration of in-principle support should the need arise.

Yours faithfully



Les Finn
ACTING GENERAL MANAGER

OFFICE OF THE MAYOR

FORBES SHIRE COUNCIL

FORBES SHIRE COUNCIL

2 Court Street
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MAYOR

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PJM/JCC (Ref: 308617)

7 April 2016



Scandium21 Pty Ltd
PO Box 227
MULGRAVE VIC 3170

Attention: Mr John Carr, General Manager, Clean Teq Metals

John
Dear Mr Carr

Thank you for Scandium21's recent efforts to consult with the Forbes Shire Council (FSC) about Scandium21 Pty Ltd's (Scandium21) proposal to develop the Syerston Project (the Project). FSC acknowledges that Scandium21 proposes to develop the Project with an initial focus on a scandium oxide product and that Scandium21 is proposing to modify the existing Development Consent DA 374-11-00 to authorise this. FSC also acknowledges that Scandium21 proposes a Voluntary Planning Agreement (VPA) with FSC in accordance with Section 93F of the *Environmental Planning and Assessment Act* to address community contributions in light of the proposed modified Project. FSC offers this letter of in-principle support for the terms of the proposed VPA.

FSC proposes to execute the VPA upon the Minister for Planning's approval of Scandium21's modification application for the modified Project. FSC is of the view that execution must await this approval to provide certainty for the need for a VPA and to confirm that the terms of the VPA as proposed are appropriate (i.e. confirm that the approved modified Project is the same as the proposed Project in the modification application and that there are no changes which would trigger the need to change the terms of the VPA).

FSC authorises Scandium21 to share this letter with the Department of Planning and Environment as a demonstration of in-principle support, should the need arise.

Background

FSC understands as follows:

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the *Environmental Planning and Assessment Act* in 2001.

/2...



The Project includes the establishment and operation of the:

- nickel cobalt mine and processing facility (MPF);
- limestone quarry and processing facility (the limestone quarry);
- rail loading and unloading facility (the rail siding);
- natural gas pipeline;
- two water supply borefields and pipelines; and
- associated road infrastructure upgrades.

The MPF, the natural gas pipeline and sections of the water supply pipeline are located in the Forbes Shire area.

Scandium21, a wholly owned subsidiary of Clean TeQ Metals Pty Ltd, owns the rights to develop the Project.

Proposed Modification

Scandium21 has indicated to the FSC that it intends to lodge an application to modify the Development Consent DA 374-11-00 to adjust mining and processing operations at the MPF to initially focus on scandium oxide (Sc_2O_3) production in addition to mixed nickel and cobalt precipitate production (the Modification).

The Modification would involve an initial scandium oxide focussed production phase (the *Initial Production Phase*) prior to refocusing on mixed nickel and cobalt precipitate production by developing the full Project (the *Full Production Phase*).

The modified Project would transition to the Full Production Phase once favourable market conditions for nickel and cobalt prevail.

Voluntary Planning Agreement

The FSC has been consulting with Scandium21 and other neighbouring Councils in regard to the proposed Modification since mid-2015. As part of this consultation process, Scandium21 proposed replacing the existing road transport and community contributions requirements of Development Consent DA 374-11-00 with commitments which are similar but are proposed to be changed to reflect the proposed modified Project via a separate VPA with the FSC in accordance with Section 93F of the *Environmental Planning and Assessment Act*.

The FSC supports this proposal and this is reflected through our recent negotiations with Scandium21 regarding the terms of the VPA. The terms of the VPA are provided in Attachment 1 to this letter and are subject to final Council approval.

The FSC is satisfied with the VPA terms and structure (Attachment 1) and considers that they are fair and reasonable considering the potential impacts of the Project on the Forbes Shire community during both the initial and full production phases of the project.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Cr Phyllis Miller OAM', written over a horizontal line.

Cr Phyllis Miller OAM
MAYOR

**Proposed Voluntary Planning Agreement
Syerston Nickel Cobalt Project
Forbes Shire Council**

COMMUNITY ENHANCEMENT

1. The owner of the Syerston Mine (the owner) shall pay the following construction community enhancement contribution to the Forbes Shire Council (FSC) for the provision of infrastructure and services generated by the development within six months of the commencement of construction of the mine and processing facility.

Construction Community Enhancement Contribution (\$) = \$100,000

2. From the commencement of operation of the processing facility until mining operations cease on the site, the owner shall pay the following annual contribution to the FSC for the provision of infrastructure and services generated by the development.

Annual Operations Community Enhancement Contribution (\$) = $\$300,000 \times Em \div 335 \times WF_{FSC}$

Notes:

- *Em = the number of full-time equivalent employees/contractors at the Project.*
- *WF_{FSC} = the percentage of the workforce residing in FSC, LSC and PSC that resides in FSC as determined by employment records held by the owner.*
- *Em and WF_{FSC} are to be calculated for the first time within three months of the commencement of run-of-mine ore processing, and then recalculated on the same date each following year.*
- *\$300,000 shall be indexed according to the CPI at the time of payments after the initial payment.*

The owner shall pay the first annual operations community enhancement contribution within six months of the commencement of operation of the processing facility, and then paid on the same date each following year until mining operations cease on the site.

Recognition of the owner's contribution to the potential supply of borefield water to the Ootha township will be discussed and agreed between the owner and FSC.

Appendix A

Road Transport Assessment



Syerston Project Scandium Oxide Modification Road Transport Assessment

Client // Clean TeQ Limited
Office // NSW
Reference // 16S1156000
Date // 21/04/16

Syerston Project

Scandium Oxide Modification

Road Transport Assessment

Issue: A 21/04/16

Client: Clean TeQ Limited
Reference: 16S1156000
GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	21/04/16	Final	Penny Dalton	Ken Hollyoak	Ken Hollyoak	Ken Hollyoak

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1 Introduction

This report has been prepared on behalf of Clean TeQ Limited (Clean TeQ) to present the findings of an assessment of the road transport implications of the proposed modification to the approved Syerston Project (the Project).

The Project includes the establishment and operation of (**Figure 1-1**):

- nickel cobalt mine and processing facility (MPF);
- limestone quarry and processing facility (the limestone quarry);
- rail loading and unloading facility (the rail siding);
- natural gas pipeline;
- two water supply borefields and pipelines; and
- associated transport and infrastructure.

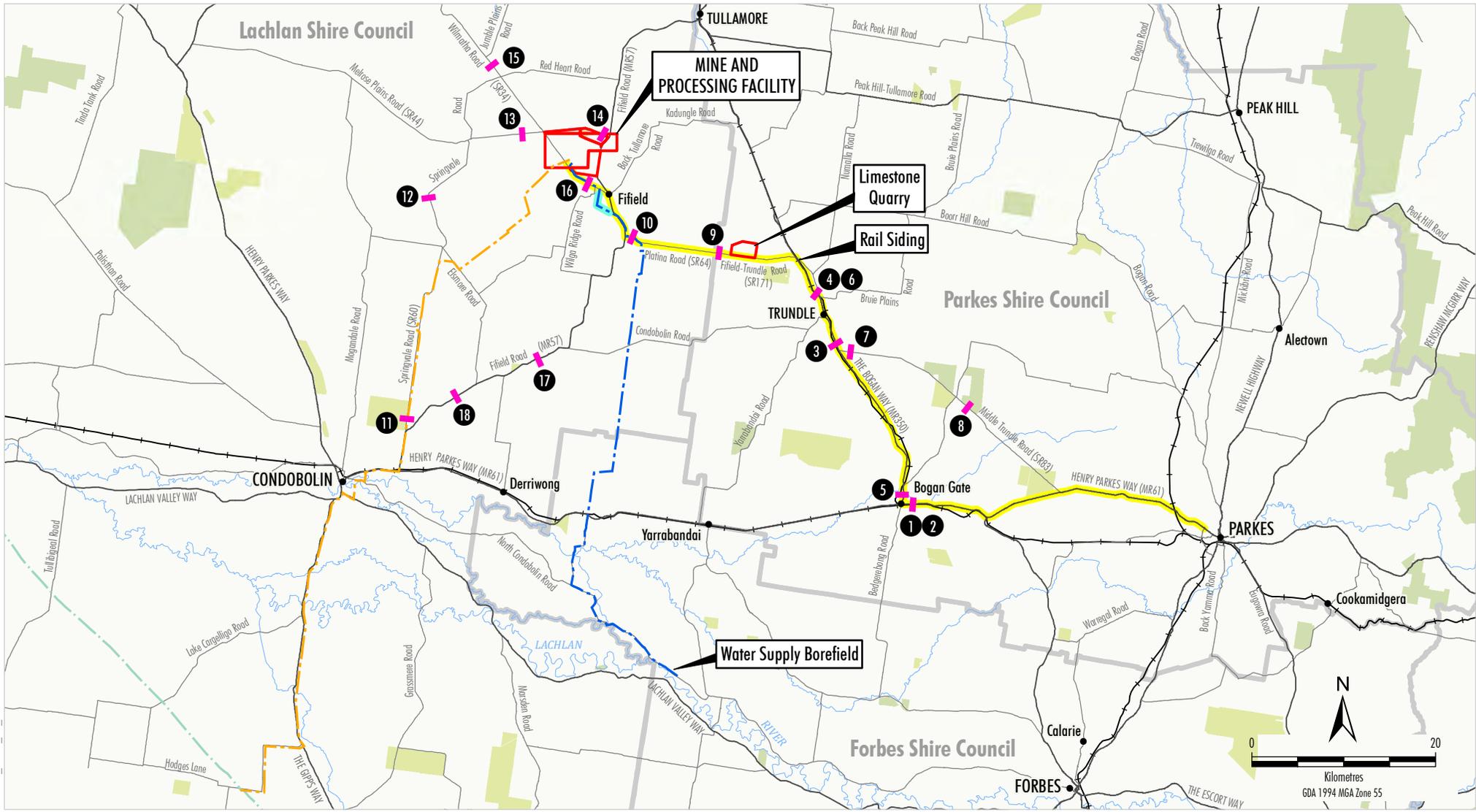
Clean TeQ is seeking approval for a modification (the Scandium Oxide Modification [the Modification]) to Development Consent (DA 374-11-00) for the Project under Section 75W of the New South Wales (NSW) *Environmental Planning & Assessment Act, 1979*.

The Modification would involve an initial scandium oxide focussed production phase (the Initial Production Phase) prior to refocusing on mixed nickel and cobalt precipitate production by developing the full Project with additional scandium oxide production (the Full Production Phase). The Initial Production Phase would be a smaller scale operation compared with the approved Project, and would include:

- preferentially mining scandium-rich areas of the Syerston deposit, within the approved MPF surface development area, at a run of mine (ROM) ore production rate of 100,000 tonnes per annum (tpa); and
- minor adjustments to the processing operations to allow for the production of approximately 80 tpa of scandium oxide and up to 1,000 tpa of nickel and cobalt metal equivalents as either sulphide or sulphate precipitate products.

The modified Project would transition to the Full Production Phase once favourable market conditions prevail for larger scale nickel cobalt scandium production. The Full Production Phase would generally be consistent with the approved Project.

This assessment considers the implications of the Modification on the operation of the road network, and reviews the requirements for road works, upgrades and financial contributions with the Modification.



CLU-15-01 - EA Mod - R1A - 2010

- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

- Heavy Vehicle Access Route
- Fifield Bypass
- Traffic Survey Location

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Fifield Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON PROJECT
 SCANDIUM OXIDE MODIFICATION

Regional Location and
 Traffic Survey Locations

Figure 1-1

2 Existing Road Transport Environment

2.1 Site Location

The MPF will be located near Fifield, approximately 80 kilometres (km) northwest of Parkes in Central NSW (Figure 1-1). The approved locations of the limestone quarry; rail siding; natural gas pipeline, two water supply borefields and pipelines; and associated infrastructure are shown on Figure 1-1.

2.2 Road Network

The road system in the region is presented in Figure 1-1 and briefly described below.

Henry Parkes Way (MR61E) forms part of Main Road 61 East, which provides an east-west link between Orange and Condobolin. It connects Parkes and Condobolin through Bogan Gate and Ootha, and is also known as Parkes-Condobolin Road. Henry Parkes Way typically has a single travel lane in each direction with gravel or grassed shoulders, and a speed limit of 100 kilometres per hour (km/h). It has centre and edge line marking and guidance posts. It is crossed by the Bogan Gate Tottenham Railway at a passive level crossing at Bogan Gate, and by the Parkes Narromine Railway at an active level crossing approximately 5 km west of Parkes.

The Bogan Way (MR350) is a Regional Road and forms part of Main Road 350, which extends from the Newell Highway at Forbes to Henry Parkes Way near Bogan Gate thence via Trundle and Kadungle to the Peak Hill-Tullamore Road (MR348) near Tullamore. The Bogan Way has a two lane sealed carriageway, with centre line marking and guidance posts. The road shoulder is unpaved and varies in width from 0 to 2 metres (m), with no edge linemarking. The speed limit is generally 100 km/h, and 50 km/h through Trundle and at the southern end in Bogan Gate. There is a 40 km/h school zone at the southern end of Trundle. The Bogan Way is crossed by the Bogan Gate Tottenham Railway at three passive control level crossings between Trundle and Bogan Gate. As a Regional Road, the NSW Roads and Maritime Services (RMS) provides financial assistance for its management.

Middle Trundle Road (SR83) runs northwest from Henry Parkes Way approximately midway between Parkes and Bogan Gate to The Bogan Way approximately 4 km south of Trundle. It is also known as Shire Road 83. The route between Parkes and Trundle along Middle Trundle Road is some 10 km shorter than via Bogan Gate. The intersections at each end of Middle Trundle Road are basic rural road T-intersections, without auxiliary lane treatments or channelisation. The intersection of Middle Trundle Road with The Bogan Way was constructed in 2013 and has some turning path deficiencies relating to B-doubles and B-triples, but is deemed suitable due to low volumes (Crossroads Civil Design, 2014). A central portion of Middle Trundle Road approximately 16 km long remains unsealed.

Fifield-Trundle Road (SR171)/Platina Road (SR64) is also known as Shire Road 171/Shire Road 64, and extends west from The Bogan Way approximately 6 km north of Trundle to Fifield Road approximately 5 km south of Fifield. The section of road in the Parkes Shire is Fifield-Trundle Road and the section of road in the Lachlan Shire is Platina Road. Fifield-Trundle Road typically has a 6.5 m wide formation with 6.0 m wide seal. Platina Road typically has a sealed surface approximately 4 m wide, with 1 m gravel shoulders. There is limited linemarking. The intersections at each end of Fifield-Trundle Road are basic rural T-intersections, without auxiliary lane treatments or channelisation.

Fifield Road (MR57N) is a Regional Road also known as Main Road 57 North, which runs northwards from Henry Parkes Way approximately 6 km east of Condobolin, through Fifield to Tullamore. It is crossed by the Parkes Narromine Railway just to the north of its intersection with Henry Parkes Way at an active level crossing, and by the Bogan Gate Tottenham Railway at a passive level crossing at Tullamore. It is a two lane sealed road with centre linemarking. The speed limit on Fifield Road is typically 100 km/h, and reduced to 50 km/h at Fifield. This portion of MR57 is a Regional Road, thus RMS provides financial assistance for its management.

Melrose Plains Road (SR44) runs east-west along the northern boundary of the MPF and is also known as Shire Road 44. It intersects with Fifield Road northeast of the MPF at a four way intersection. At the northwestern boundary of the MPF, Melrose Plains Road intersects with Wilmatha Road (Shire Road 34) at a four way intersection, and farther to the west, it intersects with (Shire Road 60) at two offset T-intersections, at which Melrose Plains Road traffic has priority. Melrose Plains Road is unsealed, and approximately 8 to 12 m wide, through flat terrain and has a speed limit of 100 km/h.

Wilmatha Road (SR34), also known as Shire Road 34, runs northwest from Fifield through the MPF site, and crosses Melrose Plains Road at the northwestern boundary of the MPF. It has an unsealed surface approximately 8 to 12 m wide and a speed limit of 100 km/h. The MPF access road will intersect with Wilmatha Road at an Austroads Type C intersection.

Springvale Road (SR60), or Shire Road 60, extends in a northerly direction from Fifield Road north of Henry Parkes Way, crossing Melrose Plains Road some 8 km west of the MPF. It has a speed limit of 100 km/h, and follows a generally straight alignment through flat terrain. It is a sealed road approximately 6 m wide with limited linemarking.

2.3 Heavy Vehicle Routes

The RMS website provides information on the enforceable network for all Restricted Access Vehicles (RAV) operating at General Mass Limits and Concessional Mass Limits. That interactive map provides the following information about use of the roads in the vicinity of the MPF by heavy vehicles:

- Lachlan Shire is an approved area for road trains and B-doubles. Lachlan Shire, Parkes Shire and Forbes Shire are approved areas for travel by vehicles up to 4.6 m high.
- Road trains and B-doubles up to 25 m long are permitted without specific conditions on Henry Parkes Way and Fifield Road.
- B-doubles up to 25 m long are permitted on The Bogan Way, and road trains are permitted at a maximum speed of 80 km/h.
- Road trains and B-doubles up to 25 m long are permitted on Middle Trundle Road at a maximum of 80 km/h, with some additional conditions as follows:
 - No road train access between sunset and sunrise.
 - No road train travel permitted between 7.30am and 9.00am, and between 3.00pm and 4.30pm on school days.
 - No B-double travel permitted between Henry Parkes Way and Five Chain Lane between 7.30am and 9.00am, and between 3.00pm and 4.30pm on school days.
 - During periods of wet weather, Parkes Shire Council is to be consulted regarding possible road closures.

2.4 Daily Traffic Volumes

Traffic volume data has been collated from data available from Lachlan Shire Council and Parkes Shire Council. Table 2.1 summarises average daily traffic volumes on routes in the region of the Project. The locations of the traffic count sites are shown on Figure 1-1.

Table 2.1: Daily Traffic Volumes (vehicles per day)

Site ^A	Road	Location	Date	Average Daily Traffic
1	Henry Parkes Way	East of Bogan Gate	Dec 2014	986
2	Henry Parkes Way	East of Bogan Gate	Nov 2014	1,024
3	The Bogan Way	North of Middle Trundle Road	Aug 2015	376
4	The Bogan Way	North of Trundle (South of Numulla Road)	Dec 2014	506
5	The Bogan Way	North of Henry Parkes Way	Nov 2014	467
6	The Bogan Way	North of Trundle	Oct 2014	479
7	Middle Trundle Road	East of The Bogan Way	Oct 2014	98
8	Middle Trundle Road	13 km Northwest of Henry Parkes Way	Sep 2014	93
9	Fifield-Trundle Road	At Parkes Shire Boundary	Sep-Nov 2015	85
10	Platina Road	East of Fifield Road	Jul 2010	54
11	Springvale Road	300 m North of Fifield Road	Jul 2010	26
12	Springvale Road	27 km North of Fifield Road	Feb-Mar 2014	21
13	Melrose Plains Road	2 km West of Wilmatha Road	Dec 2010-Jan 2011	21
14	Melrose Plains Road	West of Fifield Road	May-Jun 2010	8
15	Wilmatha Road	North of Red Heart Road	Dec 2010-Jan 2011	17
16	Wilmatha Road	West of Wilga Ridge Road	Nov 2010	26
17	Fifield Road	22 km North of Henry Parkes Way	May-Jun 2013	123
18	Fifield Road	North of Raynella Road	Feb-Apr 2014	234

Sources: Parkes Shire Council and Lachlan Shire Council

^A Refer to Figure 1-1

2.5 Peak Hour Volumes

Table 2.2 summarises the peak volumes recorded in any one hour over the average weekdays, noting that the data indicates that weekdays are typically busier than weekend days.

The data indicates that at most locations, the busiest period occurs in the mid to late afternoon, and that peak hourly volumes are generally low on the relevant roads. Henry Parkes Way is the busiest road, with a peak volume of 90 vehicles per hour, while The Bogan Way carries around 35 to 48 vehicles per hour, and Fifield Road fewer than 20 vehicles per hour.

Table 2.2: Average Weekday Peak Hourly Traffic Volumes (vehicles per hour)

Site ^A	Road	Location	Date	Peak Hour Start	Peak Hour Volume
1	Henry Parkes Way	East of Bogan Gate	Dec 2014	15:00	88
2	Henry Parkes Way	East of Bogan Gate	Nov 2014	14:00	90
3	The Bogan Way	North of Middle Trundle Road	Aug 2015	15:00	35
4	The Bogan Way	North of Trundle (South of Numulla Road)	Dec 2014	16:00	47
5	The Bogan Way	North of Henry Parkes Way	Nov 2014	14:00	44
6	The Bogan Way	North of Trundle	Oct 2014	9:00	48
7	Middle Trundle Road	East of The Bogan Way	Oct 2014	15:00	11
8	Middle Trundle Road	13 km Northwest of Henry Parkes Way	Sep 2014	16:00	8
9	Fifield-Trundle Road	At Parkes Shire Boundary	Sep-Nov 2015	16:00	7
10	Platina Road	East of Fifield Road	Jul 2010	17:00	6
11	Springvale Road	300 m North of Fifield Road	Jul 2010	17:00	3
12	Springvale Road	27 km North of Fifield Road	Feb-Mar 2014	8:00	3
13	Melrose Plains Road	2 km West of Wilmatha Road	Dec 2010-Jan 2011	13:00	2
14	Melrose Plains Road	West of Fifield Road	May-Jun 2010	10:00	1
15	Wilmatha Road	North of Red Heart Road	Dec 2010-Jan 2011	17:00	2
16	Wilmatha Road	West of Wilga Ridge Road	Nov 2010	11:00	3
17	Fifield Road	22 km North of Henry Parkes Way	May-Jun 2013	16:00	12
18	Fifield Road	North of Raynella Road	Feb-Apr 2014	16:00	19

^A Refer to Figure 1-1

Sources: Parkes Shire Council and Lachlan Shire Council, peak volume recorded over each survey period

2.6 Traffic Composition

The traffic volume data provided by Parkes Shire Council and Lachlan Shire Council also provides information on the types of vehicles using each of the routes. Table 2.3 presents the proportions of light, rigid and articulated vehicles at each of the surveyed locations. Light vehicles include motorcycles, cars, vans, 4WDs, and utes (including those towing a trailer). Rigid heavy vehicles include single unit trucks and buses with two to four axles and articulated vehicles includes semi-trailers, rigid trucks with trailers, B-doubles and road trains (where permissible).

Table 2.3 demonstrates that the proportional contribution of heavy vehicles to total traffic varies significantly on the surveyed roads, at between 6.8 percent (%) (Middle Trundle Road East of The Bogan Way) and 44.4 % (Springvale Road 27 km North of Fifield Road) of total traffic. It is noted however that on both these routes, background traffic volumes were low, so the number of heavy vehicles on an average day is small.

Table 2.3: Traffic Composition (percent of total traffic)

Site ^A	Road	Location	Date	Light	Rigid	Articulated
1	Henry Parkes Way	East of Bogan Gate	Dec 2014	80.0	14.9	5.1
2	Henry Parkes Way	East of Bogan Gate	Nov 2014	79.6	9.0	11.4
3	The Bogan Way	North of Middle Trundle Road	Aug 2015	85.6	7.3	7.0
4	The Bogan Way	North of Trundle (South of Numulla Road)	Dec 2014	83.9	10.9	5.2
5	The Bogan Way	North of Henry Parkes Way	Nov 2014	80.0	7.6	12.5
6	The Bogan Way	North of Trundle	Oct 2014	67.1	25.3	7.6
7	Middle Trundle Road	East of The Bogan Way	Oct 2014	93.2	4.5	2.3
8	Middle Trundle Road	13 km North of Henry Parkes Way	Sep 2014	90.9	8.3	0.7
9	Fifield-Trundle Road	At Parkes Shire Boundary	Sep-Nov 2015	72.7	20.6	6.7
10	Platina Road	East of Fifield Road	Jul 2010	81.3	12.3	6.4
11	Springvale Road	300 m North of Fifield Road	Jul 2010	94.3	5.2	0.5
12	Springvale Road	27 km North of Fifield Road	Feb-Mar 2014	55.6	38.4	6.0
13	Melrose Plains Road	2 km West of Wilmatha Road	Dec 2010- Jan 2011	60.9	33.8	5.3
14	Melrose Plains Road	West of Fifield Road	May-Jun 2010	85.6	7.2	7.2
15	Wilmatha Road	North of Red Heart Road	Dec 2010- Jan 2011	78.2	12.6	9.2
16	Wilmatha Road	West of Wilga Ridge Road	Nov 2010	68.7	6.6	24.7
17	Fifield Road	22 km North of Henry Parkes Way	May-Jun 2013	72.3	9.9	17.8
18	Fifield Road	North of Raynella Road	Feb-Apr 2014	61.1	11.5	27.4

^ARefer to Figure 1-1

Sources: Parkes Shire Council and Lachlan Shire Council, note totals may not add to 100% due to rounding.

2.7 Road Safety

Road crash data was obtained from RMS for the most recent five year period available on the main Project access routes. The data covers finalised data for the period from 1 January 2010 to 31 December 2014, and provisional data for the period to 11 November 2015. Data during the provisional period may be incomplete and subject to change, noting that the provisional data includes four crashes in the assessment which follows. The data includes those crashes which conform to the national guidelines for reporting and classifying road vehicle crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash data was obtained and reviewed for the following roads:

- Henry Parkes Way (MR61) between Condobolin and Parkes;
- The Bogan Way (MR350) between Bogan Gate and Tullamore;
- Fifield Road (MR57 North) between Henry Parkes Way and Tullamore;
- Middle Trundle Road (SR83) between The Bogan Way and Henry Parkes Way;
- Springvale Road (SR60) between Fifield Road and Wilmatha Road;
- Wilmatha Road (SR34) between Fifield and Springvale Road/Red Heart Road;
- Platina Road (SR64)/Fifield-Trundle Road (SR171) between Fifield Road and The Bogan Way; and
- Melrose Plains Road (SR44) between Springvale Road and The Bogan Way.

Table 2.4 summarises the number and general types of crashes which occurred on the sections of road under consideration.

Table 2.4: Reported General Crash Types on Project Access Routes (January 2010 to November 2015)

Road	Pedestrian	Multiple Vehicles					Single Vehicle			Other
		Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Henry Parkes Way Condobolin to Parkes	-	-	-	-	-	-	5	19 ^A	7	1
The Bogan Way Bogan Gate to Tullamore	-	1	-	-	-	3	1	2	2	-
Fifield Road Henry Parkes Way to Tullamore	-	-	-	-	-	-	-	2	2	-
Middle Trundle Road The Bogan Way to Henry Parkes Way	-	-	-	-	-	-	1	10 ^B	2 ^B	-
Springvale Road Fifield Road to Wilmatha Road	-	-	-	-	-	-	-	-	-	-
Wilmatha Road Springvale Road to Fifield Road	-	-	-	-	-	-	-	-	-	-
Platina Road/Fifield-Trundle Road Fifield Road to The Bogan Way	-	-	-	-	-	-	-	-	-	-
Melrose Plains Road Springvale Road to The Bogan Way	-	-	-	-	-	-	-	-	-	-
Total Crashes by Type	-	1	-	-	-	3	7	33	13	1
Total People Injured	-	1	-	-	-	1	4	19	12	1
Total People Killed	-	-	-	-	-	-	-	3	1	-

^AIncludes two fatal crashes

^BIncludes one fatal crash

Over the five years and routes reviewed, a total of 58 crashes occurred on the main Project access routes, resulting in four fatalities and 38 people being injured. No reported crashes occurred on Springvale Road, Wilmatha Road, Platina Road, Fifield-Trundle Road, or Melrose Plains Road.

Table 2.4 demonstrates that over all the roads investigated, the most common types of crashes involved single vehicles leaving the carriageway, known as run-off-road (ROR) crashes, which made up 79 % of the reported crashes in Table 2.4, 100 % of people killed, and 82 % of injured people. This is consistent with Austroads (2015), which found that in rural road environments in Australia, off-path crashes were the most likely. They were also associated with the greatest numbers of fatalities, however on the routes investigated here, the fatalities occurred only in multi-vehicle crashes. ARRB (2011) states that known causes of ROR crashes include:

- driver behaviours such as speed, inattention, avoidance manoeuvres, errant vehicles;
- driver impairment including fatigue, alcohol, drugs, mood state;
- road conditions such as horizontal alignment, shoulder deficiencies, slippery surface, poor delineation, damaged surfaces;
- vehicle failure; and
- environmental conditions such as rain, fog, snow, livestock or native fauna.

The road safety history of the various roads has been reviewed with regard to each road's crash exposure, which considers the rate at which crashes occur in crashes per vehicle kilometres travelled (VKT). One VKT is equivalent to one vehicle travelling a distance of 1 km, or alternatively two vehicles travelling for a distance of half a kilometre (and so on). The crash exposure increases as the length of a trip increases, and as traffic volumes increase. This is a general measure of the performance of the roads, and enables a comparison to be made between the relative safety of roads. RTA (2004) indicates that based on a review of data on 36 classified roads in NSW, undivided two lane rural roads have an average crash rate of 32.8 crashes per 100 million VKT, of which 28.6 crashes per 100 million VKT were non-intersection crashes, and 4.2 crashes per 100 million VKT were intersection crashes. The overall crash rate was higher where sealed shoulders of less than 1.0 m width were provided, at 38.1 crashes per 100 million VKT, and lower where sealed shoulders greater than 1.0 m width were provided, at 28.5 crashes per million VKT.

Table 2.5 presents the estimated average daily traffic (ADT) for each of the route sections described in Table 2.4, and the calculated crash rates for those routes.

Table 2.5: Crash Rates on Project Access Routes January 2010 to November 2015

	Distance (km)	Estimated ADT	MVKT	Number of Crashes	Crashes per 100 MVKT
Henry Parkes Way Condobolin to Parkes	100	1,000	213.5	32	15.0
The Bogan Way Bogan Gate to Tullamore	59	500	63.0	9	14.3
Fifield Road Henry Parkes Way to Tullamore	73	230	35.8	4	11.2
Middle Trundle Road The Bogan Way to Henry Parkes Way	40	100	8.5	13	152.2

ADT is based on seven day average volumes from recent surveys (Section 2.4)

MVKT = million vehicle kilometres travelled

Comparison with the RTA (2004) average crash rate of 32.8 crashes per 100 million VKT on two lane rural roads indicates that the overall crash rate on Henry Parkes Way and The Bogan Way are below average. The rate on Middle Trundle Road is well above that average, however direct comparison should not be drawn, as Middle Trundle Road has unsealed sections.

A detailed review of the crashes on each of these roads is provided in the following sections.

2.7.1 Middle Trundle Road

The details of the crash history of Middle Trundle Road between January 2010 and November 2015 are summarised in Table 2.6.

Table 2.6: Middle Trundle Road Crash Summary January 2010 to November 2015

	Pedestrian	Multiple Vehicles					Single Vehicle			Other
		Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Total Crashes	-	-	-	-	-	-	1	10	2	-
Road Surface Condition										
Dry Road	-	-	-	-	-	-	1	9	2	-
Wet Road	-	-	-	-	-	-	-	1	-	-
Weather Conditions										
Fine	-	-	-	-	-	-	1	10	2	-
Overcast	-	-	-	-	-	-	-	-	-	-
Raining	-	-	-	-	-	-	-	-	-	-
Vehicle Type										
Motorcycle	-	-	-	-	-	-	1	1	-	-
Car, Station Wagon, 4WD, Van	-	-	-	-	-	-	-	7	2	-
Light or Large Truck or Bus	-	-	-	-	-	-	-	2	-	-
Articulated Vehicle	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-
Severity of Crash										
Fatal	-	-	-	-	-	-	-	1	1	-
Injury	-	-	-	-	-	-	1	5	1	-
Non-injury	-	-	-	-	-	-	-	4	-	-
People Killed or Injured^A										
Killed	-	-	-	-	-	-	-	1	1	-
Injured	-	-	-	-	-	-	-	3	-	-
Factors^B										
Alcohol	-	-	-	-	-	-	-	-	1	-
Fatigue	-	-	-	-	-	-	-	4	-	-
Speed	-	-	-	-	-	-	-	-	2	-
None	-	-	-	-	-	-	1	6	-	-

^A Note this reports the number of people injured or killed not the number of accidents resulting in injury or fatalities

^B Factors considered to have contributed to the crash, more than one factor can be nominated for a single crash

Two fatal crashes occurred along Middle Trundle Road, both of which occurred in 2011 and involved loss of control of a single vehicle in fine weather on a dry road surface. One occurred in darkness at 12:30am and speed and alcohol were nominated as contributing factors. The other occurred in the late afternoon at 4:20pm and fatigue was nominated as a contributing factor.

2.7.2 Henry Parkes Way

The details of the crash history of Henry Parkes Way between Condobolin and Parkes between January 2010 and November 2015 are summarised in Table 2.7.

Table 2.7: Henry Parkes Way Crash Summary January 2010 to November 2015

	Pedestrian	Multiple Vehicles					Single Vehicle			Other
		Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Total Crashes	-	-	-	-	-	-	5	19	7	1
Road Surface Condition										
Dry Road	-	-	-	-	-	-	4	14	7	1
Wet Road	-	-	-	-	-	-	1	5	-	-
Weather Conditions										
Fine	-	-	-	-	-	-	4	15	7	1
Overcast	-	-	-	-	-	-	-	3	-	-
Raining	-	-	-	-	-	-	1	1	-	-
Vehicle Type										
Motorcycle	-	-	-	-	-	-	-	1	1	-
Car, Station Wagon, 4WD, Van	-	-	-	-	-	-	2	10	2	1
Light or Large Truck or Bus	-	-	-	-	-	-	1	6	4	-
Articulated Vehicle	-	-	-	-	-	-	-	2	-	1
Other	-	-	-	-	-	-	2	-	-	-
Severity of Crash										
Fatal	-	-	-	-	-	-	-	2	-	-
Injury	-	-	-	-	-	-	2	10	5	1
Non-injury	-	-	-	-	-	-	3	7	2	-
People Killed or Injured^A										
Killed	-	-	-	-	-	-	-	2	-	-
Injured	-	-	-	-	-	-	3	10	6	1
Factors^B										
Alcohol	-	-	-	-	-	-	-	3	3	-
Fatigue	-	-	-	-	-	-	-	11	1	-
Speed	-	-	-	-	-	-	-	-	5	-
None	-	-	-	-	-	-	5	7	1	1

^A Note this reports the number of people injured or killed not the number of accidents resulting in injury or fatalities

^B Factors considered to have contributed to the crash, more than one factor can be nominated for a single crash

Two fatal crashes occurred along this section of Henry Parkes Way, one between Fifield Road and Condobolin, and the other to the west of Bogan Gate. Both were single vehicle crashes involving a light truck in fine weather on a dry road, and alcohol was nominated as a factor in both.

2.7.3 The Bogan Way

The details of the crash history of The Bogan Way between Bogan Gate and Tullamore between January 2010 and November 2015 are summarised in Table 2.8.

Table 2.8: The Bogan Way Crash Summary January 2010 to November 2015

	Pedestrian	Multiple Vehicles					Single Vehicle			Other
		Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Total Crashes	-	1	-	-	-	3	1	2	2	-
Road Surface Condition										
Dry Road	-	1	-	-	-	2	-	2	1	-
Wet Road	-	-	-	-	-	1	1	-	1	-
Weather Conditions										
Fine	-	1	-	-	-	2	1	2	1	-
Overcast	-	-	-	-	-	1	-	-	-	-
Raining	-	-	-	-	-	-	-	-	1	-
Vehicle Type										
Motorcycle	-	-	-	-	-	-	-	-	-	-
Car, Station Wagon, 4WD, Van	-	-	-	-	-	2	-	1	1	-
Light or Large Truck or Bus	-	2	-	-	-	3	1	-	1	-
Articulated Vehicle	-	-	-	-	-	1	-	1	-	-
Other	-	-	-	-	-	-	-	-	-	-
Severity of Crash										
Fatal	-	-	-	-	-	-	-	-	-	-
Injury	-	1	-	-	-	1	-	1	1	-
Non-injury	-	-	-	-	-	2	1	1	1	-
People Killed or Injured^A										
Killed	-	-	-	-	-	-	-	-	-	-
Injured	-	1	-	-	-	1	-	1	1	-
Factors^B										
Alcohol	-	-	-	-	-	-	-	-	-	-
Fatigue	-	-	-	-	-	-	-	1	1	-
Speed	-	-	-	-	-	-	-	-	2	-
None	-	1	-	-	-	3	1	1	-	-

^A Note this reports the number of people injured or killed not the number of accidents resulting in injury or fatalities

^B Factors considered to have contributed to the crash, more than one factor can be nominated for a single crash

No fatal crashes occurred along this section of The Bogan Way over the period investigated.

2.7.4 Fifield Road

The details of the crash history of Fifield Road between Henry Parkes Way and Tullamore between January 2010 and November 2015 are summarised in Table 2.9.

Table 2.9: Fifield Road Crash Summary January 2010 to November 2015

	Pedestrian	Multiple Vehicles					Single Vehicle			Other
		Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Total Crashes	-	-	-	-	-	-	-	2	2	-
Road Surface Condition										
Dry Road	-	-	-	-	-	-	-	2	2	-
Wet Road	-	-	-	-	-	-	-	-	-	-
Weather Conditions										
Fine	-	-	-	-	-	-	-	1	2	-
Overcast	-	-	-	-	-	-	-	1	-	-
Raining	-	-	-	-	-	-	-	-	-	-
Vehicle Type										
Motorcycle	-	-	-	-	-	-	-	-	-	-
Car, Station Wagon, 4WD, Van	-	-	-	-	-	-	-	1	1	-
Light or Large Truck or Bus	-	-	-	-	-	-	-	1	1	-
Articulated Vehicle	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-
Severity of Crash										
Fatal	-	-	-	-	-	-	-	-	-	-
Injury	-	-	-	-	-	-	-	-	2	-
Non-injury	-	-	-	-	-	-	-	2	-	-
People Killed or Injured^A										
Killed	-	-	-	-	-	-	-	-	-	-
Injured	-	-	-	-	-	-	-	-	2	-
Factors^B										
Alcohol	-	-	-	-	-	-	-	-	-	-
Fatigue	-	-	-	-	-	-	-	-	1	-
Speed	-	-	-	-	-	-	-	-	1	-
None	-	-	-	-	-	-	-	2	2	-

^A Note this reports the number of people injured or killed not the number of accidents resulting in injury or fatalities

^B Factors considered to have contributed to the crash, more than one factor can be nominated for a single crash

No fatal crashes occurred along this section of Fifield Road over the period investigated.

2.8 Road Network Operations

2.8.1 Road Capacity

The theoretical capacity of a two way two lane road under ideal conditions is 3,200 passenger cars per hour (Austroads, 2013a). A two lane two way road is the most basic road with a single stream of traffic travelling in each direction, such that vehicles are required to cross to the opposing carriageway to overtake. The capacity of the sealed two lane two way roads in the vicinity of the Project would be expected to be somewhat less than the theoretical ideal, as the latter assumes no restrictive roadway, terrain or traffic conditions. Taking into account the proportion of heavy vehicles (Table 2.3), the peak hourly flows on the road network (Table 2.2) remain very low in comparison to the theoretical capacity, and a detailed assessment of midblock roadway capacity of the roads in the vicinity of the Project is not warranted.

The ideal road conditions assumed for general road capacity above assume that the road is sealed. The capacity or desirable traffic range carried on unsealed roads differs from that of sealed roads, as the quality of the road surface can vary significantly, and the type of surface can have a major influence on the speed at which drivers travel and how close behind another vehicle that drivers will choose to travel. The desirable traffic range can also vary according to the weather conditions.

Middle Trundle Road contains a length of gravel roadway, and currently carries some 100 vehicles per day, which is the lower threshold for Class U2 unsealed roads (Austroads, 2009). Wilmatha Road is unsealed and carries some 26 vehicles per day, which is consistent with the volume range for Class U3 unsealed roads, which carry between 20 and 100 vehicles per day with a travel speed of 80 km/h (not necessarily equivalent to the posted speed limit).

Austroads (2009) suggests that for a Class U2 road, a mostly all-weather formed pavement with some drainage, made up of two pavement layers over subgrade is appropriate, with granular or modified materials adopted in the wearing course. Dust suppressants may be incorporated in maintenance strategies of such roads. Class U2 roads carry volumes between 100 and 200 vehicles per day and between 10 and 20 % heavy vehicles (heavy being Class 4 and above), with a traffic speed of 100 km/h on two travel lanes with shoulders. Typical Class U2 roads are main links between communities, national parks, recreation areas, and haul roads.

Nevertheless, the existing volumes on the unsealed portion of Middle Trundle Road and Wilmatha Road remain very low, with the road surface and weather conditions having a greater impact on travel behaviour than the potential for being delayed by other vehicles.

2.8.2 Intersection Operation

At unsignalised intersections with minor roads, where there are relatively low volumes of through and turning vehicles, capacity considerations are usually not significant, and detailed analysis of capacity is not warranted. As a guide, at volumes below the following combinations of maximum hourly volumes at a cross intersection with a two lane two way road, capacity analysis is not warranted:

- major road 400 vehicles per hour, minor road 250 vehicles per hour;
- major road 500 vehicles per hour, minor road 200 vehicles per hour; and
- major road 650 vehicles per hour, minor road 100 vehicles per hour.

The intersections in the vicinity of the Project are typically T-intersections and so have fewer potentially conflicting movements than a cross intersection. Comparison between these threshold volumes and the peak hourly volumes on the key roads (Table 2.2) indicates that the existing traffic volumes on all roads are well below the threshold volumes above, and as such, there is no capacity concerns regarding the operation of intersections in the vicinity of the Project.

3 Approved Project and Modification

3.1 Approved Project Description

The approved Project has not commenced construction or operation. The Project includes the establishment and operation of:

- a MPF;
- a limestone quarry;
- a rail siding;
- a natural gas pipeline;
- two water supply borefields and pipelines; and
- associated transport and infrastructure.

The Project is approved to operate 24 hours per day (the limestone quarry may operate from 7:00am to 5:00pm, with truck loading permitted 24 hours), seven days per week for a period of 21 years after commencement of mining operations.

The Project was originally approved in 2001, and a modification was approved in 2005 (the 2005 Modification), which increased the nickel cobalt ore processing rate, removed the metals refinery from the processing facility, and increased the limestone quarry extraction rate. A second modification was approved in 2006 to allow for changes to the water supply borefield.

3.2 Project Road Transport Requirements

A Road Transport Assessment was prepared by Masson Wilson Twiney (MWT) (2000) for the Environmental Impact Statement (EIS) for the Project. The study assessed the road transport implications of the Project during both operational and construction phases. A Traffic Report was later prepared (MWT, 2005) which assessed the traffic and transport implications of the 2005 Modification. The road transport assessments assumed that construction of the Fifield Bypass would occur, which would allow “through” traffic including that travelling to and from the MPF to bypass of the village of Fifield.

The approved Project road transport requirements outlined in MWT (2005) are described below.

3.2.1 Approved Deliveries and Product Transport

Table 3.1 summarises the approved Project deliveries and product transport.

The rail loading and unloading facility north of Trundle will allow for the transport of various raw materials and products to and from the Project by rail, with back loading of products from the MPF by rail. From the rail siding, road trains and B-doubles will transport containers of raw materials and nickel-cobalt sulphide precipitate to and from the MPF, travelling along The Bogan Way (MR350), Fifield-Trundle Road (SR171), Fifield Road (MR57 North), the Fifield Bypass, and Wilmatha Road (SR34).

Trucks transporting limestone from the quarry on Fifield-Trundle Road (SR64) will use the same road trains and B-doubles used for sulphur transport, and will travel along Fifield-Trundle Road (SR171)/Platina Road (SR64), Fifield Road (MR57 North), the Fifield Bypass and Wilmatha Road (SR34).

Table 3.1: Currently Approved Project Deliveries and Product Transport

Component	Currently Approved Project
Product	53,000 tpa mixed sulphide precipitate
Process Consumables	
Sulphur	260,000 tpa
Limestone	790,000 tpa
Flocculant	1,100 tpa
Magnesium oxide	-
Caustic soda	100 tpa
Extractant	-
Modifier	-
Diluent	-
Production of Reagents	
Sulphuric acid	700,000 tpa
Hydrogen sulphide	88 tpd
Hydrogen	5 tpd
Nitrogen	10% increase in production
Oxygen	-

Trucks transporting miscellaneous items between local retailers and the MPF will use Main Road 57 North from Condobolin, the Fifield Bypass and Shire Road 34 (SR34). Magnesia will be sourced from Young, and transported in bulk pressure B-doubles, travelling from Young via Grenfell, Forbes, Parkes, Bogan Gate, and Trundle. Fuel and lubricants will be transported by 19 m long B-double tankers from Sydney, or smaller tankers from Parkes.

Nickel and cobalt product will be transported by backloading the containers bringing sulphur to the MPF, thus delivery of product will generate no additional road or rail movements.

3.2.2 Approved Employee Traffic

The assessment of the approved Project (MWT, 2005) found that the workforce will generate 225 vehicle trips on a typical weekday. The residential distribution of the workforce was assumed to be:

- 65.5% Parkes;
- 2.5% Trundle;
- 2.0% Tullamore;
- 29.0% Condobolin;
- 0.5% Bogan Gate; and
- 0.5% Ootha.

3.2.3 Approved Other Project Traffic

Other traffic visiting the MPF during its operational phase will include deliveries of daily consumables, locally sourced spare parts and equipment, maintenance contractors, mine staff visiting off-site facilities, regulating inspectors and general visitors. MWT (2000) assumed a further 100 vehicle movements per day to accommodate the additional traffic, and the modification assessment reduced this to 75 vehicle movements per day. This traffic would occur mainly between 7:00am and 6:00pm.

MWT (2000 and 2005) assumed that 90 % of the other Project traffic would travel to and from the Parkes region, and 10 % towards the Condobolin region. Vehicles travelling to and from Parkes will use Henry Parkes Way (MR61E), The Bogan Way (MR 350), Fifield-Trundle Road (SR171), Fifield Road (MR57 Nth), the Fifield Bypass and Wilmatha Road (SR34). Vehicles travelling to and from Condobolin will use Fifield Road, the Fifield Bypass and Wilmatha Road (SR34).

3.2.4 Approved Total Traffic

Table 3.2 summarises the average daily traffic volumes anticipated to be generated by the approved Project, based on the assessment undertaken by MWT (2005). Employees were assumed to travel in light vehicles, deliveries were assumed to be transported in heavy vehicles, and “other” trips were assumed to be half light vehicles and half heavy vehicles.

Table 3.2: Approved Project Average Daily Traffic (vehicles per day)

Site ^A	Road	Location	Workers Light	Deliveries Heavy	Other Light	Other Heavy	Total
A	Henry Parkes Way	East of Bogan Gate	0	0	0	34	34
B		East of Middle Trundle Road	147	0	34	34	215
C	The Bogan Way	North of Henry Parkes Way	1	0	0	34	35
D		North of Middle Trundle Road	148	0	34	34	216
E		North of Trundle	154	34	34	34	256
F	Fifield Road	North of Henry Parkes Way	65	45	4	4	118
G		North of Fifield-Trundle Road	220	169	38	38	465
H		North of Wilmatha Road	5	0	0	0	5
I	Middle Trundle Road	East of The Bogan Way	147	0	34	0	181
J	Fifield-Trundle Road	West of The Bogan Way	154	34	34	34	256
K	Platina Road	East of Fifield Road	155	124	34	34	347
L	Wilmatha Road	West of Fifield Road	225	169	38	38	470
M	MPF Access Road	East of Wilmatha Road	225	169	38	38	470

^A Refer to Figure 3-1
Source MWT (2005)

The results demonstrate that on an average day, the Project is expected to generate 470 vehicles trips per day, of which 263 vehicles per day will be light vehicles and 207 vehicles per day will be heavy vehicles.

3.3 Project Development Consent Conditions

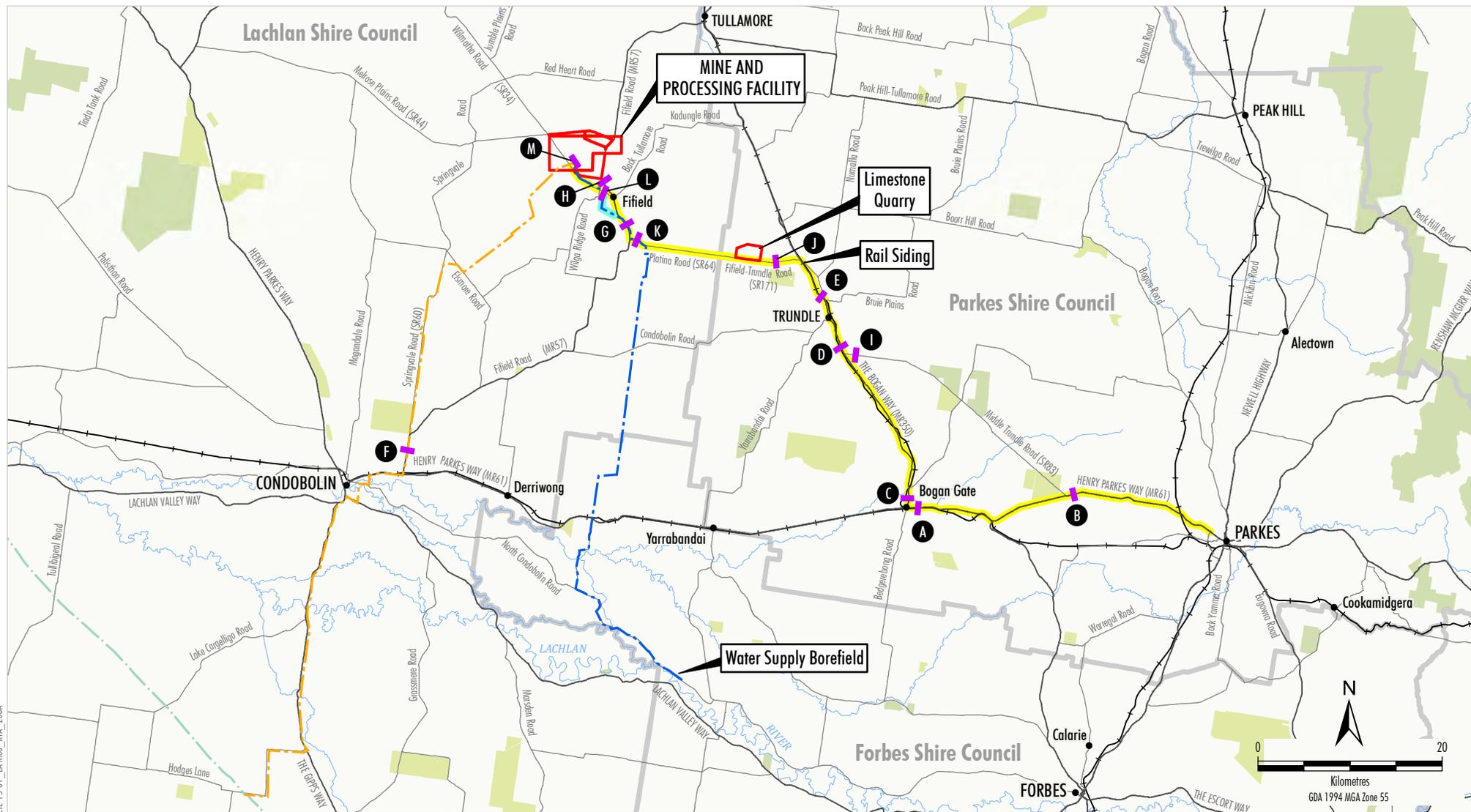
Conditions 7.2 to 7.6, Schedule 2 of Development Consent (DA 374-11-00) include requirements for road works and upgrades, road safety audits and associated financial contributions. These conditions were not altered following approval of the 2005 Modification.

3.4 The Modification

The Modification would involve an initial scandium oxide focussed production phase (the Initial Production Phase) prior to refocusing on mixed nickel and cobalt precipitate production by developing the full Project (the Full Production Phase). The Initial Production Phase would be a smaller-scale operation compared to the approved Project and would include:

- preferentially mining scandium-rich areas of the Syerston deposit, within the approved MPF surface development area, at a ROM ore production rate of 100,000 tpa; and
- minor adjustments to the processing operations to allow for the production of approximately 80 tpa of scandium oxide and up to 1,000 tpa of nickel and cobalt metal equivalents as either sulphide or sulphate precipitate products.

The modified Project would transition to the Full Production Phase once favourable market conditions prevail for a larger nickel cobalt scandium operation. The Full Production Phase would generally be consistent with the approved Project.



CLC-15-01 - EA Mod - RTA - 206A

- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline
 - Heavy Vehicle Access Route
 - Fifield Bypass
 - Traffic Forecast Location

Source: Black Range Minerals (2000);
NSW Department of Industry (2015);
NSW Land & Property Information (2015)

Note: The Fifield Bypass, Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON NICKEL COBALT PROJECT
SCANDIUM OXIDE MODIFICATION

Traffic Forecast Locations

Figure 3-1

3.5 Road Transport Aspects of the Modification

Table 3.3 summarises a comparison between road transport-related aspects of the Project as approved and with the Modification.

Table 3.3: Comparison of Road Transport Related Aspects of Approved Project and Modification

Project Component	Approved Project (Full Production Phase)	Modification (Initial Production Phase)
Hours of Operation	24 hours per day 7 days per week	Unchanged for processing plant, mining on campaign basis only, 24 hours per day, 7 days per week
Processing Plant Feed Rate	2.5 Mtpa	100,000 tpa
Product	53,000 tpa mixed sulphur precipitate	Up to 80 tpa scandium oxide Up to 1,000 tpa of nickel and cobalt metal equivalents as either sulphide or sulphate precipitate products
Key Process Consumables	260,000 tpa sulphur 790,000 tpa limestone 1,100 tpa flocculant 100 tpa caustic soda minor reagents	30,000 tpa sulphuric acid up to 25,000 tpa limestone minor reagents
Employees	300	45

The Modification proposes the production of scandium oxide as an Initial Production Phase to the Project, thus in the Full Production Phase, road transport conditions would be expected to remain as assessed for the approved Project (2005 Modification).

Similar to the approved Project, the Modification would generate road traffic associated with the movement of the workforce to and from the MPF, the delivery of raw materials and transport of product to and from the site, and other miscellaneous vehicle traffic associated with the mining activity. The main differences would be that the level of activity during the Initial Production Phase would be significantly lower than with the approved Project, and that the approved limestone quarry and rail siding would not be constructed during the Initial Production Phase.

Given the significantly lower level of activity during the Initial Production Phase, it is proposed that the Fifield Bypass not be constructed for the Initial Production Phase. The requirement for the Fifield Bypass would be reviewed prior to the commencement of the Full Production Phase (Section 4.5).

Traffic generation during the Full Production Phase would generally be consistent with the approved Project.

4 Modification Traffic Generation

The Modification would result in a change in Project traffic generation during the Initial Production Phase. During the Full Production Phase, the Modification would not change the traffic generated from Project. This section therefore focuses on the Initial Production Phase.

4.1 Initial Production Phase Employee Traffic

A workforce of 45 employees would be required during the Initial Production Phase.

The previous assessments (MWT, 2000 and 2005) estimated the employee-related traffic generation of the Project based on the characteristics of the Cadia Mine near Orange, and assumptions regarding shift times and roster arrangements at the Project. Day shift employees at the Cadia Mine travelled with an average of 1.4 people per vehicle, while night shift employees travelled with an average of 1.2 people per vehicle.

Conservatively, it is assumed for the purpose of this assessment that employees would travel with an average of 1.0 people per vehicle, and that all employees would be present on site each day. On this basis, the 45 employees would generate 90 vehicle trips on the surrounding road network each day. These assumptions will tend to overestimate the traffic generated by employees on a typical day as it does not account for workers being absent due to illness, or being rostered off.

Generally consistent with previous assessments, Clean TeQ has advised that it anticipates that two-thirds of employees would reside in Parkes, and one-third would reside in Condobolin. The resulting vehicle trips generated by the workforce are summarised in Table 4.1.

Table 4.1: Estimated Employee Trip Distribution

Location	Percent of Employees	Employees	Daily Vehicle Trips
Parkes	67%	30	60
Condobolin	33%	15	30
Total	100%	45	90

It is noted that drivers travelling between Parkes and the Fifield area have a choice between using Middle Trundle Road or continuing along Henry Parkes Way to The Bogan Way. The route via Middle Trundle Road is shorter, but contains some unsealed road, while the alternative route is somewhat longer but is fully sealed. The level of use of Middle Trundle Road by Project traffic would largely depend on the condition of the unsealed section of that route. Regularly maintained, it would allow travel at around 80 km/h and would be the faster route. After rain or if maintenance is poor, travel would be slower and the route less likely to be used. This assessment has conservatively assumed a worst case for impacts on Middle Trundle Road, in which all employee traffic between Parkes and the Project would use Middle Trundle Road. In practice, it is expected that some traffic would use the sealed route along Henry Parkes Way and The Bogan Way rather than Middle Trundle Road.

During the Initial Production Phase, employees travelling to and from the site have been assumed to use the following routes:

- Parkes – Henry Parkes Way, Middle-Trundle Road, The Bogan Way, Fifield-Trundle Road/Platina Road, Fifield Road, Wilmatha Road, MPF Access Road.
- Condobolin – Henry Parkes Way, Fifield Road, Wilmatha Road, MPF Access Road.

It is noted that a small proportion of the employees may reside in Forbes. These employees would likely travel to and from the site via: The Bogan Way, Henry Parkes Way, The Bogan Way, Fifield-Trundle Road/Platina Road, Fifield Road, Wilmatha Road, MPF Access Road. Any movements along The Bogan Way between Forbes and Henry Parkes Way would be minor so have not been assessed in this report.

4.2 Initial Production Phase Materials and Product Transport

Raw materials would be transported to the Project using a range of vehicle types, including rigid trucks, B-doubles, and pneumatic bulk tippers. The typical types of trucks used for each material or product with the Modification are described below, noting that actual vehicle types used may vary.

- Scandium Oxide – would be transported from the Project, generating up to one truck departure per month.
- Nickel and Cobalt Sulphates - would be transported from the Project, generating up to one truck departure per day.
- Sulphuric Acid – would be transported to the Project from either Newcastle or Port Kembla typically using B-doubles. This would generate three deliveries per day from either Newcastle or Port Kembla.
- Caustic soda – would be transported in containers to the Project from Sydney, using B-doubles. This would generate two deliveries per month from Sydney.
- Limestone – would be transported to the Project from the Westlime bulk limestone facility on London Road in Parkes. Limestone would typically be transported in bulk in B-doubles or pneumatic bulk tippers. This would generate up to three deliveries per day from Parkes. Westlime is located on the western outskirts of Parkes, so trucks carrying limestone to and from the Modification would not pass through the town.
- Flocculent – would be transported in pallets using rigid trucks, and would generate two deliveries per month.
- Sodium Carbonate – would be transported in B-doubles and pneumatic bulk tippers, generating two deliveries per week.
- Oxalic acid – would be transported on flatbed rigid trucks, generating one delivery every three months.
- Hydrochloric Acid – would be transported in B-doubles, generating one delivery per week.
- Ion exchange resin – would be transported to the Project in flatbed rigid trucks, generating one delivery per year.
- Liquid Natural Gas (LNG) would be transported to the Project using B-doubles, generating one delivery per day.
- Fuel – would be transported to the Project using B-doubles or smaller tankers, generating up to one delivery per day from Parkes.
- Other Minor Consumables (e.g., water treatment chemicals, antiscalent) – would generate up to two deliveries per day from various sources.

Trucks from Sydney, Port Kembla, Newcastle and Parkes would approach along Henry Parkes Way, The Bogan Way, Fifield-Trundle Road/Platina Road, Fifield Road and Wilmatha Road to the MPF Access Road. They would return to Parkes, Sydney, Port Kembla or Newcastle along the same route.

Table 4.2 summarises the total transport demand generated by the movement of raw materials and product to and from the Project during the Initial Production Phase.

Table 4.2: Summary of Deliveries of Raw Materials and Products by Road (Initial Production Phase)

Product	Delivery Frequency	Average Daily Deliveries
Scandium Oxide	1 per month	0.04
Nickel and Cobalt Sulphides of Sulphates	1 per day	1.0
Sulphuric Acid	3 per day	3.0
Caustic Soda	2 per month	0.07
Limestone	3 per day	3.0
Flocculent	2 per month	0.07
Sodium Carbonate	2 per week	0.3
Oxalic Acid	1 per quarter	0.01
Hydrochloric Acid	1 per week	0.14
Ion Exchange Resin	1 per year	0.0
Fuel	1 per day	1.0
LNG	1 per day	1.0
Other Consumables	2 per day	2.0
Total Deliveries		11.6

The transport of raw materials and product associated with the Initial Production Phase would generate an average of fewer than 12 deliveries per day (24 vehicle trips per day), or a peak of up to 17 deliveries in a day (34 vehicle trips per day), noting the peak would be a very unlikely event, requiring at least one delivery of all materials types and product on a single day.

4.3 Initial Production Phase Other Traffic

The Initial Production Phase would attract other traffic, such as for deliveries of consumables and spare parts, maintenance contractors, employees visiting off-site facilities, regulatory inspectors, and general visitors. MWT (2000) found that, based on surveyed activity at the Cadia Mine, with approximately 200 employees on the site each day, this other activity would generate 100 vehicle movements (50 visits) per day. Under the 2005 Modification, the other activity would reduce to some 75 vehicle movements per day (MWT, 2005).

With the level of activity being significantly lower during the Initial Production Phase, it is expected that the level of additional traffic not directly associated with the movement of employees, raw materials and product to and from the site would also be significantly reduced. Using the number of employees on site each day as a gauge for level of other traffic activity, it is anticipated that for the Initial Production Phase, there would be fewer than 25 vehicle movements per day (12 to 13 visits) with 45 employees on site each day. Of these, approximately half would be heavy vehicles. It is assumed 90 % would be oriented towards Parkes and 10 % towards Condobolin as shown in Table 4.3.

Table 4.3: Other Traffic Distribution (Initial Production Phase)

Location	Percent of Visits	Daily Vehicle Trips
Parkes	90%	23
Condobolin	10%	2
Total	100%	25

This other traffic would occur mainly during daytime hours, between 7:00am and 6:00pm.

4.4 Total Initial Production Phase Traffic

Table 4.4 summarises the average daily traffic volumes expected to be generated by the Project on the surrounding road network during the Initial Production Phase.

Table 4.4: Initial Production Phase Average Daily Traffic (vehicles per day)

Site ^A	Road	Location	Workers Light	Materials Heavy	Other Light	Other Heavy	Total
A	Henry Parkes Way	East of Bogan Gate	0	24	0	11	35
B		East of Middle Trundle Road	60	24	11	11	106
C	The Bogan Way	North of Henry Parkes Way	0	24	0	11	35
D		North of Middle Trundle Road	60	24	11	11	106
E		North of Trundle	60	24	11	11	106
F	Fifield Road	North of Henry Parkes Way	30	0	2	1	33
G		North of Fifield-Trundle Road	90	24	13	12	139
H		North of Wilmatha Road	0	0	0	0	0
I	Middle Trundle Road	East of The Bogan Way	60	0	11	0	71
J	Fifield-Trundle Road	West of The Bogan Way	60	24	11	11	106
K	Platina Road	East of Fifield Road	60	24	11	11	106
L	Wilmatha Road	West of Fifield Road	90	24	13	12	139
M	MPF Access Road	East of Wilmatha Road	90	24	13	12	139

^ARefer to Figure 3-1

Thus the Initial Production Phase can be expected to generate 139 vehicle trips per day on an average day. These would be made up of approximately 103 trips by light vehicles and 36 trips by heavy vehicles.

4.5 Fifield Bypass

The Fifield Bypass was proposed as part of the original Project, which anticipated significantly higher use of the route between the rail siding and the Project by both light and heavy vehicles than is anticipated during the Initial Production Phase of the Project. The rationale for construction of the Fifield Bypass is not detailed in the previous assessments (MWT, 2000 and 2005). It is expected that the Fifield Bypass is intended to minimise the impact of the heavy vehicles travelling through the town, which would occur 24 hours per day. The approved Project will generate 207 heavy vehicle movements per day on the Fifield Bypass, equivalent to an average of one heavy vehicle every seven minutes. The Initial Production Phase of the Project would generate 36 heavy vehicle movements per day through Fifield, equivalent to an average of one heavy vehicle every 40 minutes.

The impacts of the significantly lower frequency of heavy vehicle movements during the Initial Production Phase would be sufficiently low that removal of the heavy vehicles from Fifield by constructing the Fifield Bypass would not be required. Heavy vehicles accessing the MPF site would therefore continue north along Fifield Road to Fifield, turn left on to Slee Street and continue straight on to Wilmatha Road.

The behaviour of heavy vehicle drivers travelling through Fifield would be appropriately managed through the Drivers' Code of Conduct (Section 6.4) which should include measures to minimise amenity impacts from heavy vehicles, such as vehicle and braking noise.

5 Implications of Modification

5.1 Generated Traffic

Table 5.1 presents a comparison between the anticipated average daily traffic generated by the modified Project during the Initial Production Phase and in the Full Production Phase (or the approved Project).

Table 5.1: Modification Average Daily Traffic (vehicles per day)

Site ^A	Road	Location	Initial Production Phase			Full Production Phase ^B		
			Light	Heavy	Total	Light	Heavy	Total
A	Henry Parkes Way	East of Bogan Gate	0	35	35	0	34	34
B		East of Middle Trundle Road	71	35	106	181	34	215
C	The Bogan Way	North of Henry Parkes Way	0	35	35	1	34	35
D		North of Middle Trundle Road	71	35	106	182	34	216
E		North of Trundle	71	35	106	188	68	256
F	Fifield Road	North of Henry Parkes Way	32	1	33	69	49	118
G		North of Fifield-Trundle Road	103	36	139	258	207	465
H		North of Wilmatha Road	0	0	0	5	0	5
I	Middle Trundle Road	East of The Bogan Way	71	0	71	181	0	181
J	Fifield-Trundle Road	West of The Bogan Way	71	0	71	0	34	34
K	Platina Road	East of Fifield Road	71	35	106	188	158	346
L	Wilmatha Road	West of Fifield Road	103	36	139	263	207	470
M	MPF Access Road	East of Wilmatha Road	103	36	139	263	207	470

^A Refer to Figure 3-1

^B As per the approved Project assessed in MWT (2005)

Shift arrangements are expected to include two shifts per day with half the workforce attending the site in each shift. Deliveries and transport of materials and products would occur throughout the day, with the majority of those trips occurring during daylight hours. Table 5.2 presents the peak volume expected to be generated by the Initial Production Phase of the Project during any one hour of the average day.

Table 5.2: Initial Production Phase Average Day Peak Hourly Traffic (vehicles per hour)

Site ^A	Road	Location	Inbound		Outbound		Two Way	
			Light	Heavy	Light	Heavy	Light	Heavy
A	Henry Parkes Way	East of Bogan Gate	0	3	0	3	0	6
B		East of Middle Trundle Road	16	3	16	3	32	6
C	The Bogan Way	North of Henry Parkes Way	0	3	0	3	0	6
D		North of Middle Trundle Road	16	3	16	3	32	6
E		North of Trundle	16	3	16	3	32	6
F	Fifield Road	North of Henry Parkes Way	8	0	8	0	16	0
G		North of Fifield-Trundle Road	24	3	24	3	48	6
H		North of Wilmatha Road	0	0	0	0	0	0
I	Middle Trundle Road	East of The Bogan Way	16	0	16	0	32	0
J	Fifield-Trundle Road	West of The Bogan Way	16	3	16	3	32	6
K	Platina Road	East of Fifield Road	16	3	16	3	32	6
L	Wilmatha Road	West of Fifield Road	24	3	24	3	48	6
M	MPF Access Road	East of Wilmatha Road	24	3	24	3	48	6

^A Refer to Figure 3-1

5.2 Heavy Vehicle Route

As described in Section 4.5, given the significantly lower level of activity during the Initial Production Phase, it is proposed that the Fifield Bypass not be constructed for the Initial Production Phase. The requirement for the Fifield Bypass would be reviewed prior to the commencement of the Full Production Phase.

The nominated heavy vehicle route for the Modification is essentially unchanged from that of the approved Project: MPF Access Road – Wilmatha Road – Slee St – Fifield Road – Platina Road – Fifield-Trundle Road – The Bogan Way – Henry Parkes Way. Table 5.3 compares the light and heavy vehicle volumes expected to be generated by the Initial Production Phase of the modified Project on the heavy vehicle route with those anticipated in the approved Project (or the Full Production Phase of the modified Project).

Table 5.3: Average Daily Project Traffic on Heavy Vehicle Route (vehicles per day)

Heavy Vehicle Route Section	Approved Full Production Phase			Initial Production Phase		
	Light	Heavy	Total	Light	Heavy	Total
MPF Access Road	263	207	470	103	36	139
Wilmatha Road MPF Access Road to Fifield Road	263	207	470	103	36	139
Fifield Road Wilmatha Road to Fifield-Trundle Road	258	207	465	103	36	139
Platina Road/Fifield-Trundle Road Fifield Road to Limestone Quarry	188	158	346	71	35	106
Fifield-Trundle Road Limestone Quarry to The Bogan Way	188	68	256	71	35	106
The Bogan Way Fifield-Trundle Road to Rail Siding Access	188	68	256	71	35	106
The Bogan Way Rail Siding Access to Trundle	188	68	256	71	35	106
The Bogan Way Trundle to Middle Trundle Road	182	34	216	71	35	106
The Bogan Way Middle Trundle Road to Henry Parkes Way	1	34	35	0	35	35
Henry Parkes Way The Bogan Way to Middle Trundle Road	0	34	34	0	35	35
Henry Parkes Way Middle Trundle Road to Parkes	181	34	215	71	35	106

Table 5.3 indicates that the number of heavy vehicle movements on the heavy vehicle route between the rail siding and the MPF would be significantly lower during the Initial Production Phase than with the approved Project. South of the rail siding, the heavy vehicle volume would be comparable to the approved Project. Light vehicle movements on the heavy vehicle route would be significantly lower during the Initial Production Phase of the Project than expected with the approved Project.

5.3 Other Developments

Other developments in the region may impact on traffic conditions on those roads serving the Project. Recent approvals and applications made to the NSW Department of Planning and Environment for major projects in the region have been reviewed and are described below, in the context of the potential road transport implications on roads of relevance to the Project.

5.3.1 Parkes Solar Farm

Neoen Australia has lodged an application to develop a commercial scale solar photovoltaic site located to the south of Henry Parkes Way some 10 km west-northwest of Parkes. A Scoping Report (NGH Environmental, 2014) has been prepared which identifies the key environmental issues that may be associated with the proposal, and Secretary's Environmental Assessment Requirements have been issued.

Construction of the Parkes Solar Farm is expected to take six to 12 months, and would generate approximately 150 to 300 jobs at peak construction. The Parkes Solar Farm would operate for approximately 30 years.

The size of the operational workforce is not provided in the Scoping Report, and our experience is that the number of workers required for the ongoing operations at solar farms is very low, and would be well below the peak construction workforce of up to 300 workers. Vehicular access would be via an access road from Pat Meredith Drive, which extends southwards from Henry Parkes Way.

It would be expected that the majority of the operational workforce at the Parkes Solar Farm would reside in Parkes, being the largest town in the region and the closest population centre. The traffic generated by the operational workforce would thus be concentrated on the route between the Parkes Solar Farm and Parkes, i.e., along Henry Parkes Way. Given the likely very low numbers of operational workers, any ongoing increase in daily traffic along Henry Parkes Way should the Parkes Solar Farm be approved, would be very low and well within the day-to-day variations in traffic expected along inter-regional routes.

This assessment therefore does not include forecasts of traffic specifically to and from the Parkes Solar Farm, as background traffic growth (Section 5.4) is considered to adequately address the potential traffic generation of the Parkes Solar Farm.

5.3.2 North Parkes Mine

The North Parkes Mine is a copper-gold mine located approximately 27 km northwest of Parkes via the Newell Highway and Bogan Road. It has been operating since 1993, and the North Parkes Step Change Project allows for continued mining operations until 2032. Transport & Urban Planning (2013) assessed the traffic implications of the Step Change Project, which included the relocation of the North Parkes Mine vehicle access to McClintocks Lane. The Step Change Project would result in some construction traffic activity, assumed to occur during 2015, while ongoing operational traffic generation would remain unchanged, as the employment and production levels would remain unchanged. Localised changes in traffic distribution would result from the relocation of the North Parkes Mine vehicle access.

The contribution of the North Parkes Mine on traffic conditions in the vicinity of the Project would be negligible, noting that less than 5 % of the workforce is assumed to travel to and from Trundle and Bogan Gate. As the traffic survey data (Section 2.4) captures that contribution, and no change to operational traffic generation is expected from the North Parkes Mine, no changes to future traffic conditions as a result of activity at North Parkes Mine are anticipated in the assessment which follows.

5.4 Background Traffic Growth

The survey data supplied by Parkes Shire Council and Lachlan Shire Council was collated over the period from May 2010 to November 2015. For the purpose of this assessment, it has been assumed that traffic growth on the roads of relevance to the Project has occurred at a rate of 2 % per year. This rate of growth has been applied over the surveyed conditions from the survey date at each location (Table 2.1).

5.5 Future Traffic Volumes

Table 5.4 presents the estimated average daily light and heavy vehicle traffic volumes on the routes to and from the Project with 10 years of growth in background non-Project traffic. This assumes growth at a rate of 2 % per year over the surveyed conditions (Table 2.1) between the survey date and 2025.

The table compares the expected traffic volumes at that time with either the approved Project operating or the Initial Production Phase operating.

Table 5.4: Year 2025 Average Daily Traffic with Modification and Approved (vehicles per day)

Site ^A	Road	Location	Background		Initial Production Phase		Approved/ Full Production Phase ^B	
			Light	Heavy	Light	Heavy	Light	Heavy
A	Henry Parkes Way	East of Bogan Gate	999	256	999	291	999	290
B		East of Middle Trundle Road	999	256	1,070	291	1,180	290
C	The Bogan Way	North of Henry Parkes Way	457	115	457	150	458	149
D		North of Middle Trundle Road	389	65	460	100	571	99
E		North of Trundle	520	99	591	134	708	167
F	Fifield Road	North of Henry Parkes Way	177	113	209	114	246	162
G		North of Fifield-Trundle Road	177	113	280	149	435	320
H		North of Wilmatha Road	177	113	177	113	182	113
I	Middle Trundle Road	East of The Bogan Way	112	9	183	9	293	9
J	Fifield-Trundle Road	West of The Bogan Way	74	28	145	28	74	62
K	Platina Road	East of Fifield Road	74	28	145	63	262	186
L	Wilmatha Road	West of Fifield Road	24	11	127	47	287	218
M	MPF Access Road	East of Wilmatha Road	0	0	103	36	263	207

^A Refer to Figure 3-1

^B As per the approved Project assessed in MWT (2005)

Table 5.4 demonstrates that with background growth up to 2025, Henry Parkes Way would continue to carry the most significant volumes of traffic, with up to 1,361 vehicles per day with the Initial Production Phase traffic or 1,470 vehicles per day with the Full Production Phase traffic. The combined effects of the Project traffic and background growth would have their greatest effect on the route between the MPF and The Bogan Way (including Wilmatha Road, Fifield Road, Platina Road and Fifield-Trundle Road) and to a lesser extent along The Bogan Way south of Fifield-Trundle Road.

5.6 Future Road Capacity

As noted (Section 2.8.1), the theoretical capacity of a two way two lane road under ideal conditions is 3,200 passenger cars per hour (Austroads, 2013a). Considering the future daily traffic volumes and taking into account the likely distribution of total vehicle trips throughout the day, the peak hourly flows on the road network with the Initial Production Phase would remain very low in comparison to the theoretical capacity, and a detailed assessment of midblock roadway capacity is not warranted.

During the Initial Production Phase of the modified Project, the gravel section of Middle Trundle Road would be expected to carry a conservative maximum of 192 vehicles per day and less than 5 % heavy vehicles (which would not be Project-related), which is near the upper threshold for Class U2 unsealed roads (Austroads, 2009). In the absence of the Project, the volume would be expected to reach approximately 121 vehicles per day, with 7 % heavy vehicles, which is also consistent with the upper threshold for Class U2 unsealed roads.

During the Initial Production Phase of the modified Project, Wilmatha Road would carry 174 vehicles per day and 27 % heavy vehicles, which is consistent with the volume and heavy vehicle range for Class U2 unsealed roads. In the absence of the Project, the volume would be expected to reach approximately 35 vehicles per day, with 31 % heavy vehicles, which is consistent with Class U3 unsealed roads.

5.7 Intersection Operation

Formal assessment of intersection capacity is not warranted at low traffic volumes (Section 2.8.2). Comparison between these threshold volumes and the expected peak hourly volumes on the key roads indicates that the future traffic volumes on all roads are well below the threshold volumes, and as such, there is no capacity concerns regarding the operation of intersections in the vicinity of the modified Project.

6 Mitigation Measures

6.1 Road Upgrades

The forecast vehicle movements for the Initial Production Phase of the modified Project along key Project routes have been reviewed with regard to relevant the Austroads (2010a) requirements for rural roads and the consultation outcomes with the Lachlan Shire Council and Parkes Shire Council to identify road upgrade requirements for the Initial Production Phase (Figure 6-1).

The nature of the actual road upgrades undertaken for the Initial Production Phase of the modified Project should be based on consultation outcomes with the Lachlan Shire Council and Parkes Shire Council.

It is recommended that a road safety audit be conducted prior to the commencement of the commissioning of the limestone quarry and rail siding to determine appropriate road upgrade requirements for the Full Production Phase.

6.1.1 The Bogan Way to MPF Access Road

The heavy vehicle access route for the MPF is shown on Figure 1-1. The section of heavy vehicle access route between The Bogan Way and the MPF access road is approved to be upgraded to allow for improved access to the MPF site.

For the Initial Production Phase of the modified Project, it is proposed that the Fifield Bypass would not be constructed (Section 3.5) and therefore this section of road would include (Figure 1-1):

- Fifield-Trundle Road between The Bogan Way and Platina Road;
- Platina Road between Fifield-Trundle Road and Fifield Road;
- Fifield Road between Platina Road and Slee Street;
- Slee Street between Fifield Road and Wilmatha Road; and
- Wilmatha Road between Slee Street and the MPF access road.

Existing Condition

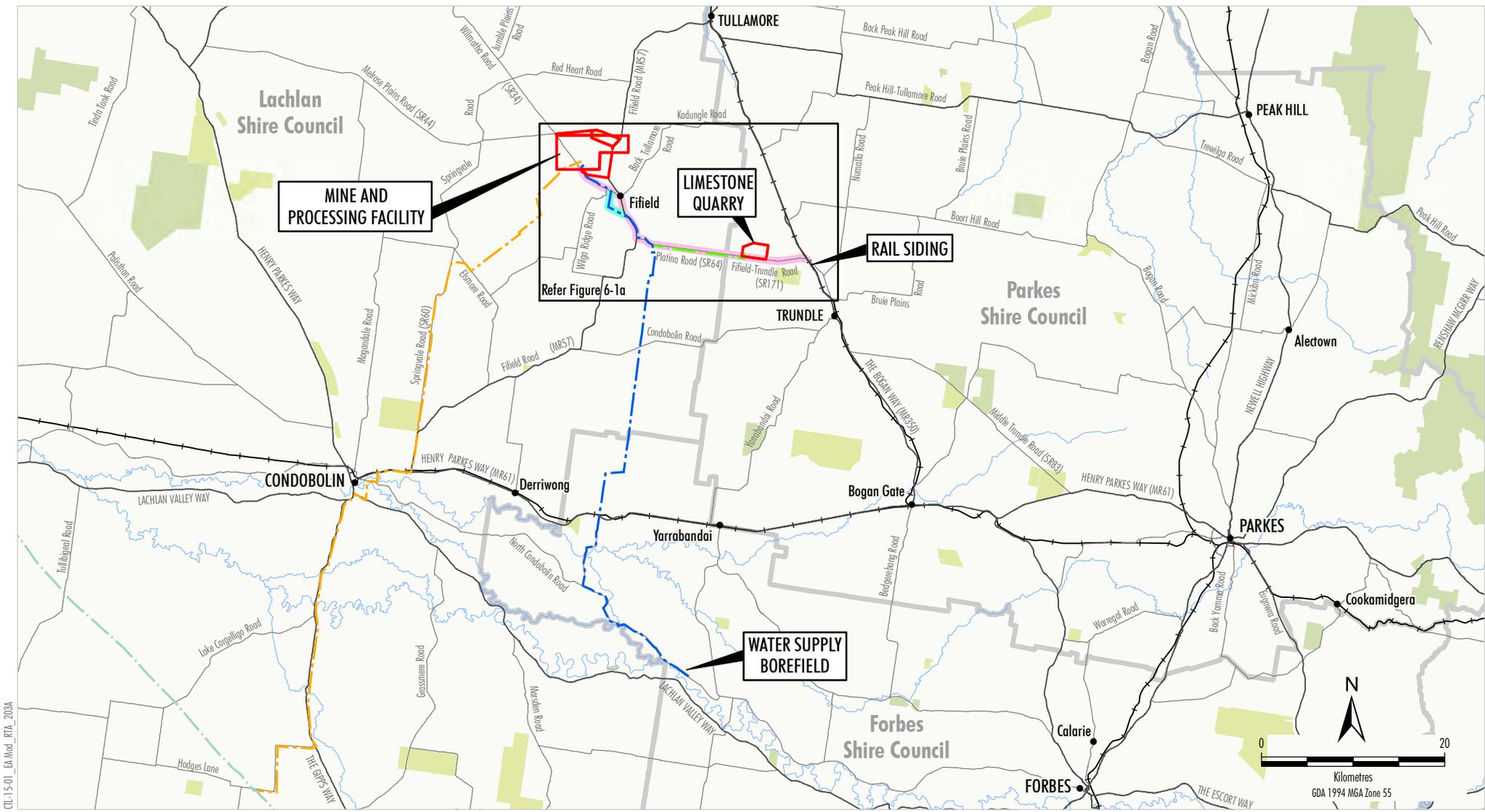
Parkes Shire Council notes that Fifield-Trundle Road is currently constructed to a 6.5 m wide formation with 6.0 m wide seal, and has a concrete causeway.

Platina Road is currently constructed with a one lane wide sealed carriageway, requiring drivers to position their vehicle with two wheels on a sealed surface and two on a gravel surface.

Fifield Road between Platina Street and Slee Street has a good road surface and of suitable width until approximately 1.5 km south of Fifield where it narrows to approximately 6 m seal with rough edges.

Slee Street has a very wide sealed carriageway with kerb and gutter on each side, and has sufficient width to allow for two way traffic together with vehicles parked on both sides of the road.

Wilmatha Road has a sealed surface for approximately 300 m from its intersection with Slee Street, and thereafter has an unsealed surface approximately 8 to 12 m wide.



CLC-15-01 - EA Mod - R1A - 2024A

- LEGEND**
- Nation Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

- Extent of Road Upgrade
- Fifeild Bypass

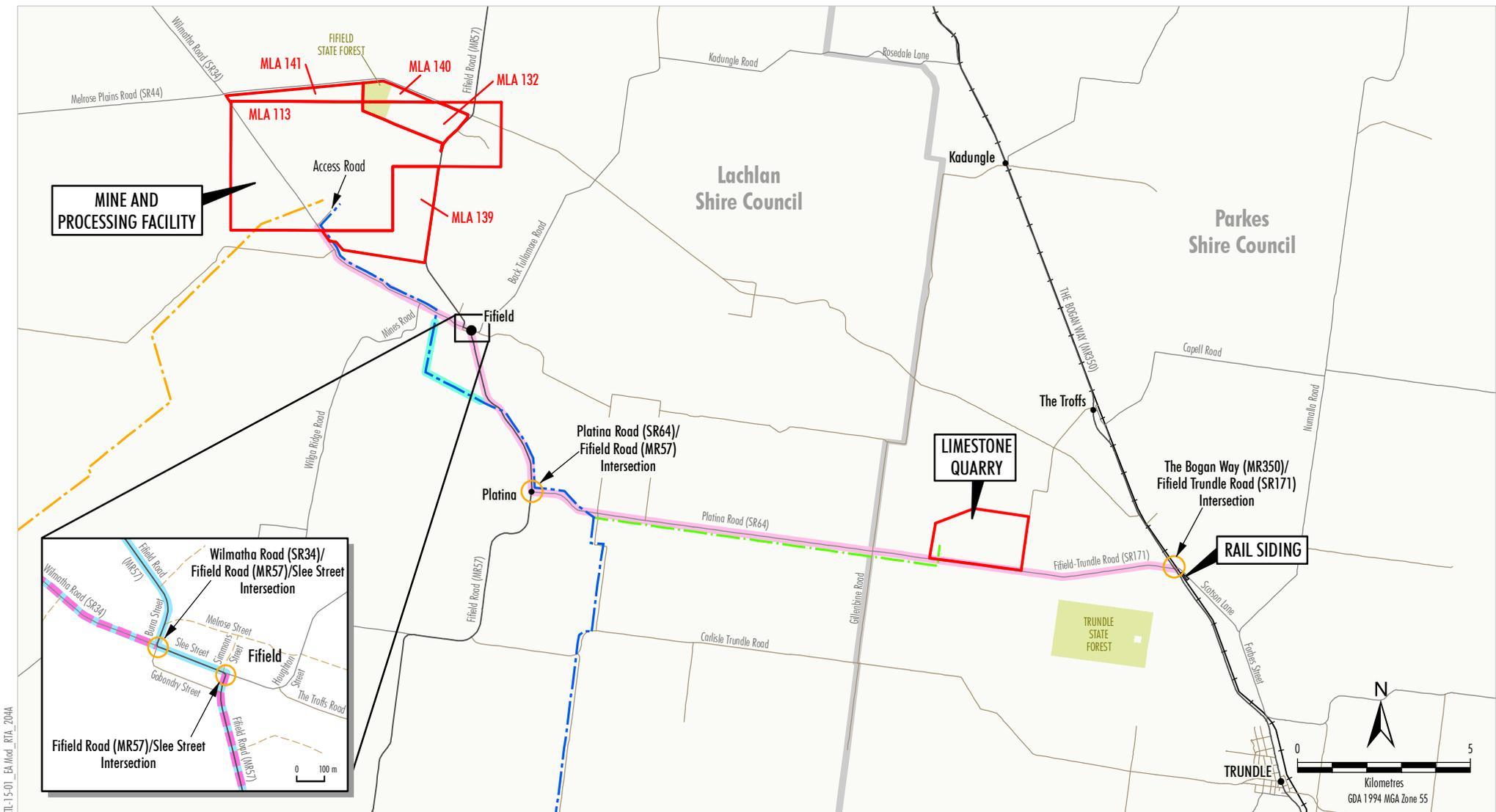
Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON PROJECT
 SCANDIUM OXIDE MODIFICATION

Road Upgrades

Figure 6-1



CLC-15-01_EA/Mad_RTA_20AA

- LEGEND**
- State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Extent of Road Upgrade
 - Fifield Bypass

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

SYERSTON PROJECT
 SCANDIUM OXIDE MODIFICATION
 Road Upgrades Inset

Figure 6-1a

Initial Production Phase Usage

During the Initial Production Phase of the modified Project, Project traffic would travel along this route in both directions, generating up to 139 vehicle movements per day at its western end and 106 vehicles per day at its eastern end. With two shifts operating per day, the Initial Production Phase of the modified Project would contribute up to approximately 50 vehicles travelling in both directions during any one hour of the day at its western end, and approximately 35 vehicles in any one hour at its eastern end.

The use of the route by heavy vehicles associated with the Project during the Initial Production Phase would be an average of 35 to 36 heavy vehicles per day. These trips would be spread throughout the day, so the Initial Production Phase of the modified Project would result in a peak of say five heavy vehicle movements in any one hour of the day. With the Initial Production Phase and background traffic in 2025, the route would carry an average of 174 vehicles per day (Wilmatha Road), 429 vehicles per day (Fifield Road), and 208 vehicles per day (Platina Road and Fifield-Trundle Road) (Table 5.4).

Proposed Upgrades

Austrroads (2010a) indicates that a single lane carriageway 3.7 m wide is suitable for rural roads in some circumstance carrying up to 150 vehicles per day. With the Initial Production Phase of the modified Project, daily traffic on Fifield-Trundle Road would be above that limit, and thus widening to a sufficient width to carry two-way traffic is recommended.

Austrroads (2010a) suggests that for a daily volume of 150 to 500 vehicles per day, the following minimum width is required:

- Traffic lanes – 2 x 3.1 m (total 6.2 m, inclusive of centre lines but exclusive of edge lines);
- Total shoulder 1.5 m; and
- Minimum shoulder seal 0.5 m.

Austrroads (2010a) indicates that the desirable lane width on rural roads is 3.5 m, which allows large vehicles to pass or overtake without either vehicle having to move sideways towards the outer edge of the lane. Wider lanes and good road surface conditions have a large influence on road safety and the comfort of road users.

To allow for its use by heavy vehicles associated with the Initial Production Phase of the modified Project, it is therefore recommended that the route between The Bogan Way and the MPF access road have a sealed pavement of minimum 8.0 m, being two 3.5 m wide travel lanes and 0.5 m wide sealed shoulders. Unsealed shoulders 1.0 m should be provided on each side of the road.

In addition, it is recommended that 3.0 m wide gravel shoulders for a minimum of 30 m on either side of all minor roads along this section of the heavy vehicle route be provided, with property access roads to be appropriately prepared and sealed 3.5 m wide. This treatment is consistent with the basic intersection treatments under Austrroads guidelines and is therefore considered appropriate for the Initial Production Phase of the modified Project.

6.1.2 The Bogan Way

The Bogan Way has a two lane sealed carriageway, with centre line marking and guidance posts. The road shoulder is unpaved and varies in width from 0 m to 2 m, with no edge linemarking. Parkes Shire Council has advised that it has been awarded grants to undertake seal works on this road in the 2015/16 and 2016/17 financial years. Selection of specific lengths of road to apply these funds has not yet been finalised.

During the Initial Production Phase of the modified Project, Project traffic would travel along this route in both directions, generating up to 106 vehicle movements per day in both directions between Fifield-Trundle Road and Middle Trundle Road and 35 vehicle movements per day between Middle Trundle Road and Henry Parkes Way (Table 5.3). With two shifts operating per day, during any one hour of the day the Initial Production Phase of the modified Project would contribute approximately 35 to 40 vehicles travelling in both directions between Fifield-Trundle Road and Middle Trundle Road, and up to approximately five to ten vehicles travelling in both directions between Middle Trundle Road and Henry Parkes Way.

The use of the route by heavy vehicles associated with the Project during the Initial Production Phase would be 35 heavy vehicles per day on The Bogan Way between Fifield-Trundle Road and Henry Parkes Way. These trips would be spread throughout the day, so the Initial Production Phase of the modified Project would result in a peak of say five heavy vehicle movements in any one hour of the day.

Clean TeQ would make contributions to the maintenance of The Bogan Way in accordance with the Voluntary Planning Agreement with the Parkes Shire Council.

6.1.3 Middle Trundle Road

Middle Trundle Road comprises both sealed and unsealed surfaces, with the central portion approximately 16 km long being unsealed.

During the Initial Production Phase of the modified Project, Project traffic would travel along this route in both directions, generating up to 71 light vehicle movements per day. With two shifts operating per day, the Initial Production Phase of the modified Project would contribute a peak of approximately 30 to 35 vehicles travelling in both directions during any one hour of the day. No Project-related heavy vehicles would use Middle Trundle Road.

Clean TeQ would make contributions to the maintenance of Middle Trundle Road in accordance with the Voluntary Planning Agreement with the Parkes Shire Council.

6.1.4 Melrose Plains Road, Wilmatha Road and Springvale Road

MWT (2000) notes a requirement for sealing of Melrose Plains Road between Springvale Road and Wilmatha Road, and of Wilmatha Road between Melrose Plains Road and the MPF site. These upgrades were proposed as Springvale Road was intended to be used for travel between the MPF and Condobolin, rather than Fifield Road. Such use was assumed to be subject to the upgrading of Springvale Road by Lachlan Shire Council, and of transfer of Main Road status from the parallel section of Fifield Road.

Since that report was prepared, Fifield Road has been sealed along its full length, thus Fifield Road is more likely to be used by traffic travelling between the MPF and Condobolin, and as such, upgrading of Melrose Plains Road and the northern approach of Wilmatha Road to the MPF access road would not be warranted by either the Initial Production Phase or the Full Production Phase of the modified Project.

As Springvale Road would not be used for general travel between the MPF and Condobolin and the alternative route along Fifield Road has been upgraded to a suitable standard, upgrading Springvale Road is also not warranted by either the Initial Production Phase or the Full Production Phase of the modified Project.

6.2 Intersection Upgrades

The forecast vehicle movements for the Initial Production Phase of the modified Project at key intersections have been reviewed with regard to Austroads (2013b) warrants for rural intersection treatments and the outcomes of consultation with the Lachlan Shire Council and Parkes Shire Council to identify road upgrade requirements for the Initial Production Phase (Figure 6-1). The Austroads (2013b) warrants are for major road turn treatments for basic, auxiliary lane and channelised layouts of rural intersections, and relate to turns from the major road only, and are based on peak hourly traffic volumes at the intersection.

The nature of the actual intersection upgrades undertaken for the Initial Production Phase of the modified Project should be based on consultation outcomes with the Lachlan Shire Council and Parkes Shire Council.

It is recommended that a road safety audit be conducted prior to the commencement of the commissioning of the limestone quarry and rail siding to determine appropriate road upgrade requirements for the Full Production Phase.

6.2.1 Intersection Treatments

The current Austroads (2013b) rural intersection designs are described in this subsection.

Basic Intersection Treatment

The general minimum preferred treatment at rural road intersections are Basic Auxiliary Left (BAL) and Basic Auxiliary Right (BAR) treatments. The rural BAL treatment on the major road has a widened shoulder, which assists turning vehicles to move further off the through carriageway, making it easier for through vehicles to pass. The rural BAR treatment features a widened shoulder on the major road that allows through vehicles, having slowed, to pass to the left of turning vehicles. The BAL treatment on the minor road allows turning movements to occur from a single lane, with a shoulder that is too narrow to be used by left-turning vehicles, so as to prevent vehicles from standing two abreast at the holding line. These design features are preferred to safely manage the movement of vehicles in the high speed rural environment.

Auxiliary Lane Treatment

Auxiliary lane turn treatments have short lengths of auxiliary lane provided to improve safety, especially on high speed roads. The Auxiliary Right-turn treatment (AUR) on the major road is created by the use of a short lane with standard painted stripes, where the median lane is shared between through and right turning vehicles, and the auxiliary kerbside lane allows through vehicles to pass a vehicle which has slowed to turn right. AUR treatments are not used in NSW, rather a channelised right turn treatment with a short turn bay known as a CHR(S) treatment is used. This is a modification of the channelised treatment described below.

Auxiliary Left-turn (AUL) treatments on the major and minor road are normal indented turn lanes, used only by vehicles turning left. The auxiliary lane treatment on the major road is safer than a basic treatment, however the channelised treatment described below is preferred where practicable, as the risk of collisions is lower. Consequently, Austroads (2013b) indicates that a channelised left turn (CHL) treatment should be used wherever practicable. The AUL treatment on the minor road is less safe than a basic or channelised treatment, and is therefore while it is included in the warrants, it is not recommended, and Austroads (2013b) indicates that a BAL or CHL treatment should be used wherever practicable.

Channelised Treatment

Channelised treatments at the intersections are CHR and channelised left turn (CHL) treatments for right and left turns respectively. The channelised "CH" treatments separate conflicting vehicle paths by raised or painted medians and/or islands, and often use auxiliary lanes in conjunction with channelisation. The CHR treatment on the major road provides a continuous lane for through vehicles only, and an auxiliary turn lane for right turning vehicles only. CHL treatments on the major or minor road provide a separate left turn "slip" lane, separated from the adjacent lane by a painted or raised island.

Channelised treatments are preferred over auxiliary lane treatments where practicable, as the risk of collisions is lower.

6.2.2 The Bogan Way and Henry Parkes Way

The existing intersection of The Bogan Way and Henry Parkes Way has BAL and BAR treatments on Henry Parkes Way, with a wide sealed shoulder for vehicles turning left into The Bogan Way, and a wide unsealed shoulder for westbound vehicles to pass vehicles turning right into The Bogan Way.

The Initial Production Phase of the modified Project would generate 17 to 18 vehicle turning movements per day turning right from Henry Parkes Way to The Bogan Way, and a similar volume turning left from The Bogan Way to Henry Parkes Way. This daily volume would be generated by vehicles transporting materials and other deliveries, and so would be spread throughout the day, with a peak of fewer than five vehicles on either movement in any one hour.

The existing weekday peak hourly traffic on Henry Parkes Way was measured at 88 to 90 vehicles per hour (two way) in November-December 2014 and the existing weekday peak hourly volume on The Bogan Way was measured at 44 vehicles per hour (two way) in November 2014 (Table 2.2).

Comparison with the Austroads (2013b) warrants suggests that should the peak hourly volumes generated by the Initial Production Phase coincide with the peak hourly background volumes and allowing for background growth, the resulting volumes would remain well below the volumes at which a CHR(S) or CHR treatment would be warranted. The existing BAL/BAR treatment at the intersection is therefore considered sufficient for the Initial Production Phase of the modified Project, for which the current carriageway layout is generally satisfactory.

As described in Section 4.1, it has been conservatively assumed that all Project light vehicle traffic would use Middle Trundle Road rather than Henry Parkes Way and The Bogan Way via Bogan Gate. It is noted that if all the Project light vehicle traffic accessed the MPF via Henry Parkes Way and The Bogan Way via Bogan Gate, the existing BAL/BAR treatment at the Henry Parkes Way/The Bogan Way intersection is also considered sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that linemarking and signage be improved to meet Austroads requirements as part of ongoing maintenance activities.

6.2.3 The Bogan Way and Fifield-Trundle Road

At its intersection with The Bogan Way, Fifield-Trundle Road is flared, which together with the unsealed shoulder on The Bogan Way, effectively provides a short left turn treatment for vehicles turning left from The Bogan Way into Fifield-Trundle Road.

At this intersection, the Initial Production Phase of the modified Project would generate 53 vehicle movements per day turning left into Fifield-Trundle Road and 53 vehicle movements per day turning right out of Fifield-Trundle Road. For each of those movements, this daily volume would be made up of:

- 30 vehicles per day generated by employees travelling at the start and end of shifts; and
- 23 vehicles per day generated by transport of materials and other deliveries, spread throughout the day.

The existing weekday peak hourly traffic on The Bogan Way was measured at 44 to 48 vehicles per hour (two way) in October and November 2014 and the existing weekday peak hourly volume on Fifield-Trundle Road was measured at 7 vehicles per hour (two way) in September-November 2015 (Table 2.2). With two shifts operating per day, employees from the Initial Production Phase of the modified Project would contribute up to 15 vehicles turning right into The Bogan Way and 15 vehicles turning left into Fifield-Trundle Road during any one hour of the day. Other light vehicles and heavy vehicles generated by the Initial Production Phase of the modified Project would contribute a peak of perhaps 5 vehicles per hour in either direction.

Comparison with the Austroads (2013b) warrants indicates that the peak hourly volumes resulting from the combination existing and the Initial Production Phase of the modified Project traffic would remain well below the volumes at which a CHR(S) or CHR treatment in The Bogan Way would be warranted. The existing flared layout and effective left turn treatment of The Bogan Way at the intersection is therefore considered sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that linemarking and signage be improved to meet Austroads requirements.

Linemarking at the existing intersection has been worn by the movement of heavy vehicles, which means drivers in Fifield-Trundle Road have only a limited indication of where to position their vehicle or stop. Larger vehicles turning from The Bogan Way into Fifield-Trundle Road could side swipe an incorrectly positioned vehicle. The linemarking should therefore be improved to meet Austroad requirements.

The intersection currently does not include signage to allocate priority, thus standard T-intersection priority rules apply. It is however slightly offset from the intersection of The Bogan Way with Scotson Lane, an unsealed road which extends to the east of The Bogan Way and links to Numulla Way. Installation of "stop" signs at the intersection would need to comply with the requirements of AS1742.2, noting that "stop" signs are only used (in place of "give way" or no signage) where sight distance is substandard. In this case the posted speed limit on The Bogan Way is 100 km/h thus "stop" signs should only be provided if the available sight distance is 95 m or less. The available sight distance exceeds this, and thus installation of "stop" signs would not comply with AS1742. AS1742.2 requires that give way signs be provided at all intersection with four or more legs, or at three way intersections where the layout means that priority is unclear, or for safety reasons. Given the slightly offset arrangement between Scotson Lane and Fifield-Trundle Road, installation of "give way" signs on both approaches would clarify priority. Retention of the existing priority reflects the through function that The Bogan Way performs, and is considered appropriate.

6.2.4 Fifield-Trundle Road and Limestone Quarry Access Roads

As the limestone quarry would not be developed during the Initial Production Phase of the modified Project, the performance of the Fifield-Trundle Road and limestone quarry access roads has not been considered.

6.2.5 Platina Road and Fifield Road

At the intersection of Platina Road and Fifield Road, Platina Road is flared which, together with the unsealed shoulder on Fifield Road, effectively provides a short left turn treatment for vehicles turning left from Fifield Road into Platina Road. There is no linemarking at the existing intersection, and no intersection priority signage is provided on the approach along Fifield-Trundle Road.

During the Initial Production Phase, the modified Project would generate 53 vehicle movements per day in each direction turning between Fifield Road and Platina Road, and 16 to 17 vehicle movements per day in each direction along Fifield Road. For each of those movements, this daily volume would be made up of:

Turning Between Fifield Road and Platina Road:

- 35 to 36 light vehicles per day turning left from Fifield Road into Platina Road, of which 30 vehicles per day would be generated by employees travelling at the conclusion of shifts;
- 35 to 36 light vehicles per day turning right from Platina Road into Fifield Road, of which 30 vehicles per day would be generated by employees travelling at the start of shifts; and
- 17 to 18 heavy vehicles per day in each direction turning between Fifield Road and Platina Road, spread throughout the day.

North-South Through Along Fifield Road:

- 15 vehicles per day in each direction generated by employees at the start and end of shifts; and
- 1 to 2 vehicles per day generated by transport of materials and other deliveries, spread throughout the day.

The existing weekday peak hourly traffic on Platina Road was measured at 7 vehicles per hour (two way) in September-November 2015 and on Fifield Road was measured at 19 vehicles per hour in February-April 2014 (Table 2.2). With two shifts operating per day, the Initial Production Phase of the modified Project would contribute up to 15 vehicles travelling through the intersection in both directions combined along Fifield Road during any one hour of the day. Other light vehicles and heavy vehicles generated by the modified Project would contribute a peak of perhaps 5 vehicles per hour in either direction, primarily turning in and out of Platina Road.

Comparison with the Austroads (2013b) warrants indicates that should the Initial Production Phase traffic coincide with the background peak traffic, and allowing for background growth, the peak hourly volumes would remain well below that which would warrant upgrading to CHR(S) or CHR treatments. The existing layout of the intersection of The Bogan Way and Fifield Road is therefore considered sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that linemarking and signage be improved in accordance with Austroads requirements.

6.2.6 Fifield Bypass Intersections

As it is not proposed to construct the Fifield Bypass for the Initial Production Phase of the modified Project, the intersections of the Fifield Bypass with Fifield Road and Wilmatha Road would not be required and therefore have not been considered further here.

6.2.7 Slee Street Intersections

As it is not proposed to construct the Fifield Bypass for the Initial Production Phase of the modified Project, Project traffic would use of the route through Fifield, including:

- the intersection of Slee Street with Fifield Road at the eastern end of Fifield, at which priority lies with the movements between Slee Street West and Fifield Road South. Give Way signage and linemarking are provided on the eastern approach of Slee Street; and
- the intersection of Wilmatha Road, Fifield Road (Burra Street), Slee Street and Gobondry Street (a minor unsealed road) at the western end of Fifield. Priority at this intersection lies with the movements between Slee Street East and Fifield Road (Burra Street). Give Way signage and linemarking are provided on the western approach of Slee Street. Gobondry Street is an unsealed narrow road with no signage or linemarking to indicate priority. Vehicles exiting Gobondry Street would give way to traffic on the other roads at the intersection.

During the Initial Production Phase of the Project, Project-related traffic would form the priority movement at the intersection of Slee Street with Fifield Road, and no amendments to the intersection are required, subject to appropriate maintenance of the road, and its signage and linemarking.

During the Initial Production Phase of the Project, Project-related traffic at the Wilmatha Road intersection with Fifield Road and Slee Street would travel east-west between Wilmatha Road and Slee Street. Westbound traffic (inbound to the MPF) would not be opposed by any other vehicles, while eastbound traffic (outbound from the MPF) would be required to give way to vehicles travelling in either direction along Slee Street – Fifield Road. It is recommended that the priority at this intersection remain unchanged, with priority being given to the through dog-leg movement along Fifield Road. With the higher use of Wilmatha Road, it is recommended that advance warning signage for the intersection and its priority be given to drivers approaching on Slee Street (W9-1R) and Fifield Road (W9-2L) and advance warning of the Give Way signs (W3-2) on Wilmatha Road.

6.2.8 The Bogan Way and Middle Trundle Road

The intersection of The Bogan Way with Middle Trundle Road was upgraded in 2013 to cater for access by low volumes of road trains but did not include any auxiliary lanes. The upgraded intersection was reviewed by Crossroads Civil Design (2014) and deemed suitable due to low volumes. Linemarking at the existing intersection has been worn by the movement of heavy vehicles, which means drivers in Middle Trundle Road have only a limited indication of where to position their vehicle or stop.

The Initial Production Phase of the modified Project would increase traffic at the intersection by:

- 17 to 18 heavy vehicles per day in each direction along The Bogan Way past Middle Trundle Road, generated by heavy vehicles typically spread throughout the day;

- 35 to 36 vehicles per day turning right from Middle Trundle Road to The Bogan Way, of which 30 vehicles per day would be generated by employees travelling for the start of their shift. The remaining trips would be spread throughout the day; and
- 35 to 36 vehicles per day turning left from The Bogan Way to Middle Trundle Road, of which 30 vehicles per day would be generated by employees departing after the end of their shift. The remaining trips would be spread throughout the day.

The existing weekday peak hourly traffic on The Bogan Way was measured at 44 to 48 vehicles per hour (two way) in October and November 2014 and the existing weekday peak hourly volume on Middle Trundle Road was measured at 11 vehicles per hour (two way) in October 2014 (Table 2.2). With two shifts operating per day, the light vehicle traffic generated by the Initial Production Phase of the Project would contribute up to 15 vehicles northbound along The Bogan Way and 15 vehicles southbound along The Bogan Way during any one hour of the day. Other light and heavy vehicles generated by the Project would contribute perhaps 5 vehicles per hour in either direction during that same hour.

Comparison with the Austroads (2013b) warrants indicates that should the peak hourly volumes generated by the Initial Production Phase coincide with the background peak hourly flows and allowing for background growth, resulting traffic volumes would remain well below the volumes at which a CHR(S) or CHR treatment in The Bogan Way would be warranted. The existing treatment of The Bogan Way at the intersection is therefore considered sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that linemarking and signage be improved to meet Austroads requirements as part of ongoing maintenance activities. It is recommended that signage on the Middle Trundle Road approach include give way signs (R1-2) and advance warning of the give way signs (W3-2) to encourage lower vehicle speeds on the approach to the intersection.

6.2.9 Henry Parkes Way and Middle Trundle Road

The existing intersection layout has large radius pavement returns which allow vehicles to turn at high speed, particularly when turning left from Middle Trundle Road, also noting the angle at which the two roads meet could lead to a side impact collision between vehicles if an approaching driver on Middle Trundle Road was unable to see an approaching vehicle on Henry Parkes Way. In addition, no signage is provided for traffic approaching Henry Parkes Way on Middle Trundle Road.

Henry Parkes Way has an unsealed shoulder on the southern side of the intersection, forming a BAR treatment. The flared layout of Middle Trundle Road effectively provides a soft left turn treatment for vehicles turning left from Henry Parkes Way to Middle Trundle Road.

The Initial Production Phase of the modified Project would increase traffic at the intersection by:

- 17 to 18 heavy vehicles per day in each direction along Henry Parkes Way past past Middle Trundle Road, generated by heavy vehicles typically spread throughout the day;
- 35 to 36 vehicles per day turning right from Middle Trundle Road to Middle Trundle Road, of which 30 vehicles per day would be generated by employees travelling for the start of their shift. The remaining trips would be spread throughout the day; and
- 35 to 36 vehicles per day turning left from Middle Trundle Road to Henry Parkes Way, of which 30 vehicles per day would be generated by employees departing after the end of their shift. The remaining trips would be spread throughout the day.

The existing weekday peak hourly traffic on Henry Parkes Way was measured at 90 vehicles per hour (two way) in November 2014 and the existing weekday peak hourly volume on Middle Trundle Road was measured at 11 vehicles per hour (two way) in October 2014 (Table 2.2).

Comparison with the Austroads (2013b) warrants indicates that should the peak hourly traffic generated by the Initial Production Phase coincide with the peak hourly background volumes and allowing for background growth, the resulting volumes would remain well below the volumes at which a CHR(S) or CHR treatment in Henry Parkes Way would be warranted. The existing BAR treatment of Henry Parkes Way at the intersection is therefore considered sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that linemarking and signage be improved to meet Austroads requirements as part of ongoing maintenance. It is recommended that signage on the Middle Trundle Road approach include give way signs (R1-2) and advance warning of the give way signs (W3-2) to encourage lower vehicle speeds on the approach to the intersection, due to the angle at which Middle Trundle Road meets Henry Parkes Way.

In addition, due to the through function that Henry Parkes Way performs, it is recommended that as part of ongoing maintenance the shoulder widening required for BAL/BAR treatments be constructed as a sealed surface in place of the existing unsealed shoulders.

6.2.10 Henry Parkes Way and Fifield Road

The existing intersection of Henry Parkes Way and Fifield Road has a sealed and unsealed shoulder on the southern side of Henry Parkes Way, and a flared layout which provides a soft left turn treatment for vehicles turning left from Henry Parkes Way into Fifield Road.

During the Initial Production Phase, the modified Project would generate 16 to 17 vehicle movements per day in each direction turning between Henry Parkes Way west and Fifield Road. For each of those movements, this daily volume would be made up of:

- 15 vehicles per day generated by employees at the start and end of shifts; and
- 1 to 2 vehicles per day generated by transport of materials and other deliveries, spread throughout the day.

The existing weekday peak hourly traffic on Henry Parkes Way was measured at 90 vehicles per hour (two way) in November 2014 and the existing weekday peak hourly volume on Fifield Road was measured at 19 vehicles per hour (two way) in February-April 2014 (Table 2.2). With two shifts operating per day, the Initial Production Phase of the modified Project would contribute up to 8 vehicles turning right into Henry Parkes Way and 8 vehicles turning left from Henry Parkes Way during any one hour of the day. Other light vehicles and heavy vehicles generated by the modified Project would contribute a peak of 1 or 2 vehicles per hour in either direction.

Comparison with the Austroads (2013b) warrants indicates that the peak hourly volumes resulting from the combination of existing and Initial Production Phase traffic would remain well below the volumes at which a CHR(S) or CHR treatment in Henry Parkes Way would be warranted. The existing treatments on Henry Parkes Way at the intersection are therefore considered sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that linemarking and signage be provided to meet Austroads requirements as part of ongoing maintenance. It is recommended that the signage should include "give way" signs (W3-2) for traffic approaching on Fifield Road.

6.2.11 Springvale Road and Fifield Road

At its intersection with Springvale Road, Fifield Road has a flared sealed shoulder forming a left turn treatment for vehicles turning left from Fifield Road into Springvale Road, and an unsealed shoulder to assist through southbound vehicles to pass a vehicle turning right into Springvale Road.

During the Initial Production Phase, the modified Project would generate 16 to 17 vehicle movements per day in each direction travelling along Fifield Road past Springvale Road. This daily volume would be made up of:

- 15 vehicles per day generated by employees at the start and end of shifts; and
- 1 to 2 vehicles per day generated by transport of materials and other deliveries, spread throughout the day.

The existing weekday peak hourly traffic on Springvale Road was measured at 3 vehicles per hour (two way) in February-March 2014 and on Fifield Road was measured at 19 vehicles per hour in February-April 2014 (Table 2.2). With two shifts operating per day, for the Initial Production Phase of the modified Project would contribute up to 8 vehicles travelling through the intersection in both directions combined along Fifield Road during any one hour of the day. Other light vehicles and heavy vehicles generated by the modified Project would contribute a peak of perhaps 1 or 2 vehicles per hour in either direction along Fifield Road.

Comparison with the Austroads (2013b) warrants indicates that should the peak hourly volumes generated by the Initial Production Phase coincide with the peak hourly background traffic, and allowing for background growth, the future volumes would remain well below that which would warrant upgrading to CHR(S) or CHR treatments. The existing treatments at the intersection would therefore be sufficient for the Initial Production Phase of the modified Project.

Notwithstanding the above, it is recommended that the signage and linemarking be provided in accordance with Austroads requirements as part of ongoing maintenance.

6.2.12 Intersection Lighting

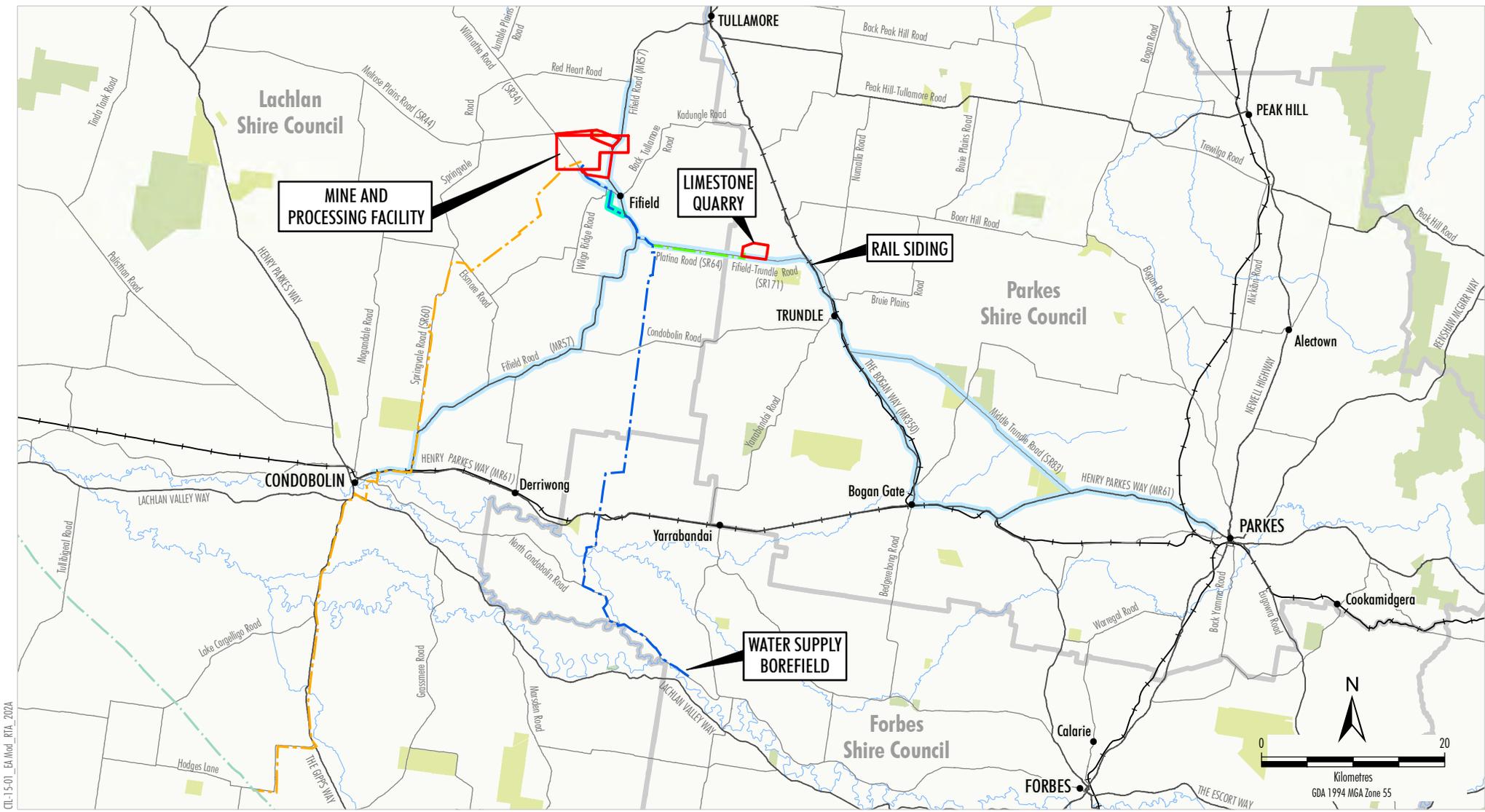
Austroads (2015) provides a general guide to road lighting, and advises that Australian Standard (AS) 1158.1.2 provides some general guidance on warrants for lighting on traffic routes and isolated intersections. AS1158.1.2 indicates however that warrants are set by individual road authorities, in this case either Council or RMS. With regard to lighting requirements, Austroads (2010b) indicates that channelised turn treatments with raised islands should be adequately illuminated by road lighting or defined by reflective pavement markers, signs, etc. The intersections and routes referred to in the conditions above would not include raised islands.

Lighting of key intersections along the heavy vehicle route could be considered as part of ongoing maintenance activities in consultation with the Parkes Shire Council and Lachlan Shire Council.

6.3 Road Maintenance Contributions

Clean TeQ proposes to make contributions to the ongoing maintenance of the following roads (Figure 6-2):

- Henry Parkes Way (between Jones Lane [eastern outskirts of Condobolin] and Fifield Road) and between Westlime Road [western outskirts of Parkes] and The Bogan Way);
- Middle Trundle Road (between Henry Parkes Way and The Bogan Way);



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- LEGEND**
- Nation Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Mining Tenement
 - Water Supply Pipeline
 - Limestone Quarry Water Supply Pipeline
 - Gas Pipeline
 - Existing Gas Pipeline

- Extent of Road Maintenance Contribution
- Fifield Bypass

Source: Black Range Minerals (2000);
 NSW Department of Industry (2015);
 NSW Land & Property Information (2015)

Note: The Limestone Quarry, Rail Siding, Limestone Quarry Water Supply Pipeline and Gas Pipeline would not be constructed during the Initial Production Phase.

**SYERSTON PROJECT
 SCANDIUM OXIDE MODIFICATION
 Road Maintenance Contribution**

Figure 6-2

- The Bogan Way (between Henry Parkes Way and Fifield-Trundle Road [SR171]);
- Fifield-Trundle Road (between The Bogan Way and the Parkes Shire boundary);
- Platina Road (between the Lachlan Shire boundary and Fifield Road);
- Fifield Road (between Henry Parkes Way and Slee Street [in Fifield Village]);
- Slee Street [in Fifield Village] (between Fifield Road and Wilmatha Road [SR34]); and
- Wilmatha Road (between Slee Street [in Fifield Village] and the MPF access road).

Contributions to maintenance of these roads would satisfactorily address the implications of increased traffic generated by the Initial Production Phase of the modified Project.

6.4 Traffic Code of Conduct

Condition 7.1 of Development Consent (DA 374-11-00) requires that a Traffic Code of Conduct be developed for haulage vehicles travelling to and from the Project. The Modification would not alter this requirement, noting that the Traffic Code of Conduct should be reviewed periodically and amended as required.

7 Conclusion

This study has found that the Initial Production Phase of the modified Project would have acceptable impacts on the operation of the surrounding road system.

During the Initial Production Phase, no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of that traffic with the implementation of the following management or mitigation measures:

- road and intersection upgrades outlined in Sections 6.1 and 6.2;
- road maintenance contributions to the maintenance of the roads outlined in Section 6.3: and
- implementation of the Traffic Code of Conduct (Section 6.4).

Based on the analysis and discussions presented within this report, it is concluded that the road network would satisfactorily accommodate the Initial Production Phase of the modified Project.

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