

Sunrise Project Project Execution Plan Modification



Modification Report Main Report and Appendices



EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The Sunrise Project (the Project) is a nickel, cobalt and scandium open cut mining project situated near the village of Fifield, approximately 350 kilometres west-northwest of Sydney, in New South Wales (NSW).

SRL Ops Pty Ltd owns the rights to develop the Project. SRL Ops Pty Ltd is a wholly owned subsidiary of Sunrise Energy Metals Limited (SEM)¹.

Development Consent (DA 374-11-00) for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Six modifications to Development Consent (DA 374-11-00) have since been granted under the EP&A Act.

The Project includes the establishment and operation of the following:

- mine and processing facility;
- limestone quarry;
- rail siding;
- borefield, surface water extraction infrastructure and water pipeline;
- gas pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

This Modification Report is a Statement of Environmental Effects that has been prepared by SEM to support a request to modify Development Consent (DA 374-11-00) under section 4.55(2) of the EP&A Act.

ES.2 OVERVIEW OF THE MODIFICATION

SEM has continued to review and optimise the Project design, construction and operation as part of preparations for Project execution. The outcomes of this review are outlined in the Project Execution Plan. The Project Execution Plan identified a number of changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities.

The Project Execution Plan Modification (the Modification) includes these Project Execution Plan changes to allow for the optimisation of the construction and operation of the Project.

Table ES.1 provides a comparative summary of the existing/approved and modified Project.

In accordance with clause 3BA(6) of Schedule 2 of the *Environmental Planning and Assessment* (*Savings, Transitional and Other Provisions*) *Regulation 2017*, the consent authority is required to satisfy itself that any consent as modified would result in the Project remaining substantially the same development as was last modified under section 75W of the EP&A Act (i.e. Modification 4, which is the existing/approved Project), inclusive of consideration of the changes arising from previously approved modifications.

Based on a review of the proposed changes, SEM considers that the modified Project would be substantially the same as the existing/approved Project.

ES.3 STAKEHOLDER ENGAGEMENT OVERVIEW

SEM has consulted with a number of stakeholders during the development of the Modification, including:

- NSW Department of Planning, Industry and Environment;
- other relevant NSW Government agencies;
- Lachlan Shire Council, Parkes Shire Council and Forbes Shire Council;
- relevant infrastructure owners and service providers;
- Community Consultative Committee; and
- the local community.

The outcomes of engagement with these stakeholders have informed the development of the scope of the Modification and SEM's preparation of the Modification Report.



¹ SEM was previously Clean TeQ Holdings Limited (Clean TeQ).

Table ES.1
Comparison of the Existing/Approved and Modified Project

Project Component	Existing/Approved	Modified
Mining Tenements	Mining Lease 1770 and Mining Lease 1769.	No change.
Project Life	 Construction phase – two years. Operational phase – 21 years from the commencement of mining. 24 hours per day, seven days per week 	 Increased construction phase duration from two to three years. No change to the operational phase. No change
Operation		
Mining Method	Conventional open cut mining methods.	No change to mining method.Increased mining rate during initial years.
Open Cut Pit Extents	 Progressive development of two main open cut pits and multiple small-scale scandium open cut pits. 	No change to open cut pit extents.Minor changes to the mining sequence.
Waste Rock Management	 Waste rock deposited in small-scale scandium open cut voids and in waste rock emplacements. 	 No change to waste rock management. Minor changes to the waste rock emplacement sequence.
Processing Facility Area	 Key components include processing plant, sulphuric acid plant, limestone slurry plant, process reagent storages, power plant, workshops, warehouses, offices, fuel storages, water treatment plants, run-of-mine pad, laydown areas and vehicle access points. 	 No change to key components. Revised processing facility area layout (including revised processing plant layout and two additional vehicle site access points).
Processing Plant	 Metals extracted from the ore using an acid leach circuit and a resin-in-pulp circuit/metals recovery. 	No change.
	 Autoclave feed rate of up to 2.5 million tonnes of ore (dry weight) in any calendar year. 	
Processing Plant Reagents	 Up to 1,050,000 tonnes per annum (tpa) of sulphuric acid produced in the sulphuric acid plant. 	 No change to sulphuric acid plant process or production rate. Reduced sulphuric acid plant stack height from 80 metres (m) to 40 m.
	Up to 990,000 tpa of limestone delivered to the mine and processing facility via road from either	No change.
	 the limestone quarry (up to 790,000 tpa); and/or 	
	 third-party suppliers (up to 560,000 tpa). 	
	Other processing plant reagents delivered to the mine and processing facility via road and rail.	Revisions to processing plant reagent types, rates and storage volumes.
Products	 Up to 40,000 tpa of nickel and cobalt metal equivalents, as sulphate precipitate products. 	No change.
	 Up to 100,000 tpa of ammonium sulphate. Up to 180 tpa of scandium oxide. 	
Tailings Management	 Tailings deposited in the tailings storage facility. 	 No change to tailings management. Revised tailings storage facility cell construction sequence. Addition of a decant transfer pond.
Water Supply	 Development of borefield, surface water extraction infrastructure and water pipeline to the mine and processing facility. 	No change.

Table ES.1 (Continued)
Comparison of the Existing/Approved and Modified Project

Project Component	Existing/Approved	Modified
Water Management	 Overall objective is to control runoff from the construction and operational areas while diverting up-catchment water around these areas. 	 No change to the overall water management objective. Relocated and resized evaporation pond. Changes to the water management system to reflect the modified mine and processing facility layout
Power Supply	 Co-generation power plant (40 megawatts). Diesel-powered backup generator. No exploration activities 	 No change to co-generation power plant. Increased number of diesel-powered backup generators (and associated stacks) from one to four. Addition of exploration activities within the
Activities		approved surface development area inside Mining Lease 1770.
Camp	 Development of an accommodation camp on the Sunrise property. Approximate capacity of 1.300 personnel 	 Increased construction phase capacity from 1,300 to 1,900 personnel. Increased size of the treated wastewater irrigation
	 Reduced capacity of 300 personnel during the operations phase. 	 Option for an alternative alignment of the last section of the accommodation camp water pipeline along the accommodation camp services corridor rather than along the access road corridor.
		• Option to transfer treated wastewater to the mine and processing facility via a water pipeline.
Deil Cidina		No change to the operational phase capacity.
Rail Siding	Development of a fall siding on the Bogan Gate Tottenham Railway.	 Rall slding relocated approximately 500 m south of the approved location on the Bogan Gate Tottenham Railway.
		 Addition of an ammonium sulphate storage and distribution facility.
		Addition of a 22 kilovolt electricity transmission line (subject to separate approval).
Gas Pipeline	 Development of a gas pipeline from the Moomba Sydney Pipeline to the mine and processing facility. 	No other changes to rail siding operations. No change.
Material Transport	 Transport of reagents and products via a combination of road and rail. 	Changes to construction phase vehicle movements associated with the increased construction phase accommodation camp capacity and changes to heavy vehicle delivery requirements.
		 Changes to operational phase heavy vehicle movements associated with revisions to processing plant reagent types, rates and storage volumes.
		 Changes to operational phase heavy vehicle movements to and from the rail siding associated with the transport of metal and ammonium sulphate products.
Road and Intersection	 Road and intersection upgrades in accordance with the Development 	• Two additional mine and processing facility vehicle access point intersections on Wilmatha Road.
Upgrades	Consent (DA 374-11-00) and Voluntary Planning Agreement.	Extension to the Scotson Lane road upgrade.
		 No change to other road and intersection upgrades.
Workforce	Peak of approximately 1,000 personnel during construction phase.	Increased peak construction phase workforce from approximately 1,000 to 1,900 personnel.
	Approximately 335 personnel during operation phase	 Increased operational phase workforce from approximately 335 to 340 personnel



ES.4 ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

SEM has undertaken a review of the potential environmental impacts of the Modification to identify key potential environmental aspects requiring assessment. The key potential environmental aspects identified and environmental review outcomes are summarised in Table ES.2.

ES.5 EVALUATION OF MERITS

Approval of the Modification is considered to be justified given:

- The Modification would allow for the optimisation of the construction and operation of the approved Project.
- The Modification would increase the peak construction phase workforce from approximately 1,000 personnel to approximately 1,900 personnel and the duration of the construction phase would increase from two to three years providing additional employment opportunities and economic benefits.

 The Modification would include the development of NSW mineral resources in a manner that minimises environmental impacts through the implementation of the Environmental Management Strategy and other measures.

In weighing up the main environmental impacts (costs and benefits) associated with the proposal as assessed and described in this Modification Report, the Modification is, on balance, considered to be in the public interest of the State of NSW.

Summary of Key Environmental Review Conclusions
 Compliance with the relevant air quality criteria is predicted at privately-owned sensitive receivers surrounding the modified mine and processing facility and rail siding.
 Two "moderate" exceedances and five "negligible" exceedances are predicted at privately-owned sensitive receivers in the vicinity of the mine and processing facility with the implementation of reasonable and feasible mitigation measures.
 The privately owned dwellings with a "moderate" exceedance would be afforded noise mitigation measures upon request rights in accordance with the Voluntary Land Acquisition and Mitigation Policy.
Compliance with the relevant noise criteria is predicted at the modified rail siding.
 The water balance modelling demonstrates that the modified site water management system has sufficient capacity and flexibility to accommodate a wide range of climate scenarios.
 No overflows are predicted from the tailings storage facility, decant transfer pond, evaporation pond, mine water dams or processing plant runoff dams over the Project life.
 The predicted average and maximum annual off-site water requirements for the Project would not significantly change.
 Potential surface water impacts associated with the Modification are not considered to be significant.
 No significant change to approved groundwater impacts are predicted as a result of the Modification.
The Modification would have "minimal impact" as defined in the Aquifer Interference Policy.
 The Preliminary Hazard Analysis concluded that the modified Project would comply with all relevant risk criteria (including societal risk, area cumulative risk, propagation risk, transport risk and environmental risk).

Table ES.2 Key Outcomes of Environmental Review of the Modified Project



Table ES.2 (Continued)
Key Outcomes of Environmental Review of the Modified Project

Environmental Aspect	Summary of Key Environmental Review Conclusions
Road Transport	Construction phase daily traffic movements would significantly reduce.
	Operational phase daily traffic movements would not significantly change.
	Construction and operational phase truck traffic in Trundle main street would reduce.
	 The road and intersection upgrades required by Development Consent (DA 374-11-00) and the Voluntary Planning Agreement are appropriate for the modified Project with the addition of the extension of the approved Scotson Lane upgrade to the modified rail siding access and two additional vehicle site access points.
	 No significant impacts to road performance, capacity, efficiency or safety are expected as a result of the traffic associated with the Modification.
Biodiversity	 No increase to impacts on vegetation abundance, vegetation integrity, habitat suitability, threatened species abundance, habitat connectivity, threatened species movement, flight path integrity or hydrological processes that are known to sustain a threatened species or ecological community.
	 As there would be no increase in impacts on biodiversity values, a Biodiversity Development Assessment Report is not required.
Aboriginal Cultural Heritage	No additional Aboriginal cultural heritage sites would be impacted by the Modification.
Historic Heritage	No additional historic heritage sites would be impacted by the Modification.
Visual	 The Modification is not expected to significantly change the visual impacts associated with the mine and processing facility, accommodation camp and rail siding.
Social	 All identified social impacts associated with the Modification are evaluated as low significance, with the exception of two positive impacts rated as medium significance.
Economic Effects	 The Modification would provide additional employment opportunities during the construction phase of the Project that would result in increased economic benefits (e.g. increased wages, business turnover) in the NSW economy.
Greenhouse Gas Emissions	 The total greenhouse gases directly generated as a result of the modified Project (Scope 1 emissions) would be less than those generated by the approved Project.



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1 INTRODUCTION

The Sunrise Project (the Project) is a nickel, cobalt and scandium open cut mining project situated near the village of Fifield, approximately 350 kilometres (km) west-northwest of Sydney, in New South Wales (NSW) (Figure 1).

SRL Ops Pty Ltd owns the rights to develop the Project. SRL Ops Pty Ltd is a wholly owned subsidiary of Sunrise Energy Metals Limited (SEM)².

Development Consent (DA 374-11-00) for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Six modifications to Development Consent (DA 374-11-00) have since been granted under the EP&A Act. Development Consent (DA 374-11-00) is provided in Attachment 1.

This Modification Report is a Statement of Environmental Effects that has been prepared by SEM to support a request to modify Development Consent (DA 374-11-00) under section 4.55(2) of the EP&A Act.

1.1 DESCRIPTION OF THE EXISTING/APPROVED PROJECT

1.1.1 Project Overview

The Project includes the establishment and operation of the following:

- mine and processing facility;
- limestone quarry;
- rail siding;
- borefield, surface water extraction infrastructure and water pipeline;
- gas pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

The Project is currently approved to:

- undertake mining operations for 21 years from the day upon which mining operations start;
- operate a maximum autoclave feed rate of 2.5 million tonnes (Mt) of ore (dry weight) in any calendar year;
- transport in any one calendar year no more than 40,000 tonnes (t) of nickel and cobalt metal equivalents, 180 t of scandium oxide and 100,000 t of ammonium sulphate;
- extract up to 790,000 t of limestone from the limestone quarry in any one calendar year; and
- operate related supporting infrastructure.

Construction of the Project commenced in 2006, which included components of the borefield, however construction of other Project components is yet to commence.

1.1.2 Environment Monitoring and Management

An Environmental Management Strategy (Clean TeQ, 2019a) has been developed and approved for the Project to minimise environmental impacts by providing the strategic context for environmental management across the Projects various components.

The following environmental management and monitoring plans and strategies have been developed in consultation with relevant agencies as part of the Environmental Management Strategy:

- Water Management Plan, including:
 - Water Balance;
 - Surface Water Management Plan; and
 - Groundwater Management Plan.
- Noise Management Plan;
- Air Quality Management Plan;
- Blast Management Plan;
- Heritage Management Plan;
- Rehabilitation Management Plan;
- Biodiversity Management Plan and Revegetation Strategy;
- Traffic Management Plan; and
- Road Upgrade and Maintenance Strategy.





² SEM was previously Clean TeQ Holdings Limited (Clean TeQ).



In addition, the following hazard studies will be prepared for the Project in accordance with Development Consent (DA 374-11-00):

- Fire Safety Study;
- Final Hazard Analysis;
- Construction Safety Study;
- Hazard and Operability Study;
- Transport of Hazardous Materials Study;
- Emergency Plan; and
- Safety Management System.

A further detailed description of the Project environmental management and monitoring plans and hazard studies listed above is provided in Section 6.

SEM maintains and operates an environmental monitoring network for the Project, including meteorological, dust, particulate matter, surface water and groundwater monitoring.

An overview of environmental management actions and environmental monitoring results, including a review of SEM's performance against the requirements of the environmental management and monitoring plans, is presented each year in an Annual Review. The Annual Review is provided to government agencies and made publicly available on SEM's website.

1.1.3 Community Engagement

SEM is committed to engaging with communities to understand their priorities, provide information about the Project, and seek opportunities to create shared value. To do so, SEM operates under a community engagement policy which defines guiding principles for interactions with the community (Clean TeQ, 2019b).

A Community Consultative Committee (CCC) has been established for the Project. The purpose of the CCC is to provide a forum for open discussion between SEM representatives, the community, the relevant councils and other stakeholders on issues directly relating to the Project activities, environmental performance and community relations, and to keep the community informed on these matters. The independently chaired CCC meets biannually and the meeting presentation and minutes are publicly available on the SEM website. In addition, SEM has offices located in Parkes and Condobolin which are regularly open to members of the community to discuss the Project with SEM employees.

In addition, SEM operates a toll-free community complaints line to allow community members to easily raise issues regarding SEM's activities.

A Voluntary Planning Agreement (VPA) was executed with Lachlan Shire Council (LSC), Parkes Shire Council (PSC) and Forbes Shire Council (FSC) in December 2018. The first payments of \$200,000 to LSC, \$100,000 to PSC and \$100,000 to FSC were made in January 2019.

In 2019 SEM provided financial and/or non-financial support to local agricultural shows, primary and secondary schools (in Trundle, Condobolin, Parkes and Forbes), and the Trundle Bush Tucker Day (Clean TeQ, 2020a). SEM intends to continue its support of local agricultural shows and events as they recommence after the COVID-19 pandemic.

During 2020, SEM donated 100 megalitres (ML) of its surface water allocation to the LSC to assist filling Gum Bend Lake to allow for the continuation of recreational activities over the 2020/2021 summer.

1.2 MODIFICATION OVERVIEW

SEM has continued to review and optimise the Project design, construction and operation as part of preparations for Project execution. The outcomes of this review are outlined in the Project Execution Plan (Clean TeQ, 2020b).

The Project Execution Plan identified a number of changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities.

The Project Execution Plan Modification (the Modification) includes these Project Execution Plan changes to allow for the optimisation of the construction and operation of the Project.

Table 1 provides a comparative summary of the existing/approved and modified Project. Based on a review of the proposed changes, SEM considers that the modified Project would be substantially the same as the existing/approved Project.

A detailed description of the Modification is provided in Section 3.

Project Component	Existing/Approved	Modified
Mining Tenements	• Mining Lease (ML) 1770 and ML 1769.	No change.
Project Life	 Construction phase – two years. Operational phase – 21 years from the commencement of mining. 	 Increased construction phase duration from two to three years. No change to the operational phase.
Hours of Operation	• 24 hours per day, seven days per week.	No change.
Mining Method	Conventional open cut mining methods.	No change to mining method.Increased mining rate during initial years.
Open Cut Pit Extents	 Progressive development of two main open cut pits and multiple small-scale scandium open cut pits. 	 No change to open cut pit extents. Minor changes to the mining sequence.
Waste Rock Management	 Waste rock deposited in small-scale scandium open cut voids and in waste rock emplacements. 	 No change to waste rock management. Minor changes to the waste rock emplacement sequence.
Processing Facility Area	 Key components include processing plant, sulphuric acid plant, limestone slurry plant, process reagent storages, power plant, workshops, warehouses, offices, fuel storages, water treatment plants, run-of-mine (ROM) pad, laydown areas and vehicle access points. 	 No change to key components. Revised processing facility area layout (including revised processing plant layout and two additional vehicle site access points).
Processing Plant	 Metals extracted from the ore using an acid leach circuit and a resin-in-pulp circuit/metals recovery. Autoclave feed rate of up to 2.5 Mt of ore (dry weight) in any calendar year. 	No change.
Processing Plant Reagents	 Up to 1,050,000 tonnes per annum (tpa) of sulphuric acid produced in the sulphuric acid plant. 	 No change to sulphuric acid plant process or production rate. Reduced sulphuric acid plant stack height from 80 metres (m) to 40 m.
	 Up to 990,000 tpa of limestone delivered to the mine and processing facility via road from either the limestone quarry (up to 790,000 tpa); and/or third-party suppliers (up to 560,000 tpa). 	No change.
	 Other processing plant reagents delivered to the mine and processing facility via road and rail. 	 Revisions to processing plant reagent types, rates and storage volumes.
Products	 Up to 40,000 tpa of nickel and cobalt metal equivalents, as sulphate precipitate products. Up to 100,000 tpa of ammonium sulphate. Up to 180 tpa of scandium oxide. 	No change.
Tailings Management	• Tailings deposited in the tailings storage facility.	 No change to tailings management. Revised tailings storage facility cell construction sequence. Addition of a decant transfer pond.
Water Supply	 Development of borefield, surface water extraction infrastructure and water pipeline to the mine and processing facility. 	No change.

 Table 1

 Comparison of the Existing/Approved and Modified Project



Table 1 (Continued)
Comparison of the Existing/Approved and Modified Project

Project Comp <u>onent</u>	Existing/Approved	Modified
Water	Overall objective is to control runoff	No change to the overall water management objective.
Management	from the construction and operational areas while diverting up-catchment	Relocated and resized evaporation pond.
	water around these areas.	 Changes to the water management system to reflect the modified mine and processing facility layout.
Power Supply	Co-generation power plant	No change to co-generation power plant.
	(40 megawatts [MW]).Diesel-powered backup generator.	 Increased number of diesel-powered backup generators (and associated stacks) from one to four.
Exploration Activities	No exploration activities.	 Addition of exploration activities within the approved surface development area inside ML 1770.
Accommodation Camp	 Development of an accommodation camp on the Sunrise property. 	 Increased construction phase capacity from 1,300 to 1,900 personnel.
	Approximate capacity of 1,300 personnel during the construction	 Increased size of the treated wastewater irrigation area.
	 Phase. Reduced capacity of 300 personnel during the operations phase. 	 Option for an alternative alignment of the last section of the accommodation camp water pipeline along the accommodation camp services corridor rather than along the access road corridor.
		 Option to transfer treated wastewater to the mine and processing facility via a water pipeline.
		No change to the operational phase capacity.
Rail Siding	 Development of a rail siding on the Bogan Gate Tottenham Railway. 	 Rail siding relocated approximately 500 m south of the approved location on the Bogan Gate Tottenham Railway.
		 Addition of an ammonium sulphate storage and distribution facility.
		 Addition of a 22 kilovolt (kV) electricity transmission line (ETL) (subject to separate approval).
		No other changes to rail siding operations.
Gas Pipeline	Development of a gas pipeline from the Moomba Sydney Pipeline to the mine and processing facility.	No change.
Material Transport	 Transport of reagents and products via a combination of road and rail. 	 Changes to construction phase vehicle movements associated with the increased construction phase accommodation camp capacity and changes to heavy vehicle delivery requirements.
		 Changes to operational phase heavy vehicle movements associated with revisions to processing plant reagent types, rates and storage volumes.
		 Changes to operational phase heavy vehicle movements to and from the rail siding associated with the transport of metal and ammonium sulphate products.
Road and Intersection	Road and intersection upgrades in accordance with the Development	 Two additional mine and processing facility vehicle access point intersections on Wilmatha Road.
Upgrades	Consent (DA 374-11-00) and Voluntary Planning Agreement.	Extension to the Scotson Lane road upgrade.
		No change to other road and intersection upgrades.
Workforce	Peak of approximately 1,000 personnel during construction phase.	 Increased peak construction phase workforce from approximately 1,000 to 1,900 personnel.
	 Approximately 335 personnel during operation phase. 	 Increased operational phase workforce from approximately 335 to 340 personnel.

1.3 STRUCTURE OF THE DOCUMENT

This Modification Report, prepared in consideration of the exhibition draft *Preparing a Modification Report State Significant Development Guide* (NSW Department of Planning, Industry and Environment [DPIE], 2020a), is structured as follows:

Section 1	Provides an overview of the existing/approved Project and the background to the Modification.
Section 2	Provides an overview of the strategic context for the modified Project.
Section 3	Provides a description of the Modification.
Section 4	Describes the statutory context of the Modification.
Section 5	Provides a summary of the engagement undertaken for the Modification and key issues raised.
Section 6	Provides a review of the existing/approved environmental management at the Project and an environmental assessment of the Modification.
Section 7	Evaluates the merits of the modified Project, and provides justification for approval of the Modification.
Section 8	Lists the references cited in Sections 1 to 7.

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

Attachment 1	Development Consent (DA 374-11-00)
Attachment 2	Proposed Amendments to Appendix 1 of Development Consent (DA 374-11-00)
Appendix A	Air Quality Assessment
Appendix B	Noise Assessment
Appendix C	Surface Water Assessment
Appendix D	Road Transport Assessment
Appendix E	Preliminary Hazard Analysis
Appendix F	Biodiversity Review
Appendix G	Aboriginal Cultural Heritage Assessment

Appendix H	Land Contamination Assessment

Appendix I Social Impact Review

Appendix J Environmental Review of Rail Siding Electricity Transmission Line

2 STRATEGIC CONTEXT

This section outlines the strategic context for the Modification. The strategic need and potential benefits of the Modification are also described in this section.

2.1 REGIONAL CONTEXT

The Project is located in the Lachlan, Parkes and Forbes local government areas (LGAs) (Figure 1), which form part of the Central West and Orana region of NSW. The wider Central West and Orana region also comprises the LGAs of Bathurst Region, Blayney, Cabonne, Cowra, Lithgow, Oberon, Orange, Weddin, Bogan, Coonamble, Dubbo Region, Gilgandra, Narromine, Mid-Western Region, Warren and Warrumbungle (NSW Government, 2017).

The Central West and Orana region has a diverse and productive economy that leverages its connections to Sydney, Newcastle, Canberra, Melbourne and Brisbane to access domestic and international markets (NSW Government, 2017).

The Central West and Orana region's gross regional product represents approximately 12 percent (%) of NSW's gross regional product. The "mining" and the "agriculture, forestry and fishing" sectors are the two largest contributors to the region's gross regional product (\$2.5 billion and \$1.3 billion, respectively) (NSW Government, 2017).

Productive and diversified agribusiness, manufacturing, mineral and renewable energy resources provide local employment opportunities in the Central West and Orana region. The "agriculture, forestry and fishing" and "mining" sectors provide approximately 11% and 5% of employment opportunities in the region, respectively (NSW Government, 2017).

The Lachlan Shire is located in the south-west of the Central West and Orana region. Condobolin is the local service centre and main residential area for the Lachlan Shire and provides a hub for agricultural activity, grain storage and transportation links for Lake Cargelligo, Tottenham, Tullibigeal, Burcher, Derriwong, Fifield and Albert (NSW Government, 2017). The Parkes Shire has a diverse economy underpinned by agriculture and mining and supported by a robust transport and logistics industry. The Parkes Shire includes the strategic centre of Parkes and smaller towns of Peak Hill, Bogan Gate, Trundle and Tullamore (NSW Government, 2017).

Parkes sits at the intersection of the Newell Highway and the rail corridor that links Melbourne, Brisbane, Sydney and Perth, as well as Adelaide and Darwin (NSW Government, 2017). The NSW Government has established the Parkes Special Activation Precinct under the *State Environmental Planning Policy (Activation Precincts) 2020* to take advantage of this access to existing national transport corridors and provide opportunities for new industries to co-locate in Parkes to drive economic activity (NSW Government, 2020).

The Forbes Shire is located in the south of the Central West and Orana region. The economy is underpinned by irrigated and dryland agriculture, particularly grains and livestock, as well as wholesale trade, health care and manufacturing (NSW Government, 2017).

2.2 PROJECT CONTEXT

The Modification would involve changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities (Section 3).

The mine and processing facility and accommodation camp are located approximately 40 km north-east of Condobolin and approximately 80 km north-west of Parkes. Fifield is the closest community to these Project components and is located approximately 2 km to the south-east (Figure 1).

Existing land uses in the vicinity of the mine and processing facility and accommodation camp are characterised by a combination of agricultural enterprises (grazing and dryland cropping), carbon offset properties and forestry operations (Fifield State Forest).

The rail siding is located approximately 50 km north-west of Parkes. Trundle is the closest community to the rail siding and is located approximately 4 km to the south-southeast (Figure 1).



Existing land uses in the vicinity of the rail siding are characterised by a combination of agricultural enterprises (grazing and dryland cropping), roads and the Bogan Gate Tottenham Railway. The Bogan Gate Tottenham Railway is infrequently used for grain transport and provides access to the Port of Newcastle, Port Botany and Port Kembla.

Relevant land ownership information for land parcels and the location of rural dwellings within the immediate vicinity of the mine and processing facility, accommodation camp and rail siding is provided in Section 6.2.

A detailed description of the regional road network is provided in Section 6.6.

2.3 POTENTIAL CUMULATIVE INTERACTIONS WITH OTHER STATE SIGNIFICANT PROJECTS

This section describes the potential interaction between the modified Project and other State significant projects in the region that may be of potential relevance to the environmental assessment of the Modification.

Key proposed or approved projects that may potentially interact with, or have potential cumulative impacts with, the modified Project are listed in Table 2 and shown on Figure 1.

Table 2 also classifies each of the State significant projects as "relevant" or "potentially relevant" in accordance with the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b).

Cumulative impacts with the modified Project and the "relevant" State significant projects have been considered in this Modification Report (Section 6) in accordance with the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b).

The NSW Government has established the Parkes Special Activation Precinct under the *State Environmental Planning Policy (Activation Precincts)* 2020. The Parkes Special Activation Precinct is a 3,600 hectare (ha) industrial park located approximately 3 km west of Parkes (Figure 1) (NSW Government, 2020).

Construction of Stage 1 infrastructure for the industrial park (i.e. road and electricity distribution infrastructure) is expected to commence in June 2021 (Regional Growth NSW, 2021).

The Parkes Solar Farm, Goonumbla Solar Farm and Parkes Peaking Power Plant (Table 2) are located in the Parkes Special Activation Precinct. Any future developments associated with the Parkes Special Activation Precinct may also potentially interact with, or have potential cumulative impacts with, the modified Project. These potential interactions or cumulative impacts would be assessed as part of separate development applications for these future developments.

2.4 RELEVANT STRATEGIC PLANNING DOCUMENTS

2.4.1 Central West and Orana Regional Plan 2036

The Central West and Orana Regional Plan 2036 (NSW Government, 2017) (the Regional Plan) applies to the Central West and Orana region which includes the Lachlan, Parkes and Forbes LGAs where the Project is located (Section 2.1). The Regional Plan outlines the land use planning priorities for the region over 20 years to 2036.

The Regional Plan recognises the significance of mineral resource development and includes the growth of mineral resource development in the overall vision for the region. The modified Project would provide continued growth of mineral resource development in the region.

The Regional Plan has four goals for the region:

- The most diverse regional economy in NSW
- A stronger, healthier environment and diverse heritage
- Quality freight, transport and infrastructure networks
- Dynamic, vibrant and healthy communities

The Modification is generally consistent with the goals of the Regional Plan as:

- The modified Project would benefit the regional economy through the creation of employment opportunities and regional expenditure, including the addition of an ammonium sulphate storage and distribution facility that would facilitate the supply of ammonium sulphate (a fertiliser) to agricultural operations in the region.
- The modified Project incorporates a range of strategies to manage and minimise impacts on the environment and heritage (Sections 1.1.2 and 6 and Appendices A to J).

 Table 2

 Summary of Key Proposed or Approved State Significant Projects in the Project Region

Project	Overview	Status	Cumulative Impact Assessment ¹
Lachlan Shire Local Govern	ment Area		
Cattle Feedlot and Quarry (Department of	 50,000 head cattle feedlot and quarry (providing material to the feedlot for construction and maintenance), located approximately 30 km west of Condobolin. 	 Approved (2005) – Not constructed 	 Relevant Project – Required to be
Natural Resources, 2005)	 The construction workforce is approximately 85 personnel in the first year of construction and 53 personnel over the following three years of construction. 		Considered
	The operational workforce is approximately 50 personnel.		
Flemington Cobalt Scandium Mine	 A proposed nickel, cobalt and scandium open cut mine located to the immediate north-west of the Project. 	 Environmental Assessment 	 Potentially Relevant Project – Not
(Australian Mines Limited, 2017)	 The proposed construction workforce is approximately 120 to 150 personnel for approximately 12 to 18 months. 	Requirements (EARs) Issued (2018)	Required to be Considered
	The proposed operational workforce is approximately 75 personnel for 18 years.	(2010)	
Owendale Scandium Mine (R.W. Corkery & Co. Pty	 A proposed nickel, cobalt and scandium open cut mine (immediately north-east of the Project), processing site (located approximately 5 km west of Condobolin) and associated infrastructure. 	EARs Issued (2018)	 Potentially Relevant Project – Not
Limited, 2018)	• The proposed construction period is approximately two years (no workforce estimate provided).		Required to be
	• The proposed operational workforce is approximately 121 personnel for 28 years of mining operations.		oonsidered
Western Slopes Pipeline (APA Group, 2017)	 A proposed high pressure gas pipeline approximately 450 km in length to connect the Narrabri Gas Project to the NSW gas transmission network, with the alignment located north and west of the Project. 	EARs Issued (2019)	 Potentially Relevant Project – Not
	 The proposed construction workforce is between 250 and 350 personnel for approximately eight to 10 months. 		Required to be Considered
	The proposed operational workforce is four to five personnel for approximately 40 years.		
Parkes Shire Local Governm	nent Area		
Northparkes Mine Extension Project (CMOC Mining Services Pty Ltd, 2018)	 A copper-gold mine located approximately 27 km north-west of Parkes. Operational workforce of approximately 700 personnel until end of the mine life in 2032. 	Approved (2014) – Operational	 Relevant Project – Required to be Considered
Inland Rail Parkes to Narromine (Australian Rail Track Corporation [ARTC], 2021)	 An upgrade of the existing rail line between Parkes and Narromine as part of the Inland Rail Project (including 98.4 km of upgraded track and 5.4 km of new track). 	Approved (2018) – Operational	 Relevant Project – Required to be Considered
Parkes Solar Farm (Neoen Renewing Energy, 2016)	 A 65 MW photovoltaic solar farm located approximately 10 km west of Parkes. The operational workforce on-site is approximately one for the expected 25 to 30 year operational life. 	 Approved (2016) – Operational 	Relevant Project – Required to be Considered

Project	Overview	Status	Cumulative Impact Assessment ¹
Goonumbla Solar Farm (Geolyse, 2016)	 A 70 MW photovoltaic solar farm located approximately 10 km west of Parkes and immediately north of the Parkes Solar Farm. 	 Approved (2016) – Operational 	 Relevant Project – Required to be
	There are no operational employees stationed on-site at the solar farm.		Considered
Quorn Park Solar Farm	An 80 MW photovoltaic solar farm located approximately 10 km north-west of Parkes.	• Approved (2020) -	 Relevant Project –
(Premise Australia Pty	The peak construction workforce is 100 personnel for approximately nine months.	Not constructed	Required to be
Elifited, 2019)	The operational workforce is two to three personnel for the expected 30 year operational life.		Considered
Parkes Peaking Power Plant (NSW Department of	 A gas turbine peaking power plant with a nominal output between 120 MW to 150 MW, located approximately 10 km west of Parkes. 	 Approved (2008) – Not constructed 	 Relevant Project – Required to be
Planning [DoP], 2008)	• The construction workforce is approximately 44 personnel for six to eight months.		Considered
	The operational workforce is approximately four personnel.		
Parkes Bypass ²	 A 10.5 km Newell Highway bypass approximately 2 km west of Parkes. 	• Approved (2019) -	 Relevant Project –
(Transport for NSW [TfNSW], 2019 and 2021)	• The main construction workforce is up to approximately 400 personnel for approximately three years.	Under construction	Required to be Considered
E44 Rocklands Project (MineSoils, 2021)	 A proposed open cut mine to supplement existing underground operations at Northparkes Mine, approximately 50 km south-east of the Sunrise Mine. 	Site Verification Certificate Application submitted (2020)	 Potentially Relevant Project – Not Required to be Considered
Forbes Shire Local Government Area			
Jemalong Solar Farm (NGH	A 50 MW photovoltaic solar farm undergoing construction, approximately 36 km west of Forbes.	Approved (2018) – Under construction	Relevant Project – Required to be Considered
Environmental Pty Ltd, 2017)	 The construction workforce is approximately 100 direct jobs and 100 indirect jobs over a construction period of approximately 12 months. 		
	The operational workforce is three to four personnel for approximately 30 years.		
Daroobalgie Solar Farm (Pacific Hydro, 2019)	A 100 MW photovoltaic solar farm located approximately 11 km north-east of Forbes.	EARs Issued	 Potentially Relevant
	 A proposed peak construction workforce of approximately 160 personnel for approximately 12 to 18 months. 	(2019)	Project – Not Required to be Considered
	 A proposed operational workforce of approximately four to six personnel for the expected operational life of approximately 25 years. 		

 Table 2 (Continued)

 Summary of Key Proposed or Approved State Significant Projects in the Project Region

¹ In accordance with the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b).

² Approved under Part 5 of the EP&A Act.



- The modified Project includes consideration of potential impacts on transport infrastructure (Section 6.6 and Appendix D).
- The modified Project would include road and intersection upgrades and ongoing maintenance contributions that would improve the quality of transport infrastructure (Sections 3.5.3 and 6.6 and Appendix D).
- SEM would continue to make community contributions supporting positive social outcomes, social infrastructure investments and/or community resilience improvements that would promote community growth and development (Sections 1.1.3 and 6.13 and Appendix I).

2.4.2 Lachlan Shire Council Community Strategic Plan 2017/18 – 2026/27

The Community Strategic Plan 2017/18 – 2026/27 (the Lachlan CSP) (LSC, 2017) is LSC's strategic plan for the Lachlan Shire to 2027.

The Lachlan CSP includes visions for seven key themes:

- Community Services That everyone in Lachlan Shire receives the services that they need to enjoy a rich and diverse lifestyle.
- Tourism & Economic Development That Lachlan Shire is a place people want to be and that people who want to work have a job.
- Transport To have a world class transport network that enables everyone in the community to be where they want to be when they want.
- Governance & Financial Control A responsive and sustainable Council with community focus and a can-do attitude.
- People and Environment Lachlan Shire is clean and green and a safe place to live.
- Recreation Foster the need of our citizens recreational and cultural pursuits.
- Service Infrastructure Provide world class water and sewerage systems in every town in the shire.

The Modification is generally consistent with the key themes included in the Lachlan CSP as:

- SEM would continue to make community contributions supporting positive social outcomes, social infrastructure investments and/or community resilience improvements that would promote community growth and development (Sections 1.1.3 and Section 6.13 and Appendix I).
- The modified Project would benefit the Lachlan Shire economy by continuing to diversify the economy and through the creation of training and employment opportunities and regional expenditure.
- The modified Project includes consideration of potential impacts on transport infrastructure (Section 6.6 and Appendix D).
- The modified Project would include road and intersection upgrades that would improve the quality of transport infrastructure in the Lachlan Shire (Sections 3.5.3 and 6.6 and Appendix D).
- SEM would make contributions to ongoing road maintenance in the Lachlan Shire in accordance with the terms of the VPA to assist in maintaining the road network.
- The modified Project incorporates a range of strategies to manage and minimise impacts on the environment and heritage (Sections 1.1.2 and 6 and Appendices A to J).
- The modified Project would incorporate Project-specific water supply and sewerage infrastructure and therefore would not impact LSC water and sewerage infrastructure.

2.4.3 Parkes Shire 2030+ Community Strategic Plan

PSC's strategic plan for the Parkes Shire is outlined in the *Parkes Shire* 2030+ *Community Strategic Plan* (the Parkes CSP) (PSC, 2021).

The Parkes CSP includes eight future directions for the Parkes Shire:

- Develop education and lifelong learning opportunities.
- Improve health and well being.
- Promote, support and grow our communities.



- Grow and diversify the economic base.
- Develop Parkes as a national logistics hub.
- Enhance recreation and culture.
- Care for the natural and built environment in a changing climate.
- Maintain and improve the Shire's assets and infrastructure.

The Modification is generally consistent with the strategic directions included in the Parkes CSP as:

- SEM would continue to make community contributions supporting positive social outcomes, social infrastructure investments and/or community resilience improvements that would promote community growth and development (Sections 1.1.3 and Section 6.13 and Appendix I).
- The modified Project would benefit the Parkes Shire economy by continuing to diversify the economy and through the creation of training and employment opportunities and regional expenditure.
- The modified Project would support the development of the Parkes national logistics hub through the use of transport infrastructure associated with the Parkes national logistics hub (e.g. rail transport).
- The modified Project includes consideration of potential impacts on transport infrastructure (Section 6.6 and Appendix D).
- The modified Project would include road and intersection upgrades that would improve the quality of transport infrastructure in the Parkes Shire (Sections 3.5.3 and 6.6 and Appendix D).
- SEM would make contributions to ongoing road maintenance in the Parkes Shire in accordance with the terms of the VPA to assist in maintaining the road network.
- The modified Project incorporates a range of strategies to manage and minimise impacts on the environment and heritage (Sections 1.1.2 and 6 and Appendices A to J).

2.4.4 Forbes Community Strategic Plan 2018-2028

The Forbes Community Strategic Plan 2018–2028 (the Forbes CSP) (FSC, 2017) sets out the FSC's vision, long term goals and community priorities for the future of Forbes Shire. The Forbes CSP includes goals for six future directions for the Forbes Shire:

- Community and Culture Our communities are healthy, vibrant and connected, sustained by our diversity, our inclusiveness and the strong community spirit that binds us.
- Local Economy Our local economy is strong, innovative and sustainable, providing diverse local employment opportunities and ease of access to goods and services.
- Natural Environment The good health of our natural environment and biodiversity is valued, protected and enhanced.
- Rural and Urban Land Use Our rural and urban land uses are carefully planned and managed to acknowledge the importance of local agriculture and accommodate growth, diversity and amenity in our town and villages.
- Infrastructure and Services Our Shire is supported by high quality, reliable infrastructure and services that meet the needs of our communities and connects us locally, regionally and nationally.
- Government and Representation We are supported by strong and ethical civic leadership at all levels and activities of government within the Shire are conducted in an open, transparent and inclusive manner.

The Modification is generally consistent with the strategic directions included in the Forbes CSP as:

- SEM would continue to make community contributions supporting positive social outcomes, social infrastructure investments and/or community resilience improvements that would promote community growth and development (Sections 1.1.3 and Section 6.13 and Appendix I).
- The modified Project would benefit the Forbes Shire economy by continuing to diversify the economy and through the creation of training and employment opportunities and regional expenditure.
- The modified Project incorporates a range of strategies to manage and minimise impacts on the environment (Sections 1.1.2 and 6 and Appendices A to J).
- The modified Project incorporates a range of strategies to manage and minimise impacts on the surrounding land users (Section 6 and Appendices A to J).



- The modified Project includes consideration of potential impacts on transport infrastructure (Section 6.6 and Appendix D).
- SEM would make contributions to ongoing road maintenance in the Forbes Shire in accordance with the terms of the VPA to assist in maintaining the road network.

2.4.5 Parkes Special Activation Precinct Master Plan

The NSW Government has established the Parkes Special Activation Precinct under the *State Environmental Planning Policy (Activation Precincts) 2020.*

The Parkes Special Activation Precinct Master Plan (the Master Plan) (NSW Government, 2020) is a statutory planning document under State Environmental Planning Policy (Activation Precincts) 2020 and describes the vision and principles for the Parkes Special Activation Precinct, provides detailed land use provisions by sub-precinct and provides performance criteria for environmental considerations.

The Master Plan includes the following overall vision for the Parkes Special Activation Precinct:

Stimulating economic development and employment, the Parkes Special Activation Precinct will be a hub of sustainability and enterprise that will enhance the local and regional community. Located at the epicentre of transport and logistics, Parkes will be a true inland port to national and global markets.

Although the Master Plan does not apply to the modified Project as the modified Project is not located in the Parkes Special Activation Precinct, the Modification is generally consistent with the vision included in the Master Plan as:

- The modified Project would support economic development and provide employment opportunities in the region.
- The modified Project incorporates a range of strategies to manage and minimise impacts on the environment and heritage (Sections 1.1.2 and 6 and Appendices A to J).
- The modified Project would utilise transport infrastructure associated with the Parkes Special Activation Precinct (e.g. rail transport).

2.4.6 Other Relevant NSW Assessment Policies

A range of NSW environmental assessment policies for various potential environmental aspects pertain to assessment and to the application of the Modification assessment findings (e.g. the *Voluntary Land Acquisition and Mitigation Policy* [VLAMP] [NSW Government, 2018]).

Where relevant to the Modification, the requirements of these policies and the assessed outcomes relative to these policies are presented in Section 6 and/or the associated specialist Appendices A to J.

2.5 STRATEGIC NEED AND POTENTIAL BENEFITS OF THE MODIFICATION

Once operating, the Project will be a leading global supplier of nickel and cobalt sulphates to the lithium-ion battery industry. It will also produce low-cost scandium for use in lightweight aluminium alloys for key transportation markets (Clean TeQ, 2020b).

Demand for lithium-ion batteries is expected to increase at approximately 28% per annum between 2020 to 2030. The increased demand for lithium-ion batteries is forecast to increase demand for nickel and cobalt by 36% and 19% per annum respectively (compound annual growth rate) over the same period (SEM, 2021).

The Modification includes a number of changes to the approved Project to optimise the construction and operation of the Project.

Production from the modified Project would contribute to Commonwealth Government tax revenue as well as NSW Government royalty and tax revenues.

The modified Project would provide employment for up to approximately 1,900 personnel during the three year construction phase and up to approximately 340 personnel during the 21 year operations phase.

The Project would also support regional businesses over the modified Project life.

Environmental mitigation measures (including performance monitoring) would be implemented at the modified Project to minimise potential impacts on the environment and community (Section 6).

A detailed evaluation of the Modification is provided in Section 7.



3 DESCRIPTION OF THE MODIFICATION

A description of the Modification is provided in this section, including a comparison of the modified Project with the approved Project. As only minor changes are proposed to the approved Project as part of the Modification (Table 1), this section focuses on the components of the Project that would change as a result of the Modification.

3.1 OVERVIEW

The Modification would include the following changes to the approved Project:

Mine and Processing Facility

- addition of a temporary construction laydown area inside the approved tailings storage facility surface development area;
- optimised production schedule resulting in an increased mining rate during the initial years of mining and associated changes to mining and waste rock emplacement sequencing;
- revised processing facility area layout, including a revised processing plant layout and two additional vehicle site access points;
- reduced sulphuric acid plant stack height from 80 m to 40 m;
- revisions to processing plant reagent types, rates and storage volumes;
- revised tailings storage facility cell construction sequence and the addition of a decant transfer pond;
- relocated and resized evaporation pond;
- changes to the water management system to reflect the modified mine and processing facility layout;
- increased number of diesel-powered backup generators (and associated stacks) from one to four;
- addition of exploration activities within the approved surface development area inside ML 1770;
- increased duration of the construction phase from two years to three years;
- increased peak construction phase workforce from approximately 1,000 to approximately 1,900 personnel;

Rail Siding

- revised rail siding location and layout;
- addition of an ammonium sulphate storage and distribution facility to the rail siding;
- extension of the Scotson Lane road upgrade;
- addition of a 22 kV ETL (subject to separate approval) to the rail siding power supply;
- increased peak operational phase workforce from approximately five to approximately 10 personnel;

Accommodation Camp

- increased construction phase capacity from 1,300 to 1,900 personnel;
- increased size of the treated wastewater irrigation area;
- option for an alternative alignment of the last section of the accommodation camp water pipeline along the accommodation camp services corridor, rather than along the access road corridor;
- option to transfer treated wastewater to the mine and processing facility for reuse via a water pipeline located inside the approved services corridor;

Road Transport Activities

- changes to construction phase vehicle movements associated with the increased construction phase accommodation camp capacity and changes to heavy vehicle delivery requirements;
- changes to operational phase heavy vehicle movements associated with revisions to processing plant reagent types, rates and storage volumes; and
- changes to operational phase heavy vehicle movements to and from the rail siding associated with the transport of metal and ammonium sulphate products.

The Modification would not change the following approved components of the Project:

- other mine and processing facility components (e.g. surface development area, mining method, processing method and rate, tailings management and water management concepts);
- other accommodation camp components (e.g. surface development area; operational phase capacity);



- other transport activities and transport infrastructure (e.g. the Fifield Bypass);
- limestone quarry;
- borefield, surface water extraction infrastructure and water pipeline; and/or
- gas pipeline.

The sub-sections below provide a detailed description of the Project components relevant to the Modification.

3.2 MINE AND PROCESSING FACILITY

3.2.1 General Arrangement

The general arrangement of the approved mine and processing facility includes the following main components:

- open cut pits (including small-scale scandium rich open cut pits);
- waste rock emplacements;
- ore stockpiles;
- processing facility area, including:
 - ROM pad;
 - processing plant;
 - sulphuric acid plant;
 - limestone slurry plant;
 - reagent storage areas;
 - fuel storage areas;
 - gas-fired power plant, diesel generators and associated power distribution infrastructure;
 - vehicle site access points;
 - offices, workshops, warehouse, laboratory and amenities buildings and car parking facilities;
 - communications infrastructure;
 - raw water dam;
 - potable water treatment plant;
 - wastewater (including sewage) treatment plant;
 - water management infrastructure;
 - laydown areas; and
 - concrete batch plant (construction phase only).

- tailings storage facility;
- evaporation pond;
- water storage dam;
- sediment dams, mine water dams, diversion dams, diversions, pumps, pipelines and other water management structures and equipment;
- gravel and clay borrow pits (within the open cut pits, waste rock emplacement and tailings storage facility surface development area);
- laydown areas;
- explosives magazine;
- power distribution infrastructure;
- internal roads and haul roads;
- topsoil stockpiles; and
- other associated minor infrastructure, plant, equipment and activities.

The approved mine and processing facility general arrangement is provided on Figure 2.

The Modification would include the following changes to the approved mine and processing facility general arrangement (Figure 2):

- addition of a temporary construction laydown area inside the tailings storage facility surface development area (Section 3.2.2);
- changes to mining and waste rock emplacement sequencing (Section 3.2.3);
- revised processing facility area layout (Section 3.2.4);
- revised tailings storage facility cell construction sequence and addition of a decant transfer pond (Section 3.2.5);
- relocated and resized evaporation pond (Section 3.2.6); and
- changes to the water management system to reflect the modified layout (Section 3.2.6).

The Modification would <u>not</u> change the final extents and designs of the approved open cut pits or waste rock emplacements (Figure 2).

In addition, the Modification would <u>not</u> change the approved mine and processing facility surface development area (Figure 2).

Progressive general arrangements of the modified mine and processing facility are provided on Figures 3 to 9.





CTL-20-08 MOD 7 MT 204D









CTL-20-08 MOD 7_MT_206D





CTL-20-08 MOD 7_MT_217A

Figure 8



3.2.2 Construction

The approved construction phase includes development of the following key mine and processing facility components over an approximate two year period:

- processing facility;
- tailings storage facility;
- water storage dam;
- evaporation pond; and
- water management infrastructure.

The approved construction phase workforce is up to approximately 1,000 personnel during the peak construction phase.

The Modification would include an increase in the peak construction phase workforce from approximately 1,000 personnel to approximately 1,900 personnel. A detailed review of the Project construction phase manning conducted as part of the Project Execution Plan concluded that the workforce would peak at approximately 1,900 personnel for approximately two months.

The duration of the construction phase would increase from two to three years as part of the Modification. The commissioning phase component of the construction phase is expected to be longer than originally contemplated based on the time required to commission other similar processing plants.

The Modification would also include the addition of a temporary construction laydown area inside the tailings storage facility surface development area (Figure 2). The additional temporary construction laydown area outside of the processing facility area would improve the constructability of the processing facility.

There would be no significant change to the key construction activities as a result of the Modification.

Details of construction phase heavy vehicle requirements for the Modification are provided in Section 3.5.

3.2.3 Mining Operations

Conventional open cut mining methods are approved to develop the two main open cut pits and multiple small-scale scandium open cut pits. Ore will be loaded directly to haul trucks for transfer to the ROM pad or ore stockpiles. Waste rock material is approved to be emplaced in either one of the two waste rock emplacements, or used to backfill the small-scale scandium open cut pits located outside the approved open cut pit areas (Figure 2).

The waste rock emplacements are approved to be constructed up to approximately 20 m and 30 m high (corresponding to the heights of approximately 315 metres Australian Height Datum (m AHD) and 330 m AHD for the eastern and western waste rock emplacements, respectively [Figure 9]). The overall batter slopes of the waste rock emplacements will be 1 vertical (V):4 horizontal (H) with reverse graded berms at approximately 10 m intervals. Intermediate batter slopes will be constructed to 1V:3H grades.

Excavators, haul trucks, dozers, drills, graders and front end loaders will be used during mining operations. Mining operations will be conducted 24 hours per day, seven days per week.

The Project Execution Plan included a review of mining operations to optimise production and the financial performance of the Project. The optimised mining operations include an increased mining rate during the initial years of mining operations and associated changes to mining and waste rock emplacement sequencing.

The Modification would include the optimised mining operations. The revised mining and waste rock emplacement sequencing is shown on Figures 5 to 9.

The modified mining rate would require changes to the size of the approved mine fleet. A list of the approved and modified major mobile equipment for the Project is provided in the Noise Assessment (Appendix B).

The Modification would not change the approved mining method, final design and extents of the open cut pits and waste rock emplacements. The approved mine and processing facility life (i.e. 21 years), operating hours and workforce (i.e. 300 personnel) would not change as a result of the Modification.

3.2.4 Processing Facility Area

Processing Facility Area Layout

The approved processing facility area layout is shown on Figure 2.

The Modification includes a revised processing facility area layout (Figure 2) that was optimised as part of the Project Execution Plan.



As part of the processing facility layout optimisation, two additional vehicle site access points have been included to improve site access safety by separating light vehicle and heavy vehicle streams (Figure 2).

Processing Plant

The approved processing plant includes the following key processing stages:

- Ore preparation circuit removal of oversize material and production of an ore slurry suitable for acid leaching;
- Acid leach circuit leaching of nickel, cobalt and scandium from the ore slurry by application of sulphuric acid under high pressure and temperature in an autoclave to produce an autoclave slurry containing acid, scandium and soluble nickel and cobalt sulphates;
- Resin in Pulp (RIP) 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 – neutralisation of residue solids slurry (tailings) with a limestone slurry prior to thickening and transfer to the tailings storage facility; 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 extraction and precipitation.

The processing plant is approved to operate with an autoclave feed rate of up to 2.5 Mt of ore (dry weight) in any calendar year.

The Modification would include revisions to processing plant reagent types, rates and storage quantities based on revised process modelling conducted as part of the Project Execution Plan.

A summary of the approved and modified processing plant reagents is provided in Table 3.

The Modification would not change the approved processing stages, processing rate, or product quantities.

Project Components	Approved	Modified
Sulphur	350,000 tpa	No Change
Limestone	990,000 tpa	No Change
Flocculant	820 tpa	No Change
Caustic Soda	330 tpa	1,300 tpa
Soda Ash	7,500 tpa	1,500 tpa
Ammonia	26,000 tpa	No Change
Hydrochloric Acid	17,000 tpa	2,500 tpa
Quicklime	40,000 tpa	65,000 tpa
Sodium metabisulphite	5,600 tpa	7,000 tpa
Resin, cRIP	720 tpa	780 tpa
Diluent	190,000 Lpa	350,000 Lpa
Extractant	75,000 Lpa	109,000 Lpa
Hydrated Lime	1,500 tpa	600 tpa
Hydrogen Peroxide	70 tpa	1,000 tpa
Minor reagents (mill balls, coagulant, oxalic acid, hydrogen peroxide, resin [Sc cLX])	Used in ore preparation, thickening and tailings neutralisation, sulphuric acid plant and wastewater treatment plant.	No Change

Table 3 Summary of Approved and Modified Peak Processing Plant Process Reagents

Sulphuric Acid Plant

The sulphuric acid plant is approved to produce approximately 1,050,000 tpa of sulphuric acid for use in the acid leach circuit in the processing plant.

The Modification would include a reduction in the height of the sulphuric acid plant stack from 80 m to 40 m.

Consideration of the potential air quality impact of the reduced sulphuric acid plant stack is provided in Section 6.2.

No changes to other aspects of the approved sulphuric acid plant are proposed as part of the Modification.

3.2.5 Tailings Storage Facility

Construction Sequence

The approved tailings storage facility consists of three cells (Figure 2). Each cell would be progressively developed using downstream lifts prior to the construction of the next cell. The approved cell construction sequence is for the northern cell (Tailings Storage Facility [TSF] Cell 2) to be constructed first, followed by the south-western cell (TSF Cell 1) and then the south-eastern cell (TSF Cell 3).

The Modification would include a revised tailings storage facility cell construction sequence to improve the constructability of the tailings storage facility and to reduce initial construction costs.

The modified cell construction sequence would be TSF Cell 1 constructed first, followed by TSF Cell 2 and then TSF Cell 3 (Figures 5 to 9).

The Modification would not change the approved tailings storage facility design. The tailings storage facility would be designed and constructed consistent with the requirements outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00).

The design of the tailings storage facility would take into consideration the relevant geotechnical conditions at the site.

Decant Water Management

Tailings are approved to be pumped from the processing plant to the tailings storage facility to be deposited. A decant pond will form in the operational tailings storage facility cell.

Supernatant water (including incident rainfall) in the decant pond is approved to be decanted from the tailings storage facility to the water storage dam for reuse in the processing plant (Section 3.2.6).

In accordance with Condition 29, Schedule 3 of Development Consent (DA 374-11-00), the tailings storage facility (including decant pond) will be operated to capture and convey the volume of runoff generated from a 1 in 100 year average recurrence interval (ARI) rain event of 72 hours duration. The decant system will be designed to remove stored water so that the tailings storage facility will have a capacity to capture and convey a separate 1 in 100 year ARI rain event of 72 hours duration rain event within seven days of the event occurring.

The Modification would include the addition of a decant transfer pond (Figure 2). The decant transfer pond would be used to manage stored water volumes in the tailings storage facility and the water storage dam.

Supernatant water (including incident rainfall) would initially be decanted from the tailings storage facility to the decant transfer pond. The tailings storage facility seepage collection sumps would also be dewatered to the decant transfer pond. The water in the decant transfer pond would then be pumped to the water storage dam for re-use in the processing plant (Section 3.2.6).

Consistent with the approved tailings storage facility, the decant transfer pond would be designed to:

- include floor and side walls with a minimum of:
 - a 900 millimetre (mm) clay liner with a permeability of no more than
 1 x 10⁻⁹ metres per second (m/s); or
 - a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1 x 10⁻¹⁴ m/s (or equivalent).
- maintain a freeboard storage in excess of that required to store the volume of runoff generated from a 1 in 100 year ARI rain event of 72 hours duration.

No other changes to the approved tailings storage facility decant water management operations are proposed as part of the Modification.



3.2.6 Water Management

Water Management System

Water management at the approved mine and processing facility will be conducted in accordance with the water management performance measures outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00).

Consistent with these performance measures, the key objectives of the approved water management system are to control runoff from construction and operational areas, while diverting up-catchment water around these areas, and to minimise the use of clean water on-site.

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

The Modification would not change the approved water management performance measures or objectives of the water management system.

The Modification would however include the following changes to the approved water management system:

- revised tailings storage facility cell construction sequence and the addition of a decant transfer pond (Section 3.2.5);
- relocated and resized evaporation pond; and
- changes to the water management system to reflect the modified mine and processing facility layout.

The approved and modified conceptual water management schematic is shown on Figure 10.

A detailed description of the operation of the approved and modified water management system is provided in the Surface Water Assessment (Appendix C).

Water Storages

The approved water management system consists of the following key water storages:

- tailings storage facility;
- evaporation pond;
- water storage dam;
- raw water dam;

- mine water dams/processing plant runoff dams; and
- sediment dams.

The Modification would not change the design and/or the operation of the water storage dam or the raw water dam.

A description of the changes to the other water storages proposed in the Modification is provided below.

Tailings Storage Facility

The Modification would include a revised tailings storage facility cell construction sequence.

In addition, the Modification would include the addition of a decant transfer pond (Figures 2 and 10).

Additional detail on these proposed changes is provided in Section 3.2.5.

Evaporation Pond

The evaporation pond is approved to contain and evaporate a processing plant liquid waste stream containing high concentrations of chloride to prevent the build-up of chloride in the water management system and process water.

The Modification would include the relocation and resizing of the evaporation pond approximately 400 m to the north of its approved location (Figure 2) to avoid the predicted flood extent of the unnamed watercourse prior to its diversion in Year 11 (Figure 7).

The design and operation of the modified evaporation pond would be consistent with the relevant water management performance measures outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00), including that the floor and side walls would have a minimum of a 900 mm clay or modified soil liner with a permeability of no more than 1×10^{-9} m/s, 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).

The Modification would not change the operation of the evaporation pond.

Mine Water/Processing Plant Runoff Dams and Sediment Dams

Mine water dams/processing plant runoff dams and sediment dams are approved to capture runoff from construction and operational areas.








Management Schematic

Source: Clean TeQ (2020)

The Modification would include minor changes to the progressive development and location of the mine water dams/processing plant runoff dams and sediment dams to reflect the modified layout (Figure 3 to 9).

The design and operation of the modified mine water dams/processing plant runoff dams and sediment dams would be conducted consistent with the relevant water management performance measures outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00).

Clean Water Diversions

Two permanent clean water diversions (i.e. the southern and northern diversions) are approved at the mine and processing facility (Figure 2).

The mine and processing facility layout changes proposed as part of the Modification, particularly the relocation of the evaporation pond, would delay the requirement for the construction of the southern diversion from Year 1 to approximately Year 11 (Figure 7).

The design and operation of the southern diversion would be conducted consistent with the relevant water management performance measures outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00).

The Modification would not change the approved northern diversion.

Water Supply

Water is approved to be supplied to the mine and processing facility from a number of, and varying, sources during the life of the Project, including the following in order of priority (when available) (Figure 10):

- recycled water from the processing facility and tailings storage facility;
- mine dewatering (in-pit and advance);
- internal runoff collection at the mine site (including harvestable rights); and
- off-site supply (i.e. borefield and surface water extraction from the Lachlan River).

SEM will source water from the borefield and surface water from the Lachlan River in accordance with relevant *Water Management Act 2000* approvals to meet the off-site water demand. The Modification would not change the approved water supply sources.

Water Consumption

The main water requirements at the Project are associated with the processing facility once commissioned and operating. Other water demand requirements include water for construction activities (e.g. moisture for soil compaction control), dust suppression, cooling water and other potable and non-potable uses.

The water requirements will fluctuate with climatic conditions, ore processing rates and as the extent of the mining operation changes over time.

The predicted average and maximum annual off-site water requirements for the approved Project operational phase are approximately 2,800 megalitres per year (ML/year) and 4,080 ML/year, respectively (Hydro Engineering and Consulting Pty Ltd [HEC], 2019).

The Modification would not significantly change the predicted average and maximum annual off-site water requirements for the approved Project (Appendix C).

Simulated Performance of the Site Water Management System

A water balance model (using the GoldSim[®] simulation package) has been prepared by HEC (2021), to simulate the performance of the site water management system over the life of the modified Project.

The water balance modelling demonstrates that the proposed site water management system has sufficient capacity and flexibility to accommodate a wide range of climate scenarios (Appendix C).

No overflows were predicted from the tailings storage facility, decant transfer pond, evaporation pond, mine water dams or processing plant runoff dams over the Project life (Appendix C).

3.2.7 Power Supply

Power for the mine and processing facility is approved to be provided by the power plant and a diesel-powered backup generator. The steam for the power plant is approved to be generated through heat recovery from the sulphuric acid plant or steam generated by gas. Steam generation would also be supported by an auxiliary diesel boiler. No change to the approved power plant is proposed as part of the Modification. As per the approved Project, if the heat recovery from the sulphuric acid plant supported by the auxiliary diesel boiler is able to meet the power requirements of the mine and processing facility, there would be no need for the external gas supply, and therefore the gas pipeline would not be constructed.

The Modification would however increase the number of backup diesel-powered generators (and associated stacks) from one to four.

SEM is separately considering importing electricity to the mine and processing facility via an electricity transmission line to supplement on-site generation. This electricity transmission line would be subject to separate environmental assessment and approval and does not form part of the Modification.

3.2.8 Road and Intersection Upgrades

The approved mine and processing facility has one vehicle site access point on Wilmatha Road.

As part of the processing facility layout optimisation, two additional vehicle site access points have been included to improve site access safety by separating light vehicle and heavy vehicle streams (Figure 2).

One vehicle site access point would provide access to the processing facility offices and car parking area and would be for light vehicles and buses.

The other two vehicle site access points would form an access loop to the processing facility area (predominantly for heavy vehicles) with dedicated entry and exit points.

The modified Wilmatha Road and vehicle site access point intersections would be undertaken in consultation with the LSC.

3.2.9 Exploration Activities

The Modification would include the addition of exploration activities within the approved surface development area inside ML 1770.

These exploration activities, within and external to the open cut footprint, would be used to investigate aspects such as geological and geotechnical features and waste rock characteristics as input into detailed mine planning and feasibility studies.

Details of the exploration activities would be included in the relevant Mining Operations Plan.

3.2.10 Rehabilitation Strategy

Rehabilitation Objectives

The approved rehabilitation objectives for the Project are outlined in Condition 55, Schedule 3 of the Development Consent (DA 374-11-00). The Modification would not change the approved rehabilitation objectives.

Progressive Rehabilitation

Consistent with Condition 56, Schedule 3 of Development Consent (DA 374-11-00), SEM would rehabilitate the modified mine and processing facility site progressively, that is, as soon as is practicable following disturbance, to the satisfaction of the Secretary of DPIE.

The modified progressive rehabilitation of the mine and processing facility is shown on Figures 5 to 9, and Figure 11 illustrates the conceptual rehabilitated final landform.

Final Landform

Key features of the approved final landform include:

- two final voids;
- western waste rock emplacement to a maximum final elevation of approximately 330 m AHD;
- eastern waste rock emplacement to a maximum final elevation of approximately 315 m AHD;
- tailings storage facility with a final elevation of approximately 314 m AHD;
- evaporation pond;
- water storage dam; and
- surface water diversions.

The Modification would not change the key features of the approved final landform with the exception of the location of the rehabilitated evaporation pond and addition of the decant transfer pond.

The approved rehabilitation strategy for the evaporation pond (i.e. embankment breached and profiled to be a free-draining landform with runoff reporting to the natural environment) would be unchanged.





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The conceptual rehabilitation strategy for the decant transfer pond would be as follows:

- The embankments would be removed and the area profiled to be a free-draining landform with runoff reporting to the natural environment.
- If there are any contaminated soils associated with the decant transfer pond area, these would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*.
- A layer of soil (depending on the outcomes of trials) would be placed on the reprofiled landform prior to revegetation.
- Following rehabilitation, endemic woodland land use would occur on the rehabilitated decant transfer pond.

Figure 11 illustrates the conceptual rehabilitated final landform for the modified mine and processing facility.

Post-mining Land Uses

The approved post-mining land use at the mine and processing facility and accommodation camp is a combination of agriculture (pasture for grazing) and endemic woodland areas.

The Modification would not change the approved post-mining land uses.

Figure 11 illustrates the conceptual post-mining land uses for the modified mine and processing facility.

3.3 RAIL SIDING

3.3.1 Location

The approved rail siding is located on the Bogan Gate Tottenham Railway approximately 25 km south-east of the mine and processing facility (Figures 1 and 12).

The Modification would include the relocation of the rail siding approximately 500 m south of the approved location (Figure 12) to allow for the development of the ammonium sulphate storage and distribution facility (Section 3.3.2) and to improve operability of the rail siding.

In addition, the relocation of the rail siding would minimise rail and road traffic interactions at the rail level crossing on Scotson Lane in the vicinity of the approved rail siding (Figure 12).

3.3.2 Ammonium Sulphate Storage and Distribution Facility

Ammonium sulphate produced at the mine and processing facility is approved to be transported by road to the rail siding for transport by rail at a rate of up to 100,000 tpa.

The Modification would include the addition of an ammonium sulphate storage and distribution facility at the rail siding (Figure 13) to facilitate the supply of ammonium sulphate (a fertiliser) to agricultural operations in the region by road, in addition to distribution by rail.

The ammonium sulphate storage and distribution facility would be a predominantly enclosed shed that would allow for the covered loading/unloading and storage of the ammonium sulphate.

The ammonium sulphate would be unloaded from the haulage vehicles (typically B-double trucks) directly onto stockpiles within the ammonium sulphate storage and distribution facility, which would have capacity to store approximately 30,000 t of ammonium sulphate.

A front end loader would be used to reclaim ammonium sulphate from the stockpiles and load directly into haulage vehicles for transport by road to agricultural operations in the region or into containers for transport by rail.

3.3.3 General Arrangement

The general arrangement of the modified rail siding would include the following main components:

- loading siding³;
- site access point and internal roads;
- truck parking/loading/unloading hardstand areas and weighbridge;
- container storage hardstand areas;
- ammonium sulphate storage and distribution facility (Section 3.3.2);
- site offices, ablution facilities, sewage system and car parking;

³ The loading siding may not be required depending on other rail operations on the Bogan Gate Tottenham Railway.



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Source: Black Range Minerals (2000); NSW Spatial Services (2020); Clean Teq (2017, 2018, 2020). Orthophoto: © NSW Department of Finance, Services & Innovation (2020)



- equipment and fuel storage areas;
- water storage tanks;
- lighting and telecommunications infrastructure;
- sediment dams, clean water diversions, runoff collection drains and other water management equipment and structures;
- landscaping (including vegetation screens) and perimeter security fencing; and
- other associated minor infrastructure, plant, equipment and activities.

The general arrangement of the modified rail siding is provided on Figure 13.

The Bogan Gate Tottenham Railway is infrequently used for grain transport. Depending on future rail operations on the Bogan Gate Tottenham Railway, the Project trains may therefore be able to be loaded/unloaded on the main line. If this is the case, the loading siding would not be constructed and train loading/unloading would occur on the main line. The requirement for the loading siding would be determined in consultation with John Holland (or the relevant rail network operator at the time).

The design and construction of the loading siding would be undertaken in accordance with the requirements of John Holland (or the relevant rail network operator at the time).

3.3.4 Construction

Construction of the modified rail siding would be undertaken during the Project construction phase and would take approximately seven months.

Consistent with Condition 1, Schedule 3 of Development Consent (DA 374-11-00), construction of the modified rail siding would be undertaken between 7:00 am and 6:00 pm, seven days per week.

A list of the approved and modified construction mobile equipment for the rail siding is provided in the Noise Assessment (Appendix B).

3.3.5 Operations

Sulphur, minor quantities of other consumables and empty containers for product transport are approved to be received by rail at the rail siding. The incoming containers are approved to be unloaded by reachstacker/forklift and either loaded on to haulage vehicles for transport to the mine and processing facility or temporarily stored on the container storage hardstand areas prior to loading on to haulage vehicles.

The reachstacker/forklift will then load the train with containers containing metal sulphate and ammonium sulphate products, and empty sulphur containers.

The Modification would not change the approved rail loading/unloading operations with the exception of the potential for loading/unloading on the main line (Section 3.3.3).

An average of three trains per week (six train movements per week), with a maximum of two trains per day, is approved at the rail siding.

Although the Modification would not change the frequency of train movements, the length of the trains would increase from approximately 44 wagons to 77 wagons⁴. The additional wagons are required as a detailed review of the Project rail transport requirements conducted as part of the Project Execution Plan, determined that the metal sulphate and ammonium sulphate products could not be backloaded in containers transporting sulphur as the products may become contaminated. Additional wagons would therefore be required to transport the additional containers.

Consistent with Condition 1, Schedule 3 of Development Consent (DA 374-11-00), operations at the modified rail siding would be undertaken 24 hours per day, seven days per week.

3.3.6 Water Management

During construction of the rail siding, erosion and sedimentation controls would be designed, installed and maintained in accordance with the relevant requirements of *Managing Urban Stormwater: Soils and Construction* including Volume 1 (Landcom, 2004), Volume 2A – Installation of Services (Department of Environment and Climate Change [DECC], 2008a) and Volume 2C – Unsealed Roads (DECC 2008b).



⁴ The modified train length would be approximately 1,050 m.

Sediment dams would be constructed within the footprint of the rail siding to collect rainfall runoff from hardstand and infrastructure areas during operations. The sediment dams would be designed, constructed and operated in accordance with the relevant requirements of *Managing Urban Stormwater: Soils and Construction* – Volume 1 (Landcom, 2004).

Waters collected in the sediment dams would be utilised at the rail siding, allowed to evaporate or released from site following treatment for any pollution.

3.3.7 Supporting Infrastructure

Water Supply

Water for use at the modified rail siding would be sourced from either the rail siding sediment dams (Section 3.3.6) or from the mine and processing facility.

Water sourced from the mine and processing facility would be transported to the rail siding by truck and stored in the water storage tanks (Figure 13).

Power Supply

The approved power supply for the rail siding is from an existing ETL that passes through the approved rail siding site (Figure 12).

As the existing ETL does not have sufficient capacity for the modified rail siding, a new 22 kV ETL (subject to separate approval) would be required to provide power to the modified rail siding (Figures 12 and 13).

Waste Management

The Modification would not significantly change the approved waste generation and management at the rail siding.

All waste generated at the modified rail siding would be disposed of at an appropriately licensed landfill consistent with Condition 54, Schedule 3 of Development Consent (DA 374-11-00).

The sewage system would be designed and constructed in accordance with PSC requirements. Waste from the sewage system would be periodically collected for disposal by a licensed contractor. Dependent upon the design, treated effluent from the sewage system would either be reused at the rail siding or released underground into an absorption field located inside the modified rail siding surface development area (e.g. along the vegetation screen).

3.3.8 Road and Intersection Upgrades

The Modification would include an approximate 675 m extension of the approved Scotson Lane road upgrade (Figure 12).

Consistent with the approved road and intersection upgrades between the rail siding and the mine and processing facility, Scotson Lane, between The Bogan Way and the modified rail siding access road, would be upgraded to include an 8 m sealed pavement and 1 m gravel shoulders.

In addition, the intersection of Scotson Lane and the modified rail siding access road would be located approximately 475 m to the south-east of the approved location (Figures 12 and 13).

The Scotson Lane road upgrade would be undertaken in consultation with the PSC.

3.3.9 Workforce

The approved rail siding construction and operational workforce is approximately 15 and five personnel, respectively.

The Modification would increase the rail siding construction and operational workforces to approximately 20 and 10 personnel, respectively.

3.3.10 Rehabilitation Strategy

Consistent with Condition 55, Schedule 3 of the Development Consent (DA 374-11-00), the modified rail siding would be rehabilitated to the satisfaction of the Secretary of the DPIE.

The following decommissioning and final land use options exist for the modified rail siding:

- decommission the rail siding infrastructure and rehabilitate the area to its former land use (i.e. agriculture); or
- transfer ownership of the rail siding to landholders with the rail siding remaining in working condition.

The decommissioning and land use options for the modified rail siding would be determined in consultation with landowners and PSC and be subject to the agreement of the Secretary of the DPIE.

The approved rehabilitation objectives for the Project are outlined in Condition 55, Schedule 3 of the Development Consent (DA 374-11-00) and the Modification would not change the approved rehabilitation objectives.



3.4 ACCOMMODATION CAMP

3.4.1 Capacity

The Modification would include an increase in the peak construction workforce from approximately 1,000 personnel to approximately 1,900 personnel (Section 3.2.2).

The capacity of the accommodation camp during the construction phase would increase from approximately 1,300 personnel to 1,900 personnel to accommodate the modified construction workforce.

Consistent with the approved accommodation camp, at the completion of the construction phase, the capacity of the modified accommodation camp would be reduced to approximately 300 personnel during the operations phase.

This reduced capacity accommodation camp would be maintained for the short-term use of temporary contractors and visitors during the operations phase (e.g. short-term contractors present during scheduled processing plant maintenance shutdowns). No permanent employees or contractors would reside in the modified accommodation camp on a full-time basis during operations.

3.4.2 General Arrangement

The approved accommodation camp general arrangement is shown on Figure 14 and would include the following main components:

- accommodation camp, including:
 - accommodation facilities;
 - administration offices and first aid facility;
 - recreational and mess areas;
 - fire-fighting infrastructure (e.g. fire water tank and reticulation system);
 - internal access roads and car parking areas; and
 - communications infrastructure.
- sewage pump station, irrigation water pipeline and irrigation area;
- utilities area, including:
 - water supply infrastructure (e.g. water treatment plant, storage tanks, distribution system);

- water management infrastructure, including collection drains and sediment dams;
- sewage collection system, treatment plant and storage tanks; and
- power supply infrastructure (e.g. diesel generators, substation).
- accommodation camp ETL (between the mine site and the accommodation camp);
- accommodation camp water pipeline (between the mine site and the accommodation camp);
- site access road from Sunrise Lane; and
- construction (laydown) areas.

The Modification would include the following changes to the approved accommodation camp general arrangement (Figure 14):

- additional accommodation facilities (i.e. conventional demountable components);
- increased size of the treated wastewater irrigation area;
- option for an alternative alignment of the last section of the accommodation camp water pipeline along the accommodation camp services corridor rather than along the access road corridor (subject to detailed design outcomes); and
- a new water pipeline located inside the approved accommodation camp services corridor to transfer treated wastewater to the mine and processing facility.

The Modification would not change other components of the approved accommodation camp general arrangement.

In addition, the Modification would <u>not</u> change the approved accommodation camp surface development area (Figure 14).

The general arrangement of the modified accommodation camp is provided on Figure 14.

In accordance with Condition 47, Schedule 3 of Development Consent (DA 374-11-00), SEM would prepare the final layout of the modified accommodation camp in consultation with the LSC and to the satisfaction of the Secretary of the DPIE.







Note: The approved accommodation camp layout shown has been prepared in consultation with the LSC and approved by the Secretary of the DPIE on 3 June 2019.



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3.4.3 Wastewater Management

Sewage generated at the accommodation camp is approved to be treated by a packaged sewage treatment plant in the utilities area. The treated wastewater produced from the sewage treatment plant will be pumped to the irrigation area via the irrigation water pipeline (Figure 14).

The Modification would include an increase in the size of the treated wastewater irrigation area due to the increased wastewater volume associated with the increased construction phase accommodation camp capacity.

Consistent with Condition 29, Schedule 3 of Development Consent (DA 374-11-00), irrigation of the treated wastewater at the modified accommodation camp would be undertaken in accordance with the *Environmental Guidelines Use of Effluent by Irrigation* (Department of Environment and Conservation [DEC], 2004).

The Modification would also include the construction of a new water pipeline located inside the approved services corridor to provide the option to transfer treated wastewater from the accommodation camp to the mine and processing facility for reuse.

3.4.4 Waste Management

The amount of waste generated at the accommodation camp would increase as a result of the increased accommodation camp capacity proposed as part of the Modification (Section 3.4.1).

Consistent with Condition 54, Schedule 3 of Development Consent (DA 374-11-00), SEM would implement the following waste management measures at the modified Project (including the accommodation camp):

- implement all reasonable and feasible measures to minimise the waste generated by the development (e.g. maximise recycling of key waste streams);
- classify all waste in accordance with the Waste Classification Guidelines (Environment Protection Authority [EPA], 2014);
- store and handle all waste generated on site in accordance with its waste classification;
- ensure that waste is disposed of at appropriately licensed waste facilities; and
- manage on-site sewage treatment and disposal in accordance with the requirements of the EPA and LSC.

SEM would consult with relevant councils in the region to determine suitable appropriately licensed waste facilities for the disposal of waste generated at the modified Project.

3.5 ROAD TRANSPORT

3.5.1 Construction Phase

Heavy vehicles are approved to deliver construction equipment, construction materials, processing plant components, and construction consumables to the Project. A peak of 160 heavy vehicle movements per day is expected over the approved construction period.

A detailed review of the Project road transport requirements was conducted as part of the Project Execution Plan. The review identified that changes to the construction phase heavy vehicle delivery requirements would be required for the modified Project.

The increased construction phase workforce (Section 3.2.2) would also result in increased road traffic movements.

Further detail on the approved and modified construction phase road transport requirements of the Project is provided in Section 6.6 and the Road Transport Assessment (Appendix D).

3.5.2 Operations Phase

Metal sulphate and ammonium sulphate products are approved to be transported from the mine and processing facility to the rail siding by road. These products were to be backloaded in trucks transporting sulphur from the rail siding to the mine and processing facility.

The detailed review of the Project road transport requirements conducted as part of the Project Execution Plan, determined that the metal sulphate and ammonium sulphate products could not be backloaded in trucks transporting sulphur as the products may become contaminated. Separate truck movements would therefore be required to transport these products.

In addition, revisions to processing plant reagent types, rates and storage volumes would be required as part of the Modification (Section 3.2.4). These revisions to processing plant reagent types, rates and storage volumes would result in minor changes to road transport requirements.



Further detail on the approved and modified operational phase road transport requirements of the Project is provided in Section 6.6 and the Road Transport Assessment (Appendix D).

3.5.3 Road and Intersection Upgrades and Maintenance

Road and intersection upgrades and maintenance will be undertaken in accordance with Conditions 43 and 44, Schedule 3 of Development Consent (DA 374-11-00) and the VPA.

Details of the approved road and intersection upgrades and maintenance are outlined in the Road Upgrade and Maintenance Strategy (Clean TeQ, 2019c).

The Modification would include two additional vehicle site access points from Wilmatha Road to the mine and processing facility (Section 3.2.8).

The Modification would also include an extension of the Scotson Lane road upgrade to reflect the modified rail siding location (Section 3.3.8).

The Modification would not change other road and intersection upgrades and maintenance requirements for the Project.

3.6 HAZARD STUDIES

A range of environmental management and monitoring plans, strategies and hazard studies are required to be prepared for the Project in accordance with Development Consent (DA 374-11-00) (Section 1.1.2).

Condition 12, Schedule 2 of Development Consent (DA 374-11-00) allows for the progressive development and staging of the environmental management and monitoring plans and strategies.

SEM proposes to modify Condition 12, Schedule 2 of Development Consent (DA 374-11-00) so that the hazard studies can be progressively developed and staged consistent with the environmental management and monitoring plans and strategies. This would allow SEM to prepare hazard studies that reflect the development that is planned to be carried out at the Project at the time of preparation of the hazard studies. The following modifications (underlined) to Condition 12, Schedule 2 of Development Consent (DA 374-11-00) is proposed:

UPDATING & STAGING OF <u>HAZARD STUDIES,</u> STRATEGIES, PLANS OR PROGRAMS

12. With the approval of the Secretary, the Applicant may submit any <u>hazard study</u>, strategy, plan or program required by this consent on a progressive basis.

> To ensure these <u>hazard studies</u>, strategies, plans or programs are updated on a regular basis, the Applicant may at any time submit revised <u>hazard studies</u>, strategies, plans or programs to the Secretary for approval.

With the agreement of the Secretary, the Applicant may prepare any revised <u>hazard</u> <u>study</u>, strategy, plan or program without undertaking consultation with all the parties referred to under the relevant condition of this consent.

Notes:

- While any <u>hazard study</u>, strategy, plan or program may be submitted on a progressive basis, the Applicant must ensure that all development being carried out on site is covered by suitable <u>hazard studies</u>, strategies, plans or programs at all times.
- If the submission of any <u>hazard study</u>, strategy, plan or program is to be staged, then the relevant <u>hazard study</u>, strategy, plan or program must clearly describe the specific stage to which the <u>hazard study</u>, strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the <u>hazard study</u>, strategy, plan or program.

4 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the Modification.

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The EP&A Act and *Environmental Planning and Assessment Regulation 2000* set the framework for planning and environmental assessment in NSW.

4.1.1 Applicability of S4.55(2) of the 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]) (Attachment 1).

Section 4.55(2) of the EP&A Act relevantly provides:

4.55 Modifications of consents-generally

- •••
- (2) Other modifications

A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and

Clause 3BA(6) of Schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017* relevantly provides:

> 3BA Winding-up of transitional Part 3A modification provisions on cut-off date of 1 March 2018 and other provisions relating to modifications

• • •

(6) In the application of section 4.55 (1A) or (2) or 4.56 (1) of the Act to the following development, the consent authority need only be satisfied that the development to which the consent as modified relates is substantially the same development as the development authorised by the consent (as last modified under section 75W): (a) development that was previously a transitional Part 3A project and whose approval was modified under section 75W,

The consent authority is, therefore, required to satisfy itself that any consent as modified would result in the Project remaining substantially the same development as was last modified under section 75W of the EP&A Act (i.e. Modification 4), inclusive of consideration of the changes arising from previously approved modifications.

The Project would demonstrably remain a large nickel, cobalt and scandium mine that incorporates the following key elements approved under Development Consent (DA 374-11-00) (Table 1):

- mine and processing facility;
- limestone quarry;
- rail siding;

. . .

- borefield, surface water extraction infrastructure and water pipeline;
- gas pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

The consent authority can therefore be satisfied that the Project, incorporating the Modification, would remain "substantially the same".

This Modification Report is a Statement of Environmental Effects that has been prepared in support of the application to modify Development Consent (DA 374-11-00).

4.1.2 EP&A Act Objects

Section 1.3 of the EP&A Act describes the objects of the EP&A Act as follows:

- (a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,
- (b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,
- (c) to promote the orderly and economic use and development of land,



- (d) to promote the delivery and maintenance of affordable housing,
- (e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,
- (f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),
- (g) to promote good design and amenity of the built environment,
- (h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,
- to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,
- (j) to provide increased opportunity for community participation in environmental planning and assessment.

The Modification is considered to be generally consistent with the objects of the EP&A Act, as the modified Project:

- incorporates:
 - development of NSW mineral resources in a manner that minimises environmental impacts through the implementation of the Environmental Management Strategy (Section 1.1.2) and other measures (Section 6);
 - measures to minimise potential biodiversity impacts (including native plants and animals, threatened species, and their habitats) (Section 6.8);
 - measures to minimise the potential Aboriginal and historic heritage impacts of the Modification (Sections 6.9 and 6.10 and Appendix G);
 - measures to minimise potential amenity impacts associated with air quality and noise impacts on surrounding land uses (Sections 6.2 and 6.3, respectively);
 - a Preliminary Hazard Analysis (PHA) to assess the potential hazards associated with the modified Project (Section 6.7 and Appendix E); and
 - employment and other socio-economic benefits to the community (Sections 6.13 and 6.14);
- involves the orderly and economic use of land;

- would support the provision of community services and facilities through contributions to Commonwealth Government tax revenue as well as NSW Government royalty and tax revenues and voluntary contributions to community initiatives;
- is an application under section 4.55(2) of the EP&A Act that would be determined by the NSW Government however, consultation with the LSC, PSC and FSC and a range of stakeholders has been undertaken (Section 5); and
- involves public involvement and participation through SEM's consultation activities (Section 5), which would be ongoing following the public exhibition of this Modification Report and the DPIE's assessment of the Modification in accordance with the requirements of the EP&A Act.

4.1.3 Evaluation under Section 4.15(1) of the Environmental Planning and Assessment Act 1979

In evaluating the Modification, under section 4.15(1) of the EP&A Act, the consent authority is required to take into consideration a range of matters as they are of relevance to the subject of the application, including:

- (a) the provisions of:
 - (i) any environmental planning instrument, and
 - (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and
 - (iii) any development control plan, and
 - (iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and
 - (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),

that apply to the land to which the development application relates,

(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,



- (c) the suitability of the site for the development,
- ...
- (e) the public interest.

While this is a requirement of the consent authority, this Modification Report has been prepared to generally address the requirements of section 4.15(1) of the EP&A Act to assist the consent authority, as follows:

- Consideration of the requirements of relevant environmental planning instruments is provided in Sections 4.2 and 2.4.1.
- SEM entered into a VPA with the LSC, PSC and FSC in December 2018.
- This Modification Report has been prepared in consideration of the prescribed matters in the *Environmental Planning and Assessment Regulation 2000.*
- The predicted impacts of the Modification, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality are provided in Section 6 and Appendices A to J.
- The suitability of the proposed site for the Modification is considered in Section 7.
- Consideration of whether, on evaluation, the Project is considered to be in the public interest is provided in Section 7.

4.2 NSW ENVIRONMENTAL PLANNING INSTRUMENTS

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

4.2.1 State Environmental Planning Policies

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 instruments (except the State Environmental Planning Policy [State Significant Precincts] 2005 and State Environmental Planning Policy [Coastal Management] 2018).

Part 2 – Permissible Development

<u>Clause 7</u>

Clause 7(1) of the Mining SEPP states that development for 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
 - (ii) on land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999,

Further discussion of the permissibility of mining in accordance with the Mining SEPP is provided in the sub-sections below.

Part 3 - Clauses 12AB to 17

Part 3 of the Mining SEPP outlines the matters to be considered when determining development applications. Relevant clauses are discussed below.

Clause 12AB

Clause 12AB of the Mining SEPP identifies non-discretionary development standards for the purposes of subsection 4.15(2) of the EP&A Act in relation to the carrying out of development for the purposes of mining.

Table 4 provides details of the non-discretionary development standards listed in clause 12AB of the Mining SEPP and a summary of the environmental assessments carried out for the Modification.

Where a project does not comply with the non-discretionary development standards in clause 12AB of the Mining SEPP, this does not prevent the consent authority from granting consent even though any such standard is not complied with.



Table 4
Clause 12AB Non-discretionary Development Standards for Mining

Subclause of Clause 12AB	Compliance of the Modified Project
(3) Cumulative noise level The development does not result in a cumulative amenity noise level greater than the recommended amenity noise levels, as determined in accordance with Table 2.2 of the Noise Policy for Industry, for residences that are private dwellings.	The amenity noise levels of the modified Project would comply with the recommended amenity noise levels outlined in Table 2.2 of the <i>Noise Policy for Industry</i> (NPfI) (EPA, 2017a) at all privately-owned sensitive receivers (Section 6.3 and Appendix B) with the exception of two privately-owned sensitive receivers (Currajong Park 1 and Currajong Park 2).
(4) Cumulative air quality level The development does not result in a cumulative annual average level greater than 25 μ g/m ³ of PM ₁₀ or 8 μ g/m ³ of PM _{2.5} for private dwellings.	The Modification would not result in a cumulative annual average level greater than 25 micrograms per cubic metre $(\mu g/m^3)$ of PM ₁₀ or 8 $\mu g/m^3$ of PM _{2.5} at any privately-owned dwellings when considered with existing background sources (Section 6.2.3 and Appendix A).
 (5) Airblast overpressure Airblast overpressure caused by the development does not exceed: (a) 120 dB (Lin Peak) at any time, and (b) 115 dB (Lin Peak) for more than 5% of the total number of blasts over any period of 12 months, measured at any private dwelling or sensitive receiver. 	The Modification would not change approved blasting practices.
 (6) Ground vibration Ground vibration caused by the development does not exceed: (a) 10 mm/sec (peak particle velocity) at any time, and (b) 5 mm/sec (peak particle velocity) for more than 5% of the total number of blasts over any period of 12 months, measured at any private dwelling or sensitive receiver. 	The Modification would not change approved blasting practices.
(7) Aquifer interference Any interference with an aquifer caused by the development does not exceed the respective water table, water pressure and water quality requirements specified for item 1 in columns 2, 3 and 4 of Table 1 of the Aquifer Interference Policy for each relevant water source listed in column 1 of that Table.	The Modification would meet the relevant minimal impact considerations as defined by the <i>Aquifer Interference Policy</i> (AIP) (NSW Government, 2012) (Section 6.5.2).

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 a 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).

Existing land uses in the vicinity of the mine and processing facility and accommodation camp are characterised by a combination of agricultural enterprises (gazing and dryland cropping), carbon offset properties and forestry operations (Fifield State Forest).

Existing land uses in the vicinity of the rail siding are characterised by a combination of agricultural enterprises (grazing and dryland cropping), roads and the Bogan Gate Tottenham Railway. The Modification components are considered to be compatible with existing and future land uses in the vicinity of the modified Project.



SEM would implement a range of measures to avoid or minimise incompatibility of the modified Project with existing and future land uses in the area (e.g. vegetation screens at the modified rail siding). This would be achieved through the implementation of the existing/approved Environmental Management Strategy (Section 1.1.2).

Clause 12A

Clause 12A(2) requires that, before determining an application for consent for State Significant Development for the purposes of mining, the consent authority must consider any applicable provisions of a voluntary land acquisition and mitigation policy and, in particular:

- any applicable provisions of the policy for the mitigation or avoidance of noise or particulate matter impacts outside the land on which the development is to be carried out, and
- any applicable provisions of the policy relating to the developer making an offer to acquire land affected by those impacts.

The applicable provisions of the VLAMP (NSW Government, 2018) are addressed in Sections 6.2 and 6.3 and Appendices A and B.

Clause 13

Clause 13(2) of the Mining SEPP requires that, before determining any application for consent for development in the vicinity of an existing mine, petroleum production facility or extractive industry (clause 13[1]), to which this clause applies, 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 a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and
 - (iii) any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery, and
- (b) evaluate and compare the respective public benefits of the development and the uses, extraction and recovery 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).

The approved mine and processing facility is located within an existing mining tenement under the *NSW Mining Act 1992* (ML 1770).

There would be no direct interaction between the modified Project and other existing or proposed mining operations. A summary of the Project key interactions with surrounding State significant projects is provided in Section 2.3 and, where relevant, potential cumulative environmental impacts are described in Section 6.

The modified Project does not overlap with any other mineral or petroleum tenements or other extractive industry, except for the accommodation camp which is located on SEM-owned land. Exploration Licence (EL) 8935 and EL 8478 overlap the accommodation camp area and are held by Rimfire Pacific Mining N.L. and Australian Mines Limited, respectively.

Neither Rimfire Pacific Mining N.L. or Australian Mines Limited have an application for a project on the accommodation camp area.

SEM has consulted with Rimfire Pacific Mining N.L. and Australian Mines Limited regarding the Modification and will continue to consult with Rimfire Pacific Mining N.L. and Australian Mines Limited regarding potential interactions with the modified Project.

Therefore, the Modification would not have a significant impact of current or reasonably foreseeable extraction or recovery of minerals, petroleum or extractive materials.

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 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, programs or guidelines concerning greenhouse gas emissions.

The potential impacts of the Modification on surface water and groundwater resources are discussed in Sections 6.4 and 6.5, respectively, including measures to minimise potential impacts.

The potential biodiversity impacts as a result of the Modification are described in Section 6.8.

An assessment of the potential greenhouse gas emissions due to the Modification is provided in Section 6.15.

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.

The Modification would promote the economic recovery of nickel, cobalt and scandium resources at the Project (i.e. through the optimised production schedule and revised mine site layout). As such, the Modification aims to achieve efficient resource recovery.

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 one 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.

Metal sulphate and ammonium sulphate products generated at the modified Project would be transported by road to the rail siding.

The Modification would also include the addition of an ammonium sulphate storage and distribution facility at the rail siding to facilitate the supply of ammonium sulphate to agricultural operations in the region by road, in addition to distribution by rail.

The potential impacts of the Modification on the surrounding road transport network are discussed in Section 6.6. No significant impacts on the performance capacity, efficiency and safety of the road network are expected to arise as a result of the Modification (Appendix D).

SEM has consulted with TfNSW, LSC, PSC and FSC regarding the Modification (Section 5).

Clause 17

Clause 17 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 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 clause 3 of Schedule 6 to 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 modified Project would generally be consistent with the approved rehabilitation objectives outlined in Condition 55, Schedule 3 of the Development Consent (DA 374-11-00) (Section 3.2.10).

Consistent with Condition 56, Schedule 3 of Development Consent (DA 374-11-00), SEM would rehabilitate the modified mine and processing facility site progressively, that is, as soon as is practicable following disturbance, to the satisfaction of the Secretary of DPIE (Section 3.2.10).

The Mining Operations Plan (which would describe how rehabilitation at the Project would be undertaken) would be prepared under the conditions of ML 1770.

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

Clause 12 of SEPP 33 requires a PHA to be prepared for developments for the purposes of potentially hazardous industries.

The PHA must be prepared in accordance with the current circulars or guidelines published by the DPIE and submitted with the development application.

Clause 13 of SEPP 33 requires the consent authority to consider the following when determining an application to carry out development for the purposes of a potentially hazardous or potentially offensive industry:

- (a) current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, and
- (b) whether any public authority should be consulted concerning any environmental and land use safety requirements with which the development should comply, and
- (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), and
- (e) any likely future use of the land surrounding the development.

A PHA has been conducted for the modified Project in accordance with SEPP 33 (Appendix E).

This PHA was conducted to evaluate the hazards associated with the modified Project in accordance with the general principles of risk evaluation and assessment outlined in the NSW Department of Planning (DoP) (2011a) (now DPIE) *Hazardous Industry Planning Advisory Paper No 6 – Hazard Analysis.*

The PHA also addressed the requirements of the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DoP, 2011b), and Hazard Industry Planning Advisory Paper No.4 – Risk Criteria for Land Use Safety Planning (DoP, 2011c).

In regard to clause 13(b), consultation has been undertaken with public authorities during the preparation of this Modification Report as described in Section 5.

In regard to clause 13(e), the land surrounding the Project is generally zoned as RU1 (Primary Production) under the *Lachlan Local Environment Plan 2013* (Lachlan LEP), *Parkes Local Environment Plan 2012* (Parkes LEP) or *Forbes Local Environment Plan 2013* (Forbes LEP) (Section 4.2.2) and the Project is generally compatible with the uses that are permissible on adjoining lands.

Consideration of the potential impacts of the Project on agricultural land uses and amenity are assessed in Sections 6.2, 6.3, 6.11 and 6.12.

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

The 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.

Clause 7(2) provides that before a consent authority determines an application for development consent, a "preliminary investigation" is required where:

- the application for consent is to carry out development that would involve a "change of use"; and
- that "change of use" applies to certain land specified in clause 7(4).

The certain land specified in clause 7(4) on which the "change of use" must relate is either:

- land that is an "investigation area" defined in SEPP 55 as land declared to be an investigation area by a declaration in force under Division 2 of Part 3 of the *Contaminated Land Management Act 1997*; or
- land on which development for a purpose referred to in Table A5-1 to the contaminated land planning guidelines (being *Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land* [NSW Department of Urban Affairs and Planning and EPA, 1998]) is being, or is known to have been carried out.

The component of the modified Project located within the boundary of Development Consent (DA 374-11-00) does not involve a "change of use" because the modified Project would involve the continued development of a nickel, cobalt and scandium mine and associated activities within this area.

Ground Doctor (Appendix H) completed a Land Contamination Assessment of the modified rail siding area (located outside the boundary of the Development Consent [DA 374-11-00]), including a Stage 1 (or Preliminary Investigation) in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites* (Office of Environment and Heritage [OEH], 2011). On the basis of the Stage 1 (or Preliminary Investigation) Land Contamination Assessment, the modified rail siding area is suitable for the land use proposed by the Modification (Section 6.11 and Appendix H).

State Environmental Planning Policy (Koala Habitat Protection) 2021

Clause 3 outlines the aims of the State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala Habitat Protection SEPP):

> This Policy aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

Part 2 of the Koala Habitat Protection SEPP requires the councils in certain LGAs (including the Parkes and Forbes LGAs) to consider certain development controls for koala habitats and regulates a councils determination of development applications.

For example, clause 11(5) of the Koala Habitat Protection SEPP (which relates to certain land without an approved koala management plan) states:

- (5) However, despite subclauses (3) and (4), the council may grant development consent if the applicant provides to the council—
 - (a) information, prepared by a suitably qualified and experienced person in accordance with the Guideline, the council is satisfied demonstrates that the land subject of the development application—
 - does not include any trees belonging to the koala use tree species listed in Schedule 2 for the relevant koala management area, or
 - (ii) is not core koala habitat,

Since the Modification is an application to modify Development Consent (DA 374-11-00) under section 4.55(2) of the EP&A Act, the LSC and PSC will not be the consent authorities. Notwithstanding that Part 2 of the Koala Habitat Protection SEPP does not apply in circumstances where the consent authority is not the Council.

An assessment of Koala habitat for the purpose of the Koala Habitat Protection SEPP has been undertaken and concluded that the Modification would not impact core Koala habitat as the modified rail siding does not represent core Koala habitat (Section 6.8 and Appendix F).



State Environmental Planning Policy (Infrastructure) 2007

The State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) applies to the whole of NSW and includes provisions for consultation with relevant public authorities about certain development during the development assessment process.

Electricity Transmission and Distribution Networks

Subdivision 2 of Division 5 of Part 3 of the Infrastructure SEPP relates to developments that are likely to affect an electricity transmission or distribution network.

Clause 45 of the Infrastructure SEPP relevantly provides:

- (1) This clause applies to a development application (or an application for modification of a consent) for development comprising or involving any of the following:
 - (a) the penetration of ground within 2m of an underground electricity power line or an electricity distribution pole or within 10m of any part of an electricity tower,
 - (b) development carried out:
 - (i) within or immediately adjacent to an easement for electricity purposes (whether or not the electricity infrastructure exists), or
 - (ii) immediately adjacent to an electricity substation, or
 - (iii) within 5m of an exposed overhead electricity power line,
- (2) Before determining a development application (or an application for modification of a consent) for development to which this clause applies the consent authority must:
 - (a) give written notice to the electricity supply authority for the area in which the development is to be carried out, inviting comments about potential safety risks, and
 - (b) take into consideration any response to the notice that is received within 21 days after the notice is given.

The approved power supply for the rail siding is from an existing ETL that passes through the approved rail siding site (Figure 12). As the existing ETL does not have sufficient capacity for the modified rail siding, a new 22 kV ETL (subject to separate approval) would be required to provide power to the modified rail siding (Section 3.3.7).

Consultation would be conducted with Essential Energy (the relevant electricity supply authority) regarding the modified Project. Further consultation with Essential Energy would be conducted during the Project operations (e.g. preparation of management plans).

Rail Corridor

Subdivision 2 of Division 15 of Part 3 of the Infrastructure SEPP relates to development in or adjacent to rail corridors.

Clause 86 of the Infrastructure SEPP relevantly provides:

- (1) This clause applies to development (other than development to which clause 88 applies) that involves the penetration of ground to a depth of at least 2m below ground level (existing) on land:
 - (a) within or above a rail corridor, or
 - (b) within 25m (measured horizontally) of a rail corridor, or
 - (b1) within 25m (measured horizontally) of the ground directly below a rail corridor, or
 - (c) within 25m (measured horizontally) of the ground directly above an underground rail corridor.
- (2) Before determining a development application for development to which this clause applies, the consent authority must:
 - (a) within 7 days after the application is made, give written notice of the application to the rail authority for the rail corridor, and
 - (b) take into consideration:
 - (i) any response to the notice that is received within 21 days after the notice is given, and
 - (ii) any guidelines issued by the Secretary for the purposes of this clause and published in the Gazette.
- (3) Subject to subclause (5), the consent authority must not grant consent to development to which this clause applies without the concurrence of the rail authority for the rail corridor to which the development application relates.



- (5) The consent authority may grant consent to development to which this clause applies without the concurrence of the rail authority concerned if—
 - (a) the rail corridor is owned by or vested in ARTC or is the subject of an ARTC arrangement, or
 - (b) in any other case, 21 days have passed since the consent authority gave notice under subclause (2)(a) and the rail authority has not granted or refused to grant concurrence.

The Bogan Gate Tottenham Railway is located within the modified Project Development Application area. Consistent with the approved Project, the modified Project would involve the construction and operation of components of the rail siding within and adjacent to the rail easement of the Bogan Gate Tottenham Railway. The design and construction of the loading siding would be undertaken in accordance with the requirements of John Holland (or the relevant rail network operator at the time).

SEM has consulted with John Holland (the relevant rail authority) in relation to the Modification (Section 5).

4.2.2 Local Environmental Plans

The Project is located within the Lachlan, Parkes and Forbes LGAs, which are covered by the Lachlan LEP, Parkes LEP and Forbes LEP, respectively.

The modified rail siding is within the Parkes LGA and, therefore, the Parkes LEP is relevant to the Modification.

As the Modification would not change the location of Project components located in the Lachlan and Forbes LGAs, the Lachlan and Forbes LEPs have not been considered further in this section.

Permissibility

As the Modification would not change the limestone quarry (within the Parkes LGA), this component has not been considered further in this section.

The modified rail siding site is within Zone RU1 (Primary Production) within the Parkes LGA.

Under the Parkes LEP, freight transport facilities are listed as permissible activity with consent on lands zones RU1 (primary production).

Therefore, the modified rail siding is permissible under the Parkes LEP.

Zone Objectives

Clause 2.3(2), Section 2 of the Parkes 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 modified rail siding is located within Zone RU1 (Primary Production) within the Parkes LGA. The objectives of Zone RU1 (Primary Production) include:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage 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.
- To encourage eco-tourism enterprises that minimise any adverse effect on primary industry production.
- To permit non-agricultural uses that support the primary production purposes of the zone.
- To permit small scale rural tourism uses associated with primary production and environmental conservation with minimal impact on primary production and the scenic amenity of the area.
- To encourage the provision of tourist
 accommodation in association with agricultural
 activities.
- To provide opportunities for employmentgenerating development that adds value to local agricultural production and integrates with tourism.

The modified Project is not inconsistent with the objectives of Zone RU1 (Primary Production) of the Parkes LEP, as:

- The modified Project would include development of NSW mineral resources in a manner that minimises environmental impacts through the implementation of the Environmental Management Strategy (Section 1.1.2) and other measures (Section 6).
- The modified Project would not result in the fragmentation or alienation of natural resource lands and would optimise the recovery of mineral resources.



- The modified Project site is considered suitable, and incorporates measures to allow for compatibility with existing land uses.
- The modified Project would provide employment and other socio-economic benefits to the community (Sections 6.13 and 6.14).
- The modified Project would include the re-establishment of agricultural land and endemic woodland areas post-mining (including in the Fifield State Forest) (Section 3.2.10).
- The modified Project would be conducted in accordance with the existing Compensation Agreement with Forestry Corporation of NSW.
- The Modification is not expected to significantly change the approved impacts on the Fifield State Forest.

4.3 OTHER STATE LEGISLATION

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

- Biosecurity Act 2015;
- Biodiversity Conservation Act 2016 (BC Act);
- Contaminated Land Management Act 1997;
- Crown Land Management Act 2016;
- Dams Safety Act 2015;
- Dangerous Goods (Road and Rail Transport) Act 2008;
- Fisheries Management Act 1994;
- Heritage Act 1977;
- Local Land Services Act 2013;
- Mining Act 1992;
- National Parks and Wildlife Act 1974 (NPW Act);
- Protection of the Environment Operations Act 1997 (PoEO Act);
- Radiation Control Act 1990;
- Roads Act 1993;
- Threatened Species Conservation Act 1995;
- Water Management Act 2000;
- Work Health and Safety Act 2011; and
- Work Health and Safety (Mines) Act 2013.

Relevant licences or approvals required under these Acts would continue to be obtained for the modified Project.

Additional detail on the likely requirements under some of the key Acts is provided in the sub-sections below.

Mining Act 1992

Under the *Mining Act 1992*, environmental protection and rehabilitation are regulated by conditions of mining leases, including requirements for the submission of a Mining Operations Plan prior to the commencement of operations, and subsequent Annual Reviews.

Mining operations at the modified mine and processing facility would be wholly within the boundary of ML 1770. Therefore, there is no need for the amendment or variation of existing authorities or the issue of new authorities under the *Mining Act 1992*. The Mining Operations Plan (incorporating the modified mine and processing facility) would be prepared under the conditions of ML 1770.

The Modification would not change operations at the limestone quarry (ML 1769).

The objects of the *Mining Act 1992* are to encourage and facilitate the discovery and development of mineral resources in NSW, having regard to the need to encourage ecologically sustainable development.

The Modification is considered to be generally consistent with the objects of the *Mining Act 1992*, as the modified Project:

- incorporates the development of NSW mineral resources in a manner that minimises environmental impacts through the implementation of the Environmental Management Strategy (Section 1.1.2) and other measures (Section 6); and
- promotes the economic recovery of nickel, cobalt and scandium resources at the Project (i.e. through the optimised production schedule and revised mine site layout).

National Parks and Wildlife Act 1974

The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage in NSW.



SEM holds Aboriginal Heritage Impact Permit C0003049 and Aboriginal Heritage Impact Permit C0003887 issued under the NPW Act for the Project.

An Aboriginal Cultural Heritage Assessment (ACHA) for the Modification has been undertaken in consultation with the Registered Aboriginal Parties (RAPs) (Appendix G).

SEM would consult with Heritage NSW regarding the need to seek a new area based Aboriginal Heritage Impact Permit for the modified rail siding.

Protection of the Environment Operations Act 1997

The PoEO Act is the primary NSW legislation that regulates pollution control and licensing. One key feature of the Act is the statutory requirement to apply for and obtain an Environment Protection Licence (EPL) in circumstances where a scheduled activity or activities are being carried out (those activities being defined in Schedule 1 of the PoEO Act).

The approved Project is currently licensed under EPL 21146 to conduct "concrete works", "crushing, grinding or separating" and "extractive activities" as defined in Schedule 1 of the PoEO Act.

SEM would review EPL 21146 in consultation with the EPA, and if necessary, apply to vary EPL 21146 under the PoEO Act to incorporate the Modification.

Water Management Act 2000

The Water Management Act 2000 contains provisions for the licensing, allocation, capture and use of water resources. Under the Water Management Act 2000, water sharing plans are being introduced (and many have commenced) for water sources. Water sharing plans establish rules for sharing water between different users and between the various environmental sources (namely rivers or aquifers).

The Project is located within the Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012, Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources 2020, Water Sharing Plan for the Lachlan Unregulated River Water Sources 2012, Water Sharing Plan for the Lachlan Regulated River Water Source 2016 and Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020 (Appendix C). SEM currently holds the following water supply works approvals for the Project:

- Water Supply Works Approval 70CA614098 for the Project borefield and linking pipeline.
- Water Supply Works Approval 70WA617095 for the surface water extraction infrastructure and water pipeline.

In addition, SEM currently holds the following water access licences (WALs) for the Project:

- WAL 32068 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 3,154 share components under the Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.
- WAL 39837 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 766 share components under the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.*
- WAL 28681 in the Lachlan Fold Belt Murray-Darling Basin (MDB) Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020.
- WAL 6679 in the Lachlan Regulated River Water Source, for 123 share components (General Security) under the Water Sharing Plan for the Lachlan Regulated River Water Source 2016.
- WAL 1798 in the Lachlan Regulated River Water Source, for 300 share components (General Security) under the Water Sharing Plan for the Lachlan Regulated River Water Source 2016.
- WAL 42370 in the Lachlan Regulated River Water Source, for 0 share components (High Security) under the Water Sharing Plan for the Lachlan Regulated River Water Source 2016.

Consistent with Condition 20, Schedule 3 of Development Consent (DA 374 11 00), SEM would obtain necessary water licences for the modified Project.

Biodiversity Conservation Act 2016

The BC Act sets the legislative framework for biodiversity conservation in NSW.



Section 6.8 considers the potential biodiversity impacts associated with the Modification.

As described in Section 6.8, with reference to clause 30A, sections 1(a) and 2(c) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*, the Modification would not increase impacts on biodiversity values and therefore, it is considered that a Biodiversity Development Assessment Report (BDAR) is not required.

Forestry Act 2012

The *Forestry Act 2012* provides for the dedication, management and use of State Forests and other Crown-timber land for forestry and other purposes.

The approved and modified mine and processing facility would involve activities within Fifield State Forest, which are dedicated as State Forest pursuant to the *Forestry Act 2012*.

Section 35 of the *Forestry Act 2012* provides that the exercise of any right under the *Mining Act 1992* on land within a State Forest is subject to conditions and restrictions relating to forestry as may be prescribed by the relevant regulations. For the portion of the Project within the Fifield State Forest, SEM holds ML 1770.

SEM has entered into a Compensation Agreement with Forestry Corporation of NSW for access into the Fifield State Forest. SEM has consulted with the Forestry Corporation of NSW regarding the Modification (Section 5).

The modified Project would be conducted in accordance with the existing Compensation Agreement with Forestry Corporation of NSW.

Crown Land Management Act 2016

The *Crown Land Management Act 2016* provides for the management of Crown land in NSW.

SEM has entered into a Compensation Agreement with DPIE – Crown Lands for the Crown land area at the mine and processing facility.

SEM holds a Crown Lands Licence (Licence number 603648) for the Crown land area at the accommodation camp.

For all relevant Crown land directly affected by the modified Project, SEM would enter into necessary leases or licences under the *Crown Lands Act 1989* and/or reach agreements under section 265 of the *Mining Act 1992* to allow Project activities to occur.

The Modification would not require additional areas of Crown Land relative to the approved Project. SEM has consulted with the DPIE – Crown Lands regarding the Modification (Section 5).

SEM has consulted with the DPIE – Crown Lands regarding the Modification (Section 5).

Local Land Services Act 2013

The Local Land Services Act 2013 established the Local Land Services which provides for management and delivery of local land services in the social, economic and environmental interests of NSW.

As part of this role, the Local Land Services manages Travelling Stock Reserves in NSW. SEM has entered into a Compensation Agreement with Local Land Services for the Travelling Stock Reserve in the mine and processing facility area.

Roads Act 1993

Works or structures that disturb the surface of a public road, or connect a road to a classified road, require consent under section 138 of the *Roads Act 1993*. The road upgrades associated with the Modification would disturb the surface of any public roads or connections to classified roads. Consent under section 138 of the *Roads Act 1993* is therefore required for the Modification.

Consents under section 138 of the *Roads Act 1993* would be obtained where required, in consultation with the relevant roads authority/authorities.

Dams Safety Act 2015

The *Dams Safety Act 2015* regulates the safety of dams. The *Dams Safety Regulation 2019* sets out operational details and safety standards that declared dam owners must comply with to satisfy the provisions of the *Dams Safety Act 2015*.

The *Dams Safety Act 2015* is administered by Dams Safety NSW.

The tailings storage facility and water storage dam are classified as a "declared dam" under the *Dams Safety Act 2015.* These dams will be managed in accordance with the requirements of the *Dams Safety Act 2015.*

SEM has consulted with Dams Safety NSW regarding the Modification (Section 5).

SEM would comply with the *Dams Safety Act 2015*, where relevant.

4.4 COMMONWEALTH LEGISLATION

Environment Protection and Biodiversity Act 1999

The objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to provide for the protection of those aspects of the environment that are of national environmental significance.

Matters of national environmental significance include:

- world heritage properties;
- wetlands listed under the Ramsar Convention;
- listed threatened species and ecological communities;
- listed migratory species protected under international agreements;
- nuclear actions;
- the Commonwealth marine environment;
- national heritage places; and
- water resources, in relation to coal seam gas development and large coal mining developments.

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.

A proposal that is, or may be, a controlled action is required to be referred to the Commonwealth Department of Agriculture, Water and Environment (DAWE) to determine whether or not the action is a controlled action.

The Project was referred in 2001, and was determined as "not a controlled action" (EPBC 2001/133).

It is concluded that the Modification would not have a significant impact on Matters of National Environmental Significance for the following reasons:

• The Modification would not have a significant impact on listed threatened species and ecological communities and/or migratory species and would result in a reduction to the clearance of *the Poplar Box Grassy Woodland on Alluvial Plains* endangered ecological community (Poplar Box EEC) (Section 6.8 and Appendix F).

- The Modification would not have a significant impact on wetlands of international importance.
- The Modification would not have a significant impact on world heritage properties or national heritage places.
- The Modification would not impact the Great
 Barrier Reef Marine Park and/or
 Commonwealth marine areas.
- The Modification is not a nuclear action.
- The Modification is not a coal mining or coal seam gas project that could have an impact on a water resource.

It is considered that there is no need to refer the Modification to the Commonwealth Minister for the Environment.

National Greenhouse and Energy Reporting Act 2007

The National Greenhouse and Energy Reporting Act 2007 (NGER Act) introduced a single national reporting framework for the reporting and dissemination of companies' greenhouse gas emissions and energy use. The NGER Act makes registration and reporting mandatory for companies whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

Section 3 of the NGER Act defines the objects of the Act:

- (1) The first object of this Act is to introduce a single national reporting framework for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy consumption and energy production of corporations to:
 - (b) inform government policy formulation and the Australian public; and
 - (c) meet Australia's international reporting obligations; and
 - (d) assist Commonwealth, State and Territory government programs and activities; and
 - (e) avoid the duplication of similar reporting requirements in the States and Territories.
- (2) The second object of this Act is to ensure that net covered emissions of greenhouse gases from the operation of a designated large facility do not exceed the baseline applicable to the facility.



The Project is anticipated to trigger the current NGER Act reporting threshold during the Project life, based on the Scope 1 and 2 greenhouse gas emission estimates provided in Appendix A. Accordingly, SEM would report relevant energy use and greenhouse gas emissions associated with its activities.

4.5 DEVELOPMENT APPLICATION AREA

Appendix 1 of Development Consent (DA 374-11-00) describes the Development Application area for the approved Project.

The proposed changes to Appendix 1 of Development Consent (DA 374-11-00) are provided in Attachment 2 and are described in this section.

4.5.1 Rail Siding

Appendix 1 of Development Consent (DA 374-11-00) lists Part Lot 39 DP 752117 for the approved rail siding.

The modified rail siding is located on Lot 1 DP 630504 (Figure 15). It is proposed that Part Lot 39 DP 752117 be replaced by Lot 1 DP 630504 in Appendix 1 of Development Consent (DA 374-11-00) (Attachment 2).

4.5.2 Administrative Amendments

Various other administrative changes to the Appendix 1 of Development Consent (DA 374-11-00) are proposed to (Attachment 2):

- reflect refined property boundary surveys;
- update lots as a result of recent property subdivisions;
- remove lots that are no longer part of the Project; and
- include lots along the approved water and gas pipeline that were not previously included.

4.6 MODIFIED PROJECT COMPLIANCE WITH STATUTORY REQUIREMENTS

The Draft State Significant Development Guide – Preparing a Modification Report (DPIE, 2020a) requires that "The applicant must also include a detailed statutory compliance table for the modified project as an appendix to the Modification Report, which identifies all the relevant statutory requirements for the modified project and indicates where they have been addressed in the Modification Report".

A summary of the modified Project's compliance with relevant statutory requirements is provided in Table 5.

Table 5	
Statutory Compliance for the Project	ct

Relevant Statute	Section Addressed	Project Compliance
Commonwealth Legislation		
Environment Protection and Biodiversity Conservation Act 1999	Section 4.5.1	~
National Greenhouse and Energy Reporting Act 2007	Section 4.3	~
NSW Legislation		
Environmental Planning and Assessment Act 1979	Section 4.1	~
Mining Act 1992	Section 4.3	~
Protection of the Environment Operations Act 1997	Section 4.3	~
Water Management Act 2000	Sections 4.3, 6.4 and 6.5 and Appendix C	\checkmark
Dams Safety Act 2015	Section 4.3	\checkmark
Biodiversity Conservation Act 2016	Sections 4.3 and 6.8 and Appendix F	✓
Forestry Act 2012	Section 4.3	\checkmark
Roads Act 1993	Section 4.3	✓
Other legislation	Section 4.3	\checkmark

Table 5 (Continued) Statutory Compliance for the Project

Relevant Statute	Section Addressed	Project Compliance		
NSW Planning Policies				
State Environmental Planning Policy (State and Regional Development) 2011	Section 2.4.1	~		
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007	Section 4.2.1	\checkmark		
State Environmental Planning Policy No. 33 – Hazardous and Offensive Development	Section 4.2.1	\checkmark		
State Environmental Planning Policy (Koala Habitat Protection) 2019	Section 4.2.1	✓		
State Environmental Planning Policy No.55 – Remediation of Land	Section 4.2.1 and Appendix G	✓		
State Environmental Planning Policy (Infrastructure) 2007	Section 4.2.1	~		
Lachlan Local Environmental Plan 2013	Section 4.2.2	~		
Parkes Local Environmental Plan 2012	Section 4.2.2	✓		
Forbes Local Environmental Plan 2013	Section 4.2.2	✓		





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5 ENGAGEMENT

This section provides an overview of the engagement undertaken during the preparation of this Modification Report, the key issues raised during this engagement, and any changes to the approved Project engagement that would be required as a result of the Modification.

5.1 ENGAGEMENT APPROACH

The engagement undertaken during preparation of this Modification Report is in accordance with SEM's Scoping Letter for the Modification and has been undertaken with consideration of the requirements of *Undertaking Engagement Guide Guidance for State Significant Projects* (DPIE, 2020c).

Key objectives of the engagement undertaken for the Modification are to:

- engage with key government and public stakeholders about the Modification;
- seek input from key stakeholders on elements of the Modification; and
- continue the ongoing dialogue between SEM and key stakeholders regarding the development of the Project.

It is anticipated that consultation will continue during the public exhibition of this Modification Report and the assessment of the Modification by the NSW Government.

5.2 MODIFICATION REPORT ENGAGEMENT

5.2.1 NSW Government Agencies

Department of Planning, Industry and Environment

SEM held a videoconference with DPIE on 18 November 2020 to provide an overview of the Modification.

Following the videoconference, SEM provided a Scoping Letter to the DPIE that provided an overview of the Modification, the proposed approval pathway, and the proposed scope of the environmental assessment and engagement based on the outcomes of the videoconference. The DPIE subsequently wrote to SEM on 8 December 2020, confirming the proposed approval pathway and that it was generally satisfied with the proposed environmental assessment and engagement scope outlined in SEM's Scoping Letter. The DPIE letter also requested that the Modification Report include consideration of relevant statutory requirements associated with the Modification as well as a revised evaluation of the modified Project. These additional aspects have been considered in Sections 4 and 7 of this Modification Report.

SEM held a videoconference with representatives of the DPIE on 28 June 2021 to provide an update on the Modification and to discuss the findings of the environmental assessment and engagement outcomes.

Environment Protection Authority

SEM provided a briefing package to the EPA on 24 March 2021 that provided an overview of the Modification, outlined the approach to assessing potential noise, air quality and water resources impacts associated with the Modification, and described the proposed waste management measures for the modified Project.

The EPA did not request any additional information regarding the Modification.

Natural Resources Access Regulator

SEM provided a briefing package to the Natural Resources Access Regulator (NRAR) on 16 April 2021 that provided an overview of the Modification, outlined the approach to assessing potential water resource impacts associated with the Modification and offered further information if requested.

The NRAR did not request any additional information regarding the Modification.

Transport for NSW

SEM met with TfNSW on 7 June 2021 to provide an overview of the Modification and discuss the findings of the Road Transport Assessment for the Modification.

TfNSW raised no significant concerns with the Modification or the Road Transport Assessment.



Biodiversity, Conservation and Science Directorate

SEM provided a briefing package to the Biodiversity, Conservation and Science Directorate [BCS] on 29 March 2021 that provided an overview of the Modification and the proposed approach to assessing potential biodiversity impacts associated with the modified rail siding.

BCS subsequently wrote to SEM on 6 April 2021 confirming that no BDAR is required for the Modification (Sections 4.3 and 6.8).

Heritage NSW

SEM provided a briefing package to Heritage NSW on 17 February 2021 that provided an overview of the Modification and presented the proposed approach to preparing the ACHA for the modified rail siding.

Heritage NSW raised no significant issues with the proposed approach to the ACHA.

Mining, Exploration and Geoscience

SEM provided a briefing package to the Mining, Exploration and Geoscience (MEG) Group (within the Department of Regional NSW) on 28 May 2021 to provide an overview of the Modification, describe the relevant resource and tenements and offer further information if requested.

MEG requested additional information on 28 June 2021. SEM has included some of the requested information in this Modification Report and will separately provide the remaining information to MEG.

Resources Regulator

SEM provided a briefing package to the Resources Regulator on 18 May 2021 that provided an overview of the Modification, described the modified rehabilitation strategy and offered further information if requested.

The Resources Regulator did not request any additional information regarding the Modification.

Dams Safety NSW

SEM provided a briefing package and held a teleconference with Dams Safety NSW on 11 June 2021 that provided an overview of the Modification, including a description of the revised tailings storage facility cell construction sequence and decant water management. SEM also outlined that the tailings storage facility and water storage dam would be managed in accordance with the requirements of the *Dams Safety Act 2015.*

Dams Safety NSW did not request any additional information regarding the Modification.

Department of Planning, Industry and Environment – Crown Lands

SEM provided a briefing package to the DPIE – Crown Lands on 26 May 2021 to provide an overview of the Modification and offer further information if requested.

The DPIE – Crown Lands subsequently indicated that it had no objections to the Modification. No further information on the Modification was requested.

Forestry Corporation of NSW

SEM provided a briefing package to the Forestry Corporation of NSW on 1 June 2021 that provided an overview of the Modification, an overview of potential interactions with the Fifield State Forest and offered further information if requested.

The Forestry Corporation of NSW requested they be provided an opportunity to review the Modification Report during the public exhibition phase.

5.2.2 Local Councils

The Project is located within the Lachlan, Parkes and Forbes LGAs (Figure 1).

SEM held meetings with the LSC, PSC and FSC on 10 December 2020, 30 November 2020 and 19 January 2021, respectively to provide an overview of the Modification and to outline the approach to assessing potential road transport and community infrastructure impacts associated with the Modification.

SEM held additional meetings with the LSC, PSC and FSC on 6 May 2021, 23 April 2021 and 27 April 2021, respectively, to provide an update on the Modification.

SEM held further meetings with the LSC, PSC and FSC on 24 May 2021, 11 June 2021 and 8 June 2021 respectively to provide an update on the Modification and to discuss the findings of the Road Transport Assessment and Social Impact Review for the Modification.



No significant issues with the Modification were raised by the LSC, PSC or FSC during the meetings. The PSC did however request that the use of Middle Trundle Road by Project truck traffic be minimised. SEM subsequently significantly reduced the amount of Project truck movements on Middle Trundle Road.

In addition, Square Peg Social Performance (SPSP) undertook consultation activities in support of the Social Impact Review for the Modification (Appendix I). Further detail on the Social Impact Review consultation activities is provided in Appendix I.

SEM will continue to consult with the LSC, PSC and FSC throughout the Modification assessment process to respond to any issues or concerns raised.

5.2.3 Infrastructure Owners and Service Providers

John Holland

John Holland is the operator of the Bogan Gate Tottenham Railway.

SEM provided a briefing package to John Holland on 31 May 2021 that provided an overview of the Modification including the modified rail siding and the associated implications for the Bogan Gate Tottenham Railway. John Holland provided in-principle support for the Modification.

Essential Energy

Essential Energy is the electricity supply authority for the existing 22 kV electricity transmission line in the vicinity of the modified rail siding. As described in Section 3.3.7, a new 22 kV ETL (subject to separate approval) would be required to provide power to the modified rail siding (Figures 12 and 13).

SEM provided a briefing package to Essential Energy on 28 May 2021 that provided an overview of the Modification including the modified rail siding power supply. Essential Energy did not raise any concerns with the Modification and provided in-principle support for the proposed approval pathway for the new 22 kV ETL.

5.2.4 Community Engagement

Community Consultation Committee

A CCC has been established for the Project (Section 1.1.3).

Updates on the status of the Modification have been provided at the November 2020 and April 2021 CCC meetings. SEM will provide an overview of the environmental assessment findings at the next CCC meeting scheduled for late July 2021.

Fifield and Trundle Communities

SEM representatives met with business and community members in Trundle and Fifield on 15 and 16 June 2021, respectively, to provide a briefing on the Modification and for the local community to ask SEM any specific queries or issues of concern relating to the Modification.

Aboriginal Stakeholders

Aboriginal stakeholders were consulted throughout the preparation of the ACHA for the Modification (Appendix G). Consultation was conducted with reference to the Heritage NSW policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (Department of Environment, Climate Change and Water [DECCW], 2010a).

Further detail on consultation with Aboriginal stakeholders for the Modification is provided in Section 6.9 and Appendix G.

Neighbouring Landholders

SEM consults with neighbouring landholders as part of its ongoing community engagement.

SEM met with landholders neighbouring the mine and processing facility and rail siding to provide an overview of the Modification and the outcomes of key assessments on 16 June 2021.

SEM will continue to consult with neighbouring landholders during the exhibition period of this Modification Report.

Community Newsletter

SEM will distribute a community newsletter providing information on the Project and the Modification in July 2021.

Neighbouring Tenement Holders

Australian Mines Limited is the proponent of the Flemington Cobalt Scandium Mine, a proposed nickel, cobalt and scandium open cut mine located to the immediate north-west of the mine and processing facility within EL 8478. EL 8478 also overlays the approved accommodation camp site.

Rimfire Pacific Mining N.L. is the holder of EL 8935 which also overlays the approved accommodation camp site.

SEM provided a briefing letter on the Modification to Australian Mines Limited and Rimfire Pacific Mining N.L. on 28 May 2021.

SEM will continue to consult with Australian Mines Limited and Rimfire Pacific Mining N.L. regarding potential interactions with the modified Project.

5.3 CONSIDERATION OF APPROVED CONSULTATION REQUIREMENTS

SEM has conducted a review of the consultation requirements in Development Consent (DA 374-11-00) and considers that no changes to the approved consultation requirements are required as a result of the Modification.



6 ASSESSMENT OF IMPACTS

6.1 IDENTIFICATION OF KEY ISSUES

The Modification would include changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities (Section 3).

SEM has undertaken a review of the potential environmental impacts of the Modification to identify the key potential environmental aspects requiring assessment.

The key potential environmental impacts associated with the modified mine and processing facility and accommodation camp would be related to the modified construction and operational activities. As the approved surface development area would not change, there would be no changes to surface development related impacts (e.g. biodiversity, Aboriginal cultural heritage) at the mine site and processing facility and accommodation camp as a result of the Modification.

The key potential environmental impacts associated with the modified rail siding would be related to the modified surface development area and potential amenity impacts associated with the construction and operation of the modified rail siding.

The changes to road transport activities would change the approved potential impacts on the road transport network.

As no changes to the other approved Project components are proposed as part of the Modification, no changes to the related environmental impacts are expected and therefore have not been considered further in this Modification Report.

The key environmental potential environmental impacts associated with the Modification are addressed in Sections 6.2 to 6.14 and in Appendices A to I.

In additional to the above, a new 22 kV ETL (subject to separate approval) would be required to provide power to the modified rail siding (Section 3.3.7). Although the potential environmental impacts would be assessed as part of the separate approval, an environmental review of the potential impacts of the new 22 kV ETL is provided in Appendix J.

6.2 AIR QUALITY

The potential air quality impacts associated with the Modification would be related to proposed changes to the mine and processing facility and the modified rail siding (Section 6.1).

An Air Quality Assessment for the Modification was undertaken by Jacobs (2021) and is presented as Appendix A. The assessment was conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (EPA, 2017b).

Potential greenhouse gas emissions associated with the Modification are discussed in Section 6.15.

6.2.1 Background

Sensitive Receivers

Mine and Processing Facility

Nearby sensitive receivers to the mine and processing facility predominantly include residential receivers.

The residential receivers are generally located in all directions in the vicinity of the mine and processing facility (i.e. to the north, south, east and west) (Figure 16).

The closest privately-owned sensitive receiver (Currajong Park 2) is located approximately 1.2 km north of the ML 1770 boundary (Figure 16).

Fifield is the closest community to the mine and processing facility and is located approximately 2 km to the south-east of the Project (Figure 16). Fifield includes residential and community receivers.

Existing land uses in the vicinity of the mine and processing facility are characterised by a combination of agricultural enterprises (grazing and dryland cropping), carbon offset properties and forestry operations (Fifield State Forest) (Section 2.2).

Rail Siding

The modified rail siding is located approximately 50 km north-west of Parkes. Trundle is the closest community to the rail siding and is located approximately 4 km to the south-southeast (Figure 1).



The two closest privately-owned sensitive receivers are located approximately 1 km west (Glen Rock) and 1.2 km east (Ballenrae West) of the modified rail siding.

Existing land uses in the vicinity of the rail siding are characterised by a combination of agricultural enterprises (grazing and dryland cropping), roads and the Bogan Gate Tottenham Railway.

Concentrations of Particulate Matter

Operations and construction activities at the modified mine and processing facility and rail siding have the potential to generate particulate matter emissions in the form of:

- total suspended particulate matter (TSP);
- particulate matter with an aerodynamic diameter less than or equal to 10 micrometres (PM₁₀) (a subset of TSP); and
- particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometres (PM_{2.5}) (a subset of TSP and PM₁₀).

Relevant health-based air quality impact assessment criteria for TSP, PM_{10} and $PM_{2.5}$ are specified in Development Consent (DA 374-11-00) and by the EPA in the Approved Methods (EPA, 2017b), and are provided in Table 6.

Dust Deposition

Particulate matter has the potential to cause nuisance (amenity) effects when it is deposited on surfaces.

The amenity criteria for the maximum increase in dust deposition, as specified in Development Consent (DA 374-11-00) and in the Approved Methods (EPA, 2017b) are provided in Table 7.

Concentrations of Gaseous Pollutants

The modified processing facility would generate emissions of gaseous pollutants associated with the processing of ore and power generation.

The impact assessment criteria for the gaseous pollutants that may be emitted by the processing facility, as specified by the EPA in the Approved Methods (EPA, 2017b), are provided in Table 8.

Existing Air Quality

Particulate Matter and Dust Deposition

Jacobs (2021) reviewed background level concentrations of PM₁₀, PM_{2.5} and dust deposition recorded at the various SEM air quality monitors as well as NSW Government operated monitors in the region. A detailed discussion of the background dust levels is provided in Appendix A, and a summary is provided below.

Background concentrations of PM₁₀ and PM_{2.5} have been monitored by SEM at two locations (PM2 and PM4) since November 2019 in the vicinity of the mine and processing facility (Figure 16).

TSP is not monitored in the vicinity of the Project. Jacobs (2021) assumed that average PM₁₀ concentrations are 40% of TSP concentrations (NSW Minerals Council, 2000; Jacobs, 2018).

A summary of the measured background levels is provided in Table 9. The measured background levels were below the relevant PM₁₀, PM_{2.5} and TSP criteria when extraordinary events (e.g. dust storms and regional bushfire activity) were excluded. However, levels were generally higher in 2019 and early 2020 due to drought conditions and associated extraordinary events (Appendix A).

Monitoring of background dust deposition is undertaken by SEM at four locations (DG1 to DG4) in the vicinity of the mine and processing facility (Figure 16). A summary of the existing dust deposition data is provided in Table 10.

Background dust deposition levels were below the relevant dust deposition criteria (4 g/m²/month) based on all available data (Appendix A).

Gaseous pollutants

Concentrations of gaseous pollutants in the vicinity of the Project were assessed to be negligible as the Project is well removed from regional centres, industry and other major developments (Appendix A).

Previous Assessments

Mine and Processing Facility

An Air Quality Assessment was undertaken for Modification 4 of the Project (Ramboll Environ, 2017).




 Table 6

 Air Quality Criteria for Particulate Matter Concentrations

Pollutant	Averaging Time	Impact Assessment Criteria ^{1, 2}
	24-hour	50 μg/m³
Particulate matter (PM ₁₀)	Annual	25 µg/m³
	24-hour	25 µg/m³
Particulate matter (PM _{2.5})	Annual	8 µg/m³
Particulate matter (TSP)	Annual	90 µg/m³

After: Development Consent (DA 374-11-00) and Approved Methods (EPA, 2017b).

Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
 Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents and any other activity agreed by the Secretary.

Table 7
Air Quality Criteria for Dust Deposition

Averaging Time	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m ² /month	4 g/m ² /month

After: Development Consent (DA 374-11-00) and Approved Methods (EPA, 2017b).

 Table 8

 Air Quality Criteria for Gaseous Pollutants

Pollutant	Averaging time	Criterion	Application ¹
	1-hour	246 µg/m³	100 th percentile, cumulative
Nitrogen dioxide (NO ₂)	Annual	62 µg/m³	100 th percentile, cumulative
	15-minute	100,000 µg/m³	100 th percentile, cumulative
Carbon monoxide (CO)	1-hour	30,000 µg/m³	100 th percentile, cumulative
	8-hour	10,000 µg/m³	100 th percentile, cumulative
	10-minute	712 µg/m³	100 th percentile, cumulative
	1-hour	570 μg/m³	100 th percentile, cumulative
Sulphur dioxide (SO ₂)	24-hour	228 µg/m³	100 th percentile, cumulative
	Annual	60 µg/m³	100 th percentile, cumulative
Sulphuric acid (H ₂ SO ₄)	1-hour	18 µg/m³	99.9th percentile, incremental
Benzene	1-hour	29 µg/m³	99.9th percentile, incremental
1,3-butadiene	1-hour	40 µg/m ³	99.9th percentile, incremental

The 100th percentile application criteria stipulates a "maximum allowable" criteria (i.e. the criterion must be complied with all the time). The 99.9th percentile application criteria allows for up to nine hours of exceedance per year (i.e. 0.01% of one year). Criteria for air quality indicators with a 99.9th percentile is applied beyond the development boundary.

Table 9Measured and Estimated Annual Average TSP, PM10 and PM2.5 at the Project

	PM ₁₀ (μg/m³)		ΡΜ _{2.5} (μg/m³)		TSP ¹ (μg/m³)	
Year	PM2	PM4	PM2	PM4	PM2	PM4
2020	11.4	14.4	3.8	4.5	46	64
Criteria	25		8		9	0

After: Jacobs (2021).

1

Estimated based on PM₁₀ being 40% of TSP levels (Jacobs, 2021).



Year	DG1	DG2	DG3	DG4
2019	3.4	2.8	2.5	3.0
2020	3.1	2.6	2.3	3.2
Criteria		4	.0	

 Table 10

 Measured Annual Average Deposited Dust at the Project (g/m²/month)

After: Jacobs (2021).

This assessment demonstrated that no exceedances of the EPA impact assessment criteria were anticipated for particulate matter and dust deposition at the mine and processing facility (Ramboll Environ, 2017).

In addition, the predicted concentrations of gaseous pollutants were predicted to be well below the EPA impact assessment criteria beyond the mine and processing facility boundary and/or at privately-owned sensitive receivers (Ramboll Environ, 2017).

Rail Siding

The most recent air quality assessment of the approved rail siding was undertaken as part of the Syerston Project Environmental Impact Statement (EIS) (Black Range Minerals, 2000).

The assessment concluded that the approved rail siding was not considered to include significant dust generating activities (Black Range Minerals, 2000).

Air Quality Management Plan

The approved Air Quality Management Plan (Clean TeQ, 2019d) describes the air quality monitoring program and air quality management strategies for the approved Project.

Locations of the current air quality monitoring locations are shown on Figure 16. The monitoring program consists of a combination of dust deposition gauges, two continuous PM_{10} and $PM_{2.5}$ monitors and an automatic weather station.

Consistent with the approved Air Quality Management Plan (Clean TeQ, 2019d), no air quality or meteorological monitors operate in the vicinity of the modified rail siding.

6.2.2 Impact Assessment Review

Jacobs (2021) assessed the potential impacts of a peak construction phase and various operational phases of modified mine and processing facility (i.e. particulate matter generated by mobile equipment, exposed areas and gaseous pollutants released from dedicated stacks).

Jacobs (2021) also assessed indicative construction and operational scenarios of the modified rail siding (i.e. particulate matter generated by mobile equipment, exposed areas and other sources).

Dispersion Modelling Methodology

The CALPUFF modelling system was used by Jacobs (2021) to assess potential air quality impacts (from gaseous pollutants and particulate matter) associated with the modified Project.

CALPUFF is a multi-layer, non-steady-state puff dispersion model that is approved by the EPA (EPA, 2017b).

Further description of the dispersion modelling is provided in Appendix A.

Assessment of Meteorological Conditions

The dispersion modelling completed for the Modification is based on data from the site meteorological station "AWS" located near the proposed accommodation camp (Figure 16).

Meteorological monitoring at the AWS has been undertaken since November 2018.

Following a review of the data, the 2020 calendar year was selected as the representative year, and was used for the modelling (Appendix A).



Jacobs (2021) adopted the meteorological conditions from the mine and processing facility AWS for the modified rail siding.

Details of the analysis of meteorological conditions modelled is provided in Appendix A.

Air Quality Modelling Scenarios

Mine and Processing Facility

Four scenarios representative of the modified mine and processing facility were assessed for potential particulate matter impacts (Appendix A):

- Construction Year 2 representative of the peak construction phase;
- Year 1 representative of maximum ore and waste extraction, with mining in the eastern and western open cut pits, and TSF Cell 1 in operation;
- Year 10 representative of continued mining across both eastern and western open cut pits, and TSF Cell 2 in operation; and
- Year 17 representative of the final years of mining, with the maximum extent of the open cut pits, maximum heights and extent of the waste rock emplacements, and TSF Cell 3 in operation.

A single modelling scenario representing expected peak emissions was used to assess emissions of gaseous pollutants (Appendix A).

Rail Siding

Two scenarios representative of the modified rail siding were assessed for potential particulate matter impacts (Appendix A):

- Construction representative of the peak construction phase; and
- Operational representative of typical operations at the rail siding.

The scenarios for the mine and processing facility and modified rail siding were selected in consideration of maximum potential dust emissions (e.g. to account for the maximum material movements and proximity to privately-owned sensitive receivers) to evaluate the potential impacts at the nearest privately-owned sensitive receivers throughout the life of the modified Project.

Emission Inventories

Mine and Processing Facility

Particulate matter emission inventories were prepared for the four scenarios assessed in consideration of the indicative construction and mining activities for each year, including ore extraction, blasting, waste rock removal rates, haul distances and routes, active stockpile and pit areas and mobile equipment operating hours.

The major sources of dust emissions are predicted to be associated with the following activities (Appendix A):

- hauling of waste rock and ore in trucks on unpaved roads (including diesel particulate emissions);
- wind erosion of exposed areas and stockpiles;
- dozer operations; and
- handling and loading/unloading of waste rock and ore.

Consistent with the Approved Methods (EPA, 2017b), emission factors developed by the United States Environmental Protection Agency (US EPA) have been used to estimate the particulate matter emissions generated by the modified Project (Appendix A).

A full description of the dispersion model methodology and emission inventories is provided in Appendix A.

Estimated emissions of gaseous pollutants from the processing facility used in the modelling were estimated by SEM based on the current design of the processing facility, and take into account the use of emission control equipment incorporated into the processing operations. The modified stack design parameters, including the reduced acid plant stack height (Section 3.2.4), were also considered.

The assumed stack design and emissions are detailed in Appendix A.

Rail Siding

Particulate matter emission inventories were prepared for the rail siding scenarios which were assessed in consideration of the typical activities during the construction and operational phases.



The major sources of dust emissions are predicted to be associated with the following activities (Appendix A):

- wind erosion of exposed areas (construction and operational phases) and soil stockpiles;
- wind erosion from soil stockpiles (construction phase); and
- handling of ammonium sulphate (operational phase).

Consistent with the Approved Methods (EPA, 2017b), emission factors developed by the US EPA have been used to estimate the particulate matter emissions generated by the modified Project (Appendix A).

Mitigation Measures

Best practice dust mitigation measures to be implemented for the modified mining operations were developed with reference to the recommendations of the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Katestone Environmental, 2011) (Appendix A). While this study was focussed on coal mines, the emissions generating sources considered in the study, and a number of the associated mitigation measures, are considered relevant to the Project mining activities.

Dust mitigation measures that would be implemented for the modified Project would include (Clean TeQ, 2019d):

- use of water carts/trucks to control emissions from haul roads;
- roads constructed in a proper manner and consideration given to using material with low silt/fines content;
- restricting speed on haul roads;
- progressive rehabilitation of disturbed areas;
- minimising pre-strip areas;
- minimisation of drop heights for handling of waste rock and ore;
- direct placement of waste rock and ore where possible; and
- delay of blasts during unfavourable weather conditions.

The processing facility has been designed to minimise potential impacts of gaseous pollutants through the use of emission control equipment incorporated into the processing operations, and design of the stacks.

Compliance with Impact Assessment Criteria

Mine and Processing Facility

Particulate Matter

No exceedances of the Development Consent (DA 374-11-00) or Approved Methods criteria were predicted at any privately-owned sensitive receivers in all scenarios for:

- annual average dust deposition levels (both incremental and cumulative);
- cumulative annual average TSP concentrations;
- cumulative annual average and 24-hour PM₁₀ concentrations; or
- cumulative annual average and 24-hour PM_{2.5} concentrations.

Figure 17 shows the 24-hour maximum PM₁₀ concentrations for Construction Year 2 and Operational Years 1, 10 and 17 for the modified Project only (i.e. excluding background sources). Additional air quality contour plots for other particulate matter parameters from the modified mine and processing facility are provided in Appendix A.

Gaseous Pollutants

Jacobs (2021) considered the potential gaseous emissions from the following at the mine and processing facility:

- the processing facility;
- blasting; and
- diesel exhaust from mobile equipment.

No exceedances of the criteria for gaseous pollutants described in the Approved Methods were predicted at any privately-owned sensitive receivers, in Years 1, 10 and 17.

For all gaseous pollutants, the predicted concentrations were well below the relevant criteria at all privately-owned receivers (Appendix A).





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Figure 17

Air quality contours for gaseous pollutant emissions from the processing facility are provided in Appendix A.

Blasting

Jacobs (2021) considered the potential post-blast fume emissions from the modified Project (as Nitrogen Dioxide [NO₂]).

The post-blast fume emissions were well below the relevant NO₂ criteria (246 μ g/m³) at all nearby privately-owned sensitive receivers.

Additional air quality contours for blasting emissions are provided in Appendix A.

Diesel Exhaust

Jacobs (2021) considered the potential diesel exhaust emissions (as NO₂) from mobile equipment.

The modified Project would comply with the relevant 1-hour average and annual average criteria at all nearby privately-owned sensitive receivers (Appendix A).

Additional air quality contours for diesel exhaust emissions are provided in Appendix A.

Cumulative NO2 Emissions

Cumulative impacts of these modified Project components would comply with the relevant 1-hour average criteria at all sensitive privately-owned sensitive receivers (Appendix A).

Rail Siding

No exceedances of the Development Consent (DA 374-11-00) or Approved Methods criteria were predicted at any privately-owned sensitive receivers in all scenarios for:

- annual average dust deposition levels (both incremental and cumulative);
- cumulative annual average TSP concentrations;
- cumulative annual average and 24-hour PM₁₀ concentrations; or
- cumulative annual average and 24-hour PM_{2.5} concentrations.

Figure 18 shows 24-hour maximum PM₁₀ concentrations for the construction and operational scenarios for the modified rail siding only (i.e. excluding background sources). Additional air quality contour plots are provided in Appendix A.

Vacant Land Assessment

Jacobs (2021) has conducted a vacant land assessment in accordance with the VLAMP (NSW Government, 2018) and concluded that no privately-owned sensitive receivers are likely to exceed the criteria based on potential impacts on vacant land (Appendix A).

Cumulative Impacts

The potential cumulative air quality impacts of the modified Project with "relevant" projects as defined in the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b) (Section 2.3) were considered by Jacobs (Appendix A).

Jacobs concluded that none of the "relevant" projects would potentially interact with, or have potential cumulative air quality impacts with, the modified Project given the distance between the modified Project and the other "relevant" projects (Appendix A).

6.2.3 Mitigation Measures, Management and Monitoring

Air Quality Management Plan

Prior to the operations phase of the modified Project, the existing Air Quality Management Plan (Clean TeQ, 2019d) would be updated, where necessary, to incorporate the Modification.

In addition, Jacobs (2021) reviewed the existing air quality monitoring network at the Project and concluded that no changes are required for the modified Project.

6.3 NOISE

The potential noise impacts associated with the Modification would be related to proposed changes to the mine and processing facility and modified rail siding (Section 6.1).

A Noise Assessment for the Modification was undertaken by Renzo Tonin & Associates (Renzo Tonin) and is presented in Appendix B. The assessment was conducted in accordance with:

- NPfl (EPA, 2017a);
- VLAMP (NSW Government, 2018);
- Interim Construction Noise Guideline (ICNG) (DECC, 2009); and
- Road Noise Policy (DECCW, 2011).





As the Modification would not change the approved blasting or rail transportation activities at the Project, potential blasting and rail transportation impacts have not been considered in this section.

6.3.1 Background

Sensitive Receivers

Refer to Section 6.2.1 for a description of sensitive receivers in the vicinity of the mine and processing facility and rail siding.

Background Noise Levels

The Rating Background Level is the background noise level determined without the subject premises in operation, in accordance with the NPfI.

Renzo Tonin (2017) conducted background noise surveys for the Project. These surveys concluded that for all seven monitoring locations, all noise levels were approximately 30 A-weighted decibels (dBA) or below, with the exception of one monitoring location which was affected by insect noise.

Review of the background noise levels measured by Renzo Tonin (2017) indicated the Rating Background Levels would be 30 dBA during all periods, for all sensitive receivers. Therefore the minimum Rating Background Levels applicable under the NPfI were adopted for the Modification (Appendix B).

Construction Noise Criteria

The ICNG provides construction noise management levels based on the time of day in which construction activities occur, with the "noise affected" construction noise management level being the Rating Background Level plus 10 dBA during recommended standard construction hours and the Rating Background Level plus 5 dBA outside of recommended standard construction hours. The ICNG recommended standard construction hours are Monday to Friday 7 am to 6 pm and Saturday 8 am to 1 pm (Appendix B). Consistent with Condition 1, Schedule 3 of Development Consent (DA 374-11-00), construction of the modified mine and processing facility would be undertaken 24 hours per day, seven days per week and construction of the modified rail siding would be undertaken between 7.00 am to 6.00 pm, seven days per week.

Modified construction activities would therefore be undertaken both within and outside of the ICNG recommended standard construction hours.

The construction noise management levels for the modified Project are shown in Table 11.

The ICNG also sets out recommended acceptable noise levels for other noise-sensitive non-residential receivers (Appendix B).

Operational Noise Criteria

The NPfI recommends two noise assessment criteria, "intrusiveness" and "amenity", both of which are relevant for the assessment of noise from the modified Project (Appendix B). Cumulative noise impacts are assessed against the amenity criteria, while the Project-only noise impacts are assessed against the intrusiveness criteria.

The intrusiveness criteria are based on an energy average noise level over a 15-minute period. In accordance with the NPfI, intrusiveness criteria require the L_{Aeq} noise level from the source being assessed to not exceed the Rating Background Level by more than 5 dBA (when measured over a 15-minute period).

Amenity criteria are based on the setting of the area (e.g. rural, suburban, urban, industrial, etc.) (EPA, 2017a). Amenity criteria are based on the energy average noise level over the entire day, evening or night period rather than a 15-minute interval. Notwithstanding, under the NPfI, the Project amenity noise levels used for assessment purposes are converted to an equivalent energy average noise level over a 15-minute period.

	L _{A90} Ratir	ng Backgrou	und Level	Noi	ise Managemen	t Level L _{Aeq,15min}	
Sensitive Receiver Location	Day	Evening	Night	Recommended Standard Hours	Outside Rec	ommended Sta	ndard Hours
				Day	Day	Evening	Night
All residential receivers	35	30	30	45	40	35	35

 Table 11

 Construction Noise Management Levels at Residential Receivers

Source: Appendix B.



The NPfI prescribes how to establish Project-specific $L_{Aeq(15 minute)}$ intrusive criteria and amenity criteria. The NPfI Project-specific intrusive and amenity assessment criteria for the modified Project are presented in Table 12.

As the Project-specific intrusive criteria are the most stringent (i.e. less than the Project amenity criteria), Appendix B assesses Project-only noise levels against the Project intrusive criteria (i.e. these are the Project Noise Trigger Levels in accordance with the NPfI) (Table 12).

Cumulative noise levels inclusive of other industrial noise sources are assessed against the recommended amenity noise criteria level for rural areas, as adjusted to a 15-minute assessment period (Table 12).

The criteria adopted for other receiver types (e.g. hotels, fire stations, churches and town halls) are provided in Appendix B.

Noise Management and Noise Affectation Zones

In those cases where the Project Noise Trigger Levels are exceeded, it does not automatically follow that all people exposed to the noise would find the noise noticeable or unacceptable.

Table 13 presents the methodology used for assessing operational noise against the NPfI Project-specific noise assessment criteria.

For the purposes of assessing potential noise impacts consistent with the VLAMP, exceedances can be separated into a Noise Management Zone (i.e. negligible, marginal or moderate impacts of 1 to 5 dBA above the criteria) and a Noise Affectation Zone (i.e. greater than 5 dBA above the criteria, with impacts considered to be moderate or significant) (Table 14).

The adopted treatments for the Project for predicted noise exceedances are outlined in Table 14. These treatments are generally consistent with Table 4.2 of the NPfI and Table 1 of the VLAMP.

Development Consent (DA 374-11-00) Criteria

Development Consent (DA 374-11-00) prescribes noise criteria for the mine and processing facility and rail siding (Table 15).

Predicted noise levels for the Modification have been assessed against both these Development Consent (DA 374-11-00) criteria and the revised criteria derived under the NPfI.

Previous Assessments

Mine and Processing Facility

A Noise and Blasting Assessment was undertaken for Modification 4 (Renzo Tonin, 2017). The assessment concluded that:

- Noise levels from the construction of the mine and processing facility would comply with the ICNG criteria within and outside of the recommended standard construction hours.
- Noise levels from the operation of the mine and processing facility would exceed the relevant noise criteria at seven privately-owned sensitive receivers. All seven privately-owned sensitive receivers were predicted to experience "negligible" exceedances of the relevant criteria.

Rail Siding

Richard Heggie Associates (2000) assessed the potential noise impacts associated with the construction of the rail siding.

The assessment concluded that noise levels associated with the construction of the rail siding would comply with the relevant criteria.

Noise Management Plan

The approved Noise Management Plan (Clean TeQ, 2020c) describes the noise monitoring program and noise management strategies for the approved Project.

Locations of the current noise monitoring locations in the vicinity of the mine and processing facility are shown on Figure 16.

Consistent with the approved Noise Management Plan (Clean TeQ, 2020c), no noise monitors operate in the vicinity of the modified rail siding.

6.3.2 Impact Assessment Review

Construction Noise

An assessment of the predicted noise level during the expected peak construction phase at the mine and processing facility and an indicative maximum case modified rail siding construction scenario has been undertaken and is presented in Appendix B and a summary is provided below.

Table 12
NPfI Project-specific Intrusive and Amenity Assessment Criteria for Operational Noise (dBA)

	Intrusive L _{Aeq(15 minute)} 1			Amenity L _{Aeq(15 minute)} ¹		
Sensitive Receiver	Day	Evening	Night	Day	Evening	Night
All residential receivers	40 dBA	35 dBA	35 dBA	48 dBA	43 dBA	38 dBA

Source: After Appendix B.

1

Daytime = 7.00 am to 6.00 pm; Evening = 6.00 pm to 10.00 pm; Night-time = 10.00 pm to 7.00 am.

Table 13	
Significance of Residual Noise Impacts and Potential	Treatments

Residual Noise Exceeds NPfl Criteria By	Total Cumulative Industrial Noise Level	Significance of Residual Impact	Example of Potential Treatment
0 to 2 dBA	Not applicable	Negligible	The exceedance would not be discernible by the average listener and therefore would not warrant receiver-based treatment or controls.
3 to 5 dBA	< recommended amenity noise level or > recommended amenity noise level, but the increase in total cumulative industrial noise level resulting from the development is less than or equal to 1 dB	Marginal	Provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity.
3 to 5 dBA	> recommended amenity noise level and the increase in total cumulative industrial noise level resulting from the development is more than 1 dB	Moderate	As for "marginal", but also upgraded façade elements, such as windows, doors or roof insulation, to further increase the ability of the building façade to reduce
>5 dBA	=< recommended amenity noise level	Moderate	noise levels.
>5 dBA	> recommended amenity noise level	Significant	May include suitable commercial agreement where considered feasible and reasonable.

Source: NSW Government (2018).

Table 14 Noise Impact Assessment Methodology

Noise Manag	Noise Affectation Zone	
1-2 dB Above Project Noise Trigger Levels	3-5 dB Above Project Noise Trigger Levels	> 5 dB Project Noise Trigger Levels
No treatment/controls required	 Voluntary mitigation rights applicable. Architectural treatment required if requested (including ventilation and upgraded façade elements). 	 Voluntary mitigation rights applicable. Architectural treatment required if requested (including ventilation and upgraded façade elements).
		 Voluntary land acquisition rights applicable.

Source: After Appendix B.

Table 15
Development Consent (DA 374-11-00) Operational Noise Criteria for the Mine and Processing Facility
and Rail Siding

	Day	Evening	Nig	ght
Sensitive Receiver	L _{Aeq,15min} (dBA)	L _{Aeq,15min} (dBA)	L _{Aeq,15min} (dBA)	L _{A1,1 min} (dBA)
Mine and Processing Facility				
Currajong Park (M08 and M23)	37	37	37	45
Abandoned 2 (M04)				
Glenburn (M10)	05	00	00	45
Rosehill (M28)	35	36	36	45
Slapdown (M29)				
Brooklyn (M22)	36	35	35	45
Wanda Bye	35	35	37	45
All other privately-owned residence	35	35	35	45
Rail Siding				
Glen Rock (Q06)				
Ballanrae (Q08)	37	35	35	45
Spring Park (Q09)				
All other privately-owned residence	35	35	35	45

Note: Wanda Bye is now mine-owned.

The Environmental Noise Model was used by Renzo Tonin (Appendix B) to simulate the modified mine and processing facility and rail siding construction components using noise source information (i.e. mobile/stationary plant and equipment sound power levels and locations) and predict corresponding potential noise levels at relevant receiver locations.

The Environmental Noise Model is compatible with the NPfI and has previously been accepted by the EPA and DPIE for use in environmental noise assessments (Appendix B).

The sources of noise included in the modelled scenarios are outlined in Appendix B.

The predicted construction noise levels at all privately-owned sensitive receivers would comply with the construction noise management levels (Table 11) within and outside of recommended hours for all time periods (Figures 19, 20 and 21) (Appendix B).

Operational Noise

An assessment of the maximum case operational noise impacts of the modified mine and processing facility and modified rail siding has been undertaken (Appendix B) and a summary is provided below.

Mine and Processing Facility

Modelling Methodology

The Environmental Noise Model was used by Renzo Tonin (Appendix B) to simulate the modified operational mine and processing facility using noise source information (i.e. mobile/stationary plant and equipment sound power levels and locations) and predict corresponding potential noise levels at relevant receiver locations.

The sources of noise included in the modelled scenarios are outlined in Appendix B. Consistent with the NPfI, the noise model also considered meteorological effects, topographical features, distance from source to receiver and noise attenuation.

The locations of all modelled receivers in the vicinity of the mine and processing facility are provided in Appendix B and shown in Figure 16.

Assessment of Meteorological Conditions

The NPfI generally directs the use of two approaches for the assessment of noise impacts through the use of default meteorological parameters or site-specific parameters.







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Figure 20



The noise modelling completed for the Modification by Renzo Tonin (Appendix B) has adopted the more detailed approach, using site-specific meteorological data obtained from the on-site meteorological station (Figure 16) to determine the appropriate noise-enhancing meteorological conditions in accordance with Fact Sheet D of the NPfl. This approach provides a more accurate prediction of noise increases due to meteorological factors.

Based on the site-specific meteorological data, temperature inversions were found to be a feature of the site in the night time (Appendix B).

In addition, some noise-enhancing winds (south, south-southwest, south-west, west-southwest) were found to be a feature of the site during the evening and were, therefore, also modelled (Appendix B).

Further details on the analysis and meteorological conditions modelled are provided in Appendix B.

Noise Modelling Scenarios

Three scenarios of the modified mine and processing facility were assessed for potential noise impacts. These scenarios were selected to evaluate potential impacts at the nearest privately-owned receivers over the life of the modified Project (Appendix B):

- Year 1 year of peak material movement and operation of maximum operational fleet.
- Year 10 reduced operational fleet with the north-western waste emplacement at an indicative height of approximately 323 m AHD and the north-eastern waste emplacement at an indicative height of approximately 298 m AHD.
- Year 17 reduced operational fleet with the north-western waste emplacement at a maximum height of approximately 330 m AHD and the north-eastern waste emplacement at a maximum height of approximately 315 m AHD.

Assessment of Feasible and Reasonable Noise Mitigation Measures

Renzo Tonin (Appendix B) conducted an assessment of feasible and reasonable noise mitigation measures for the mine and processing facility. This involved an iterative process. The following iterative steps were undertaken to determine noise mitigation measures that were incorporated to reduce potential noise emissions from the mine and processing facility (Appendix B):

- Preliminary noise modelling of scenarios representative of the maximum noise emissions from the mine and processing facility to identify potential for noise exceedances.
- Evaluation of various combinations of noise management and mitigation measures to assess their relative effectiveness.
- Review of the effectiveness of these measures and assessment of their feasibility.
- Adoption of mitigation measures to minimise noise emissions associated with the mine and processing facility. As a result of the preliminary modelling, modifications to the mine and processing facility were undertaken in order to improve acoustic performance.

The preliminary noise modelling indicated that in the absence of additional noise mitigation measures, intrusive noise levels at privately-owned dwellings could, with adverse meteorological conditions, range up to 7 dBA above the Project Noise Trigger Levels.

Without additional noise mitigation measures, five privately-owned sensitive receivers (M08 [Currajong Park 2], M22 [Brooklyn], M23 [Currajong Park 1], M28 [Rosehill] and M29 [Slapdown]) were predicted to experience moderate or significant exceedances of the Project Noise Trigger Levels (i.e. greater than 3 dBA above the Project Noise Trigger Levels) and other privately owned sensitive receivers were predicted to experience negligible exceedances.

To provide a noise reduction of up to 2 dBA, the following additional mitigation measures during the evening would be required:

- Cease operations on the north-eastern waste emplacement and ceased operation of an excavator in the eastern open cut pit during predominant south-southwest, south-west and west-southwest wind conditions in the evening period in Year 10.
- Cease haulage on the north-western waste emplacement during predominant south wind conditions in the evening period in Year 10.
- Cease haulage on the north-eastern waste emplacement during south-southwest and south-west wind conditions in the evening period in Year 17.



Operational Noise Level Predictions

Table 16 presents a summary of predicted exceedances of noise criteria due to the operational noise from the mine and processing facility (incorporating the additional mitigation measures), based on maximum noise predictions for all time periods and meteorological conditions.

Indicative noise contours of modelled day, evening and night maximum noise predictions for Years 1, 10 and 17 are shown on Figures 19, 20 and 21, respectively.

In summary, the operational noise assessment indicated the following under adverse meteorological conditions (Appendix B):

- During the day, no exceedances of the Project Noise Trigger Levels at any privately-owned sensitive receiver are predicted.
- During the evening, exceedances of the Project Noise Trigger Levels of 0 to 2 dBA (i.e. negligible exceedance) are predicted at privately-owned sensitive receivers M22, M28 and M29 and exceedances of 3 to 5 dBA are predicted at privately-owned sensitive receivers M08 and M23, resulting in moderate exceedances.
- During the night-time period, exceedances of the Project Noise Trigger Levels of 0 to 2 dBA (i.e. negligible exceedance) are predicted at privately-owned sensitive receivers M04, M10, M22, M28 and M29, an exceedance of 3 to 5 dBA is predicted at privately-owned sensitive receivers M08 and M23, resulting in moderate exceedances.

The impact of a potential exceedance of 1 to 2 dBA above the Project Noise Trigger Level is negligible and not discernible by the average listener based on the characterisation of noise impacts outlined in Table 13.

Two privately-owned receivers (M08 and M23) are predicted to experience moderate exceedances (i.e. 3 to 5 dBA above the Project Noise Trigger Levels) in the night-time and evening periods. The exceedance is classified as moderate in accordance with the VLAMP as the predicted increase in noise levels associated with the Modification is greater than 1 dBA at these privately-owned sensitive receivers (Appendix B). The amenity noise level of the modified Project would comply with the recommended amenity noise levels outlined in Table 2.2 of the NPfI (EPA, 2017a) at all privately-owned sensitive receivers with the exception of two privately-owned sensitive receivers (Currajong Park 1 and Currajong Park 2) (Appendix B).

Negotiated Agreements

Given the considerable operating costs associated with significantly modifying mining operations during adverse meteorological conditions (i.e. implementing the additional mitigation measures), SEM will seek to enter into negotiated agreements with the owners of the five privately-owned receivers that were predicted to experience moderate or significant exceedances based on the preliminary modelling (i.e. without the additional mitigation measures) in accordance with the VLAMP (NSW Government, 2018).

In accordance with Condition 7, Schedule 3 of Development Consent (DA 374-11-00), if negotiated agreements were to be put in place with the owners of the five privately-owned sensitive receivers, or these sensitive receivers were to become mine-owned, significant modifications to mining operations would not be considered reasonable, and modifications to mining operations would be less significant, with a noise reduction of less than 2 dBA (e.g. ceasing operation of a small number of noisy equipment such as drills, moving such equipment to more sheltered areas, or avoiding the use of intermittently operating auxiliary equipment).

However, if negotiated agreements with the owners of the five privately-owned sensitive receivers are not achieved, or are only achieved for a subset of the five privately-owned sensitive receivers, SEM would implement the additional mitigation measures as required to reduce noise levels by up to 2 dBA.

Sleep Disturbance

Renzo Tonin (Appendix B) conducted an assessment of potential sleep disturbance impacts. The maximum noise level criteria (L_{AFmax}) of 52 dBA have been adopted in accordance with the NPfI.

All privately-owned sensitive receivers are predicted to comply with the sleep disturbance criteria (Appendix B).

	N	oise Management Zor	Noise Affectation Zone			
	Negligible	Marginal	Mode	rate	Significant	
Period	0-2 dBA above Project Noise Trigger Level	3-5 dBA above Project Noise Trigger Level AND ≤ Amenity Noise Trigger Level	3-5 dBA above Project Noise Trigger Level AND > Amenity Noise Trigger Level	>5 dBA above Project Noise Trigger Level AND ≤ Amenity Noise Trigger Level	>5 dBA above Project Noise Trigger Level AND > Amenity Noise Trigger Level	
Day	-	-	-	-	-	
Evening	M22 (Brooklyn), M28 (Rosehill) and M29 (Slapdown)	-	M08 (Currajong Park 2) and M23 (Currajong Park 1)	-	-	
Night	M04 - M08 (Currajong (Abandoned 2), Park 2) and M2 M10 (Glenburn), (Currajong Park M22 (Brooklyn), M28 (Rosehill) and M29 (Slapdown) (Slapdown)		M08 (Currajong Park 2) and M23 (Currajong Park 1)	-	-	

Table 16 Summary of Potential Operational Noise Exceedances at Privately-owned Receivers under Adverse Meteorological Conditions

Assessment of Privately-owned Land

No privately-owned sensitive receiver in the vicinity of the mine and processing facility is predicted to experience exceedances of the relevant VLAMP noise criteria on greater than 25% of land (Appendix B).

Rail Siding

Modelling Methodology

The same modelling methodology as the mine and processing facility was adopted for the rail siding.

The locations of all modelled sensitive receivers in the vicinity of the modified rail siding are provided in Appendix B and shown on Figure 18.

Assessment of Meteorological Conditions

The same meteorological conditions as the mine and processing facility (i.e. temperature inversions at night and noise enhancing winds during the evening, as well as standard conditions) have been adopted at the modified rail siding. The adoption of the mine and processing facility meteorological conditions is consistent with the NPfI (Appendix B).

Further details on the analysis and meteorological conditions modelled are provided in Appendix B.

Noise Modelling Scenario

An indicative scenario has been prepared to assess the potential noise impacts of the modified rail siding.

Operational Noise Level Predictions

Based on the indicative operational scenario of the modified rail siding, all privately-owned sensitive receivers would comply with the relevant noise criteria (Appendix B). Indicative noise contours for the modified rail siding are provided in Figure 22.

Sleep Disturbance

Renzo Tonin (Appendix B) conducted an assessment of potential sleep disturbance impacts. The maximum noise level criteria (L_{AFmax}) of 52 dBA have been adopted in accordance with the NPfI.

All privately-owned sensitive receivers are predicted to comply with the sleep disturbance criteria (Appendix B).

Assessment of Privately-owned Land

No privately-owned sensitive receiver in the vicinity of the modified rail siding is predicted to experience exceedances of the relevant VLAMP noise criteria on greater than 25% of land (Appendix B).

Comparison Against Development Consent Criteria

A comparison of the modified Project's operational noise levels and the Development Consent (DA 374-11-00) at the relevant sensitive receivers is provided in Appendix B.





Cumulative Impacts

The potential cumulative noise impacts of the modified Project with "relevant" projects as defined in the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b) (Section 2.3) were considered by Renzo Tonin (Appendix B).

Renzo Tonin concluded that none of the "relevant" projects would potentially interact with, or have potential cumulative noise impacts with, the modified Project given the distance between the modified Project and the other "relevant" projects (Appendix B).

6.3.3 Mitigation Measures, Management and Monitoring

Noise mitigation and management measures for the Project are described in the Noise Management Plan (Clean TeQ, 2020c) and would continue to be implemented for the modified Project. This plan would be reviewed and updated, where necessary, to incorporate the Modification.

In addition to the existing management measures outlined in the Noise Management Plan (Clean TeQ, 2020c), the following additional feasible mitigation measures were identified and would be undertaken for the modified Project:

- Cease operations on the north-eastern waste emplacement and ceased operation of an excavator in the eastern pit during predominant south-southwest, south-west and west-southwest wind conditions in the evening period in Year 10.
- Cease haulage on the north-western waste emplacement during predominant south wind conditions in the evening period in Year 10.
- Cease haulage on the north-eastern waste emplacement during south-southwest and south-west wind conditions in the evening period in Year 17.

In addition, the potential treatment for the two privately-owned sensitive receivers predicted to experience "moderate" exceedances would include mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity and also upgraded façade elements such as windows, doors or roof insulation, to further increase the ability of the building façade to noise levels, if requested by the landholder.

6.4 SURFACE WATER

The potential surface water impacts associated with the Modification would be related to the modified mine and processing facility, accommodation camp, and rail siding (Section 6.1).

A Surface Water Assessment has been undertaken for the Modification by HEC and is provided as Appendix C.

6.4.1 Background

Mine and Processing Facility and Accommodation Camp

Hydrological Setting

The mine and processing facility and accommodation camp are located in the upper headwaters of Bullock Creek, a tributary of the Bogan River, within the Macquarie-Bogan catchment (Figure 23). The mine and processing facility is approximately 55 km to the south-south-west of the Bogan River. The Bogan River travels in a north-north-westerly direction towards Bourke and ultimately discharges to the Darling River (Appendix C).

Three drainage lines traverse the mine and processing facility generally in a north-easterly direction (Figure 23).

The two northernmost drainage lines converge approximately 1.5 km downstream of where they cross Wilmatha Road (Figure 23), forming the 'northern drainage line'.

The southernmost drainage line enters the mine and processing facility on its southern edge, approximately 750 m downstream of Wilmatha Road (Figure 23).

The accommodation camp area drains into the southern leg of the northern drainage line that enters the mine and processing facility (Figure 23).

The drainage lines that traverse the mine and processing facility and accommodation camp are shallow broad vegetated ephemeral channels which flow north-east towards Bullock Creek (Appendix C).

The northern and southern drainage lines have a catchment area of approximately 2,700 ha and 1,950 ha respectively, and lose definition approximately 5 km downstream from ML 1770 (Appendix C). The drainage lines in the vicinity of the mine and processing facility are not suitable for flow monitoring. In addition, there are no gauging stations maintained on Bullock Creek (Appendix C).





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Surface Water Quality

Surface water quality monitoring is undertaken in the vicinity of the mine and processing facility and accommodation camp in accordance with the approved Surface Water Management Plan (Clean TeQ, 2019e). Due to the ephemeral nature of the drainage lines, surface water sampling is undertaken only following rainfall events (and when water is flowing) for the following parameters: pH; electrical conductivity (EC); suspended solids; anions; cations; and select total and dissolved metals.

Baseline surface water quality monitoring has been undertaken at sites SW1 to SW7 (Figure 23) in the vicinity of the mine and processing facility since October 2018.

A detailed summary of the monitoring results from sites SW1 to SW7 is provided in Appendix C.

Surface Water Users

Given the ephemeral nature of the drainage lines in the vicinity of the mine and processing facility and accommodation camp, there are no known surface water users immediately upstream or downstream with an access licence (Appendix C).

Surface water runoff is collected in water storages by land users surrounding the mine and processing facility under their harvestable right entitlement under the *Water Management Act 2000*.

Flooding

The local group of west and north-west flowing rivers (Bogan, Macquarie, Castlereagh, Namoi and Barwon Rivers) drain an extensive floodplain north of the mine and processing facility at low gradients (less than 1 in 5,000) historically producing large areas of inundation in wet years. The mine and processing facility is located some 30 m to 70 m above the estimated upper extent of this floodplain (Golder Associates [Golder], 2000b).

Flood events in the vicinity of the mine and processing facility and accommodation camp are relatively minor and short in duration as the mine and processing facility and accommodation camp are located in the headwaters of the catchment (Clean TeQ, 2019e).

Surface Water Licensing

The mine and processing facility and accommodation camp are located within the mapped extent of the Upper Bogan River Water Source under the *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012.*

SEM does not currently hold any WALs under the Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012.

Rail Siding

Hydrological Setting

The modified rail siding would be located in the catchment of the Yarrabandai Creek. Yarrabandai Creek travels south-west through the township of Trundle and connects with the Bumbuggan Creek, a tributary of the Lachlan River, approximately 40 km directly south-west of Trundle (Appendix C).

The modified rail siding site is not traversed by any drainage lines. The closest drainage line is located approximately 220 m south-east of the modified rail siding (Figure 12) (Appendix C).

Surface Water Users

Given the ephemeral nature of the drainage lines in the vicinity of the modified rail siding, there are no known surface water users immediately upstream or downstream with an access licence.

Surface water flows are collected in dams by surrounding land users under their harvestable rights under the *Water Management Act 2000*.

Flooding

The modified rail siding is located approximately 220 m north-west of the closest defined drainage line, and approximately 5.5 km from Yarrabandai Creek. Given their ephemeral nature, flood events in the vicinity of the modified rail siding are expected to be relatively minor and short in duration.

Surface Water Licensing

The modified rail siding is located within the mapped extent of the Gunningbland and Yarrabandai Water Source under the *Water Sharing Plan for the Lachlan Unregulated River Water Sources 2012.* SEM does not currently hold any WALs under the Water Sharing Plan for the Lachlan Unregulated River Water Sources 2012.

SEM may however rely on its "harvestable right" entitlement for the water storages at the modified rail siding under the *Water Management Act 2000*.

Water Management

Water management at the Project is approved to be conducted in accordance with the water management performance measures outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00).

A Surface Water Management Plan (Clean TeQ, 2019e) has been developed for the Project in accordance with Condition 30(b), Schedule 3 of Development Consent (DA 374-11-00) and includes:

- water management performance measures and performance indicators, including trigger levels;
- a description of the Project water management system;
- a surface water monitoring program; and
- a contingency plan to manage any unpredicted impacts and their consequences

HEC (2019) developed a water balance model (using the GoldSim[®] simulation package) for the Project, which is summarised in the approved Water Balance (Clean TeQ, 2019f) prepared in accordance with Condition 30(a), Schedule 3 of Development Consent (DA 374-11-00). This water balance model has been updated to incorporate the Modification (Section 6.4.2 and Appendix C).

A detailed description of the approved water management system is provided Appendix C.

Project Water Supply – Surface Water

The Project water supply includes surface water extraction from the Lachlan River (Section 3.2.6).

SEM currently holds the following WALs for the surface water extraction infrastructure (Section 4.3):

• WAL 6679 in the Lachlan Regulated River Water Source, for 123 share components (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016.*

- WAL 1798 in the Lachlan Regulated River Water Source, for 300 share components (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016.*
- WAL 42370 in the Lachlan Regulated River Water Source, for 0 share components (High Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016.*

6.4.2 Impact Assessment Review

The key potential surface water impacts associated with the Modification would be (Appendix C):

- potential impacts on surface water catchments and drainage associated with the modified mine and processing facility (including the expanded treated wastewater irrigation area), and the modified rail siding;
- potential impacts on downstream surface water associated with the modified mine and processing facility water management system, expanded treated wastewater irrigation area, and the modified rail siding, including potential impacts to downstream water quality; and
- surface water licencing requirements for the modified mine and processing facility and modified rail siding.

Water Management System

The water management systems for the modified mine and processing facility and rail siding are described in Sections 3.2.6 and 3.3.6, and have been designed to comply with the water management performance measures outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00).

A detailed description of the operation of the modified water management system is provided in Appendix C.

Simulated Performance of the Modified Project Water Management System

HEC (2021) has revised the existing Project water balance model (based on the GoldSim® simulation package) to predict changes in the water balance over the mine life and assesses variation in the water balance associated with the Modification (Appendix C).



The water balance modelling demonstrates that the modified site water management system has sufficient capacity and flexibility to accommodate a wide range of climate scenarios (Appendix C).

No overflows were predicted from the tailings storage facility, decant transfer pond, evaporation pond, mine water dams or processing plant runoff dams over the Project life (Appendix C).

Although the Modification would not change the approved final voids, HEC (2021) has simulated the long-term behaviour of the final voids. The simulated water level in the eastern and western final void reaches a maximum of approximately 258 m AHD and 263.5 m AHD, respectively. This is approximately 16.0 m and 14.5 m below the spill level (i.e. the final void waterbodies would be contained under all climate scenarios) (Appendix C).

Surface Water Flow Regime

As the Modification would not increase the extent of the approved surface development area at the mine and processing facility and accommodation camp, no significant change to the approved flow impacts in the drainage lines in the vicinity of the mine and processing facility and accommodation camp would be expected (Appendix C).

The modified mine and processing facility and accommodation camp would not result in a significant reduction in the total catchment area of Bullock Creek (up to approximately 3.3% at Tullamore) which is not considered significant given the discontinued nature of watercourses within the catchment (Appendix C).

The catchment area of the Bogan River would not be significantly reduced due to the mine and processing facility and accommodation camp (approximately up to 0.3% at Dandaloo) and the change to flows in the Bogan River would be indiscernible (Appendix C).

Post-closure, the modified mine and processing facility and accommodation camp is estimated to result in a 1.2% and 0.1% reduction in catchment area of Bullock Creek (at Tullamore) and the Bogan River (at Dandaloo), respectively.

The catchment area of the drainage line to the south-east of the modified rail siding would reduce by approximately 0.1% (at the modified rail siding) and therefore there would be a very small and indiscernible impact to flow in the drainage line (Appendix C).

Surface Water Quality

The Modification would not change the approved water management performance measures or objectives of the water management system (i.e. control runoff from construction and operational areas, while diverting up-catchment water around these areas, and to minimise the use of clean water on-site) (Section 3.2.6). Furthermore, no overflows were predicted from the tailings storage facility, decant transfer pond, evaporation pond, mine water dams or processing plant runoff dams over the Project life or from the final voids (Appendix C).

Based on the above, HEC (2021) concluded there would be a low risk of adverse water quality impacts in the vicinity of the mine and processing facility as a result of the Modification.

As the expanded treated wastewater irrigation area at the accommodation camp would be designed, operated and maintained in accordance with *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004), it is expected that there would be a low risk of adverse water quality impacts associated with the modified treated wastewater irrigation area (Appendix C).

There would be a low risk of adverse water quality impacts in the vicinity of the rail siding as a result of the Modification (Appendix C).

Flooding Impacts

No significant changes to the approved potential localised flooding impacts at the mine and processing facility and accommodation camp are expected as a result of the Modification as the approved water management performance measures would be unchanged (Appendix C).

The mine and processing facility and accommodation camp are unlikely to be affected by regional flooding impacts as they are located approximately 7.5 km from Bullock Creek (Appendix C).

The Modification is not expected to result in significant flooding impacts at the rail siding (Appendix C).

Lachlan River Surface Water Extraction

The Modification would not significantly change the predicted average and maximum annual off-site water requirements for the Project (Appendix C).

SEM currently holds groundwater and surface water entitlements greater than the predicted average annual off-site water demand during the operations phase based on the results of the water balance (Appendix C).

Consistent with the approved Project, additional surface water entitlements would be required for the predicted maximum operational phase annual off-site water demand of the modified Project (Appendix C).

SEM currently holds WAL 42370 in the Lachlan Regulated River Water Source, for 0 share components (High Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016.* SEM will use WAL 42370 for trading of water on the open market under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016* to obtain additional water entitlements (if required).

Cumulative Impacts

The potential cumulative surface water impacts of the modified Project with "relevant" projects as defined in the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b) (Section 2.3) were considered by HEC (Appendix C).

HEC concluded that none of the "relevant" projects would potentially interact with, or have potential cumulative surface water impacts with, the modified Project given the distance between the modified Project and the other "relevant" projects (Appendix C).

6.4.3 Mitigation Measures, Management and Monitoring

SEM has reviewed the water management performance measures included in Condition 29, Schedule 3 of Development Consent (DA 374-11-00) in the context of the Modification and concluded that no changes are required for the modified Project.

The approved Surface Water Management Plan, and Water Balance (Clean TeQ, 2019e; 2019f) would be reviewed, and updated where necessary, to include the Modification (subject to any modified Development Consent conditions).

Consistent with Condition 26, Schedule 3 of Development Consent (DA 374-11-00), SEM would obtain sufficient water entitlements for the modified Project, and if necessary, adjust the scale of the modified Project to match its available water supply.

6.5 GROUNDWATER

The potential groundwater impacts associated with the Modification would be related to the modified construction and operational activities at the mine and processing facility (Section 6.1).

6.5.1 Background

Local Geology

Previous hydrogeological investigations for the Project have encountered the following geological formations within the mine and processing facility and immediate surrounds (Golder, 2017):

- Laterite;
- Ultrabasic intrusive rocks (pyroxenite, gabbro, diorite); and
- residual soils/alluvial (including unsaturated palaeochannel deposits).

Residual soil/alluvial covers up to 2 m of low-lying areas of the mine and processing facility site. An unsaturated palaeochannel exists through the mine and processing facility in a north-easterly direction. The palaeochannel is up to 1,500 m wide and 35 m deep and comprises silts, clays, gravels, quartz and rock fragments (Golder, 2017).

The residual soil/alluvium is generally underlain by highly and slightly weathered ultrabasic intrusive rocks including pyroxenite, gabbro and diorite. The average thickness of the highly and slightly weathered rock stratum are reported as 11 m and 13 m, respectively (Golder, 2017).

The mine and processing facility site is formed predominantly of an oblate Dunite core intrusion approximately 2 km north-south by 3 km east-west which is surrounded by ultramafic and mafic rocks (gabbro, diorite and olivine pyroxenite) and Laterite. The deposit targeted for mining contains resource grade nickel and cobalt mineralisation within the Laterite profile overlying the Dunite core intrusion (Golder, 2017).

The Girilambone Group forms the basement rock beneath the three geological formations. The bedrock is mostly dominated by fine quartz sandstone, siltstones and shale, mostly metamorphosed to quartzite, phyllite and schist (Golder, 2017).

The occurrence of groundwater within the bedrock (slightly weathered and fresh rock) is expected to be limited to secondary permeability such as joints, fault/shear zones or other geological discontinuities in the rock mass (Coffey, 2018).



Groundwater Levels

A number of groundwater monitoring sites have been established at the mine and processing facility and surrounds and are shown on Figure 24. Generally, groundwater levels are 30 m to 60 m below ground level and follow the surface topography, being highest in the western area of the mine and processing facility (Golder, 2017).

Groundwater enters the mine and processing facility from the west and flows either south-east towards the paleochannel or north-east following the lowering topography. A groundwater divide is interpreted to exist beneath the topographical ridge in the (centre) eastern area of the site (Golder, 2017).

Groundwater Yield

Groundwater at the mine and processing facility and surrounds is typically low yielding as indicated by hydraulic testing. The hydraulic conductivities are generally very low and the potential yield of the fractured rock aquifer is expected to be low (in the order of 0.1 litres per second or less) (Golder, 2017).

Groundwater Use

A bore census was undertaken in the vicinity of the mine and processing facility by Environment & Natural Resource Solutions (2019) which found the groundwater use at the mine and processing facility and surrounds is limited. The locations of bores inspected during the bore census are included on Figure 24.

The closest privately-owned bore (GW057335) is located approximately 1.8 km to the west of ML 1770 (Figure 24).

Groundwater Quality

Based on the groundwater quality monitoring between June 2018 and September 2020, groundwater salinity across the mine site and surrounds varies from fresh (170 mg/L total dissolved solids [TDS]) to saline (10,300 mg/L TDS). Fresh groundwater has been encountered in the north-west area of the site (GAM 1), brackish in and near the palaeochannel, and saline in the south-east area of the site (GAM 11) (Figure 24) (Ground Doctor, 2020a, 2020b). These results are similar to groundwater quality monitoring reported in Coffey (2018) and Golder (2000b). The groundwater is generally neutral to slightly alkaline and the metal concentrations are generally below the Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand (2000) livestock trigger values. Where available, metals concentrations show similar values between 1999, 2018, and 2020 (Coffey, 2018; Ground Doctor, 2020a, 2020b).

Groundwater Dependent Ecosystems

The Groundwater Dependent Ecosystems Atlas (Bureau of Meteorology, 2015) identifies no aquatic groundwater dependent ecosystems at the mine and processing facility and a low potential for terrestrial groundwater dependent ecosystems in the vicinity of the mine and processing facility (Golder, 2017).

Previous Assessments

A number of groundwater studies have been conducted for the Project to date (Golder 2000a, 2000b and 2017; Coffey, 2018).

The key potential groundwater impacts at the mine and processing facility will be associated with the excavation of the open cut pits and potential seepage from the tailings storage facility. A summary of the predicted potential groundwater impacts is provided below:

- Groundwater Drawdown the excavation of the open cut pits has the potential to intercept groundwater in the deepest area of the open cut pits resulting in a predicted maximum 1 m drawdown extent within ML 1770 (Golder, 2017).
- **Groundwater Inflows** the excavation of the open cut pits has the potential to intercept groundwater in the deepest area of the open cut pits resulting in predicted groundwater inflows of up to approximately 0.0023 L/s reducing to be generally less than 0.002 L/s post-mining (Golder, 2017).
- Seepage seepage from the tailings storage facility is not anticipated to migrate significantly beyond the tailings storage facility footprint during the Project life and thereafter the open cuts would act as a sink that would collect seepage from the tailings storage facility in the longer term (Coffey, 2018).



Figure 24

sunrise

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- **Groundwater Users** given that no significant groundwater drawdown or seepage impacts are predicted, and the closest privately-owned bore (GW057335) is located approximately 1.8 km to the west of ML 1770 (Figure 24), no significant impacts are predicted to groundwater users (Golder, 2017 and Coffey, 2018).
- **Groundwater Dependent Ecosystems** the mine and processing facility is unlikely to impact terrestrial groundwater dependent ecosystems (Coffey, 2018).
- Aquifer Interference Policy the mine and processing facility will meet the relevant minimal impact considerations outlined in the AIP (NSW Government, 2012) (Golder, 2017 and Coffey, 2018).

Groundwater Management Plan

In accordance with Condition 30(c), Schedule 3 of Development Consent (DA 374-11-00), a Groundwater Management Plan (Clean TeQ, 2019g) has been developed for the Project and includes:

- performance measures and performance indicators, including trigger levels;
- a description of groundwater management measures;
- a contingency plan to manage any unpredicted impacts and their consequences; and
- a groundwater monitoring program.

Groundwater Licensing

Groundwater extracted by mine dewatering (in-pit and advance) from the open cut pit (and immediate surrounds) is located in the Lachlan Fold Belt MDB Groundwater Source administered by the Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources 2020 under the Water Management Act 2000.

SEM currently holds 243 share components (currently equivalent to 243 ML/year) in the corresponding Lachlan Fold Belt MDB Groundwater Source.

6.5.2 Impact Assessment Review

The potential groundwater impacts associated with the Modification would be associated with the revised mining sequence (Section 3.2.3) and revised tailings storage facility cell construction sequence and the addition of a decant transfer pond (Section 3.2.5). Potential impacts associated with these proposed changes are discussed in more detail below.

Groundwater Drawdown and Inflows

The revised mining sequence would not significantly change the predicted drawdown and groundwater inflows as the approved final open cut design and extents (including depth) would remain unchanged (Section 3.2.3).

The predicted maximum 1 m drawdown extent would therefore remain within ML 1770 and the predicted groundwater inflows would remain less than 1 ML/year for the modified mine and processing facility.

Seepage

The modified tailings storage facility cell construction sequence would not significantly change the potential seepage impacts as the approved tailings storage facility design and the seepage management requirements outlined in Condition 29, Schedule 3 of Development Consent (DA 374-11-00) would remain unchanged (Section 3.2.5).

Potential seepage impacts of the decant transfer pond would be minor as the water level (head) would not be significant (approximately 1 m) and the floor and side walls of the decant transfer pond would be constructed with a minimum of:

- a 900 mm clay liner with a permeability of no more than 1 x 10⁻⁹ m/s; or
- a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1 x 10⁻¹⁴ m/s (or equivalent).

In addition, the decant transfer pond would be decommissioned at the end of the Project (Section 3.2.10), and therefore there would be no long-term potential seepage impacts associated with the decant transfer pond.

Given the above, seepage from the modified tailings storage facility is not anticipated to migrate significantly beyond the tailings storage facility footprint during the modified Project life and thereafter the open cuts would act as a sink that would collect seepage from the tailings storage facility in the longer term.

Groundwater Users

The Modification is not expected to have significant impacts on groundwater users as the predicted groundwater drawdown or seepage impacts are not expected to significantly change.



Groundwater Dependent Ecosystems

The Modification is not expected to have significant impacts on groundwater dependent ecosystems as the predicted groundwater drawdown or seepage impacts are not expected to significantly change.

Consideration of the Aquifer Interference Policy

The AIP (NSW Government, 2012) applies State-wide and details water licence and impact assessment requirements. The stated purpose of the AIP (NSW Government, 2012) is 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.

As described in Section 6.5.1, the approved mine and processing facility meets the relevant minimal impact considerations outlined in the AIP (NSW Government, 2012) (Golder, 2017 and Coffey, 2018).

Water Source

The AIP (NSW Government, 2012) requires all water taken by aquifer interference activities to be accounted for within the extraction limits set by the relevant Water Sharing Plan. The Water Sharing Plan relevant to the mine and processing facility is the *Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources 2020.*

Modelling of Potential Impacts

The potential groundwater impacts of the Modification have been reviewed above, which included a review of the existing groundwater model for the mine and processing facility (Coffey, 2018).

Licensing Requirements

SEM currently holds 243 share components (currently equivalent to 243 ML/year) in the Lachlan Fold Belt MDB Groundwater Source administered by the Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources 2020.

The Modification would not change the predicted groundwater inflows during the Project life and post-mining (i.e. less than 1 ML/year) and, therefore, the existing volumetric licence allocations held by SEM are considered to be adequate.

Minimal Impact Considerations

Department of Primary Industries – Water mapping of highly productive groundwater indicates that no highly productive groundwater is present at the mine and processing facility. The fractured rock aquifers associated with the mine site are considered to be less productive as testing of groundwater and monitoring bores indicate the yield is less than 5 L/s (Coffey, 2018).

Therefore, the following AIP (NSW Government, 2012) minimal impact considerations apply for groundwater quality at the mine site:

- Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity.
- If condition 1 is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.

As the Modification would not significantly change the approved groundwater drawdown and seepage impacts, the modified mine and processing facility would not lower the beneficial use category of the groundwater source beyond 40 m of the activity, and therefore the modified mine and processing facility meet the relevant minimal impact considerations outlined in the AIP (NSW Government, 2012).

Cumulative Impacts

No potential cumulative groundwater impacts with "relevant" projects as defined in the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b) (Section 2.3) are expected given the distance between the mine and processing facility and the other "relevant" projects.

6.5.3 Mitigation Measures, Management and Monitoring

The approved Groundwater Management Plan (Clean TeQ, 2019g) would be updated to include the Modification (subject to any modified Development Consent conditions).

In addition, SEM would maintain relevant water licences under the *Water Management Act 2000* for the modified Project in accordance with Condition 26, Schedule 3 of Development Consent (DA 374-11-00).



6.6 ROAD TRANSPORT

The potential road transport impacts associated with the Modification would be related to modified construction phase and operational phase road transport activities.

A Road Transport Assessment for the Modification was undertaken by The Transport Planning Partnership (TTPP) and is presented as Appendix D.

The assessment was prepared generally in accordance with the *Guide to Traffic Generating Developments* (NSW Roads and Traffic Authority [RTA], 2002) and relevant Austroads guides and TfNSW supplements to the Austroads guides.

6.6.1 Background

Relevant Roads

The following key roads are of relevance to the Project (Figure 25):

- Henry Parkes Way extends between Orange and Condobolin through Parkes.
- The Bogan Way extends generally north from Forbes to Tullamore. The Bogan Way joins the Henry Parkes Way between Gunningbland to Bogan Gate.
- Fifield Road extends generally north-east between Henry Parkes Way east of Condobolin to Tullamore.

- The McGrane Way extends north-east from north of Tullamore to Narromine. The McGrane Way intersects The Bogan Way near Tullamore.
- Fifield-Trundle Road/Platina Road provides an east-west link between The Bogan Way near Trundle to Fifield Road south of Fifield.
- Wilmatha Road extends north-west from Fifield and past the mine and processing facility.
- Sunrise Lane provides access to the accommodation camp access road and rural properties to the west of Wilmatha Road.
- Scotson Lane links The Bogan Way near Fifield-Trundle Road and Numulla Road and provides access to the rail siding.
- Middle Trundle Road 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 17 and traffic survey locations shown on Figure 25.

Traffic volumes are generally low and the proportion of heavy vehicles varies from low (7%) to relatively high (51%).

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

Table 17
Surveyed Annual Average Daily Traffic Volumes

01/1			2017		2018			
Site'	Location		Heavy	Total	Light	Heavy	Total	
1	The Bogan Way between Trundle and Fifield-Trundle Road	329	76	405	332	51	383	
2	The Bogan Way between Bogan Gate and Middle Trundle Road	291	86	377	285	43	328	
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	170	30	200	243	19	262	
4	Platina Road/Fifield-Trundle Road between The Bogan Way and Fifield Road	66	15	81	61	6	67	
5	Fifield Road between Slee Street and Platina Road	200	95	295	187	148	335	
6	Fifield Road between Platina Road and Springvale Road	139	99	238	147	150	297	
7	Wilmatha Road north of Sunrise Lane	14	4	18	15	5	20	
8	Melrose Plains Road between Fifield Road and Wilmatha Road	9	4	13	7	2	9	

Source: Appendix D.

Refer to Figure 25.





Road Safety

A review of TfNSW accident data in the vicinity of the Project for the five year period from 1 July 2015 to 30 June 2020 was undertaken by TTPP (Appendix D).

Overall, the review of the TfNSW accident data identified no inherent concerns with the safety of the key routes used by Project traffic (Appendix D).

Road and Intersection Upgrades and Maintenance

Road and intersection upgrades and maintenance will be undertaken for the Project in accordance with Conditions 43 and 44, Schedule 3 of Development Consent (DA 374-11-00) and the VPA (Section 3.5.3).

Details of the approved road and intersection upgrades and maintenance are outlined in the Road Upgrade and Maintenance Strategy (Clean TeQ, 2019c).

Traffic Management Plan

In accordance with Condition 45, Schedule 3 of Development Consent (DA 374-11-00), a Traffic Management Plan (Clean TeQ, 2019h) has been developed for the Project and includes:

- details of all transport routes and traffic types to be used for development-related traffic;
- a program to monitor and report on the amount of metal sulphate precipitate, scandium oxide and ammonium sulphate transported from the mine;
- a program to monitor and report on the amount of limestone transported from the limestone quarry and third party suppliers;
- measures that would be implemented to:
 - minimise traffic safety issues and disruption to local users of the transport route/s during construction and decommissioning of the development;
 - operate shuttle bus services to transport employees to and from Parkes, Forbes and Condobolin; and
 - operate high capacity trucks to transport limestone and other materials and products to and from the mine and processing facility.

- a Road Transport Protocol for all drivers transporting materials to and from the site with measures to:
 - ensure drivers adhere to the designated transport routes and prioritise the use of national, state and regional roads over local roads;
 - verify that these heavy vehicles are completely covered whilst in transit;
 - co-ordinate the staggering of heavy vehicle departures to minimise impacts on the road network, where practicable;
 - minimise disruption to school bus timetables and rail services;
 - ensure travelling stock access and right of way to the adjacent travelling stock route;
 - maintain radio communications between all school buses and heavy vehicle operators operating on the transport route between the rail siding and mine and processing facility, limestone quarry or third party limestone quarries and the mine and processing facility;
 - manage worker fatigue during trips to and from the site;
 - manage appropriate driver behaviour including adherence to speed limits, safe overtaking and maintaining appropriate distances between vehicles (i.e. a Driver Code of Conduct);
 - inform drivers of relevant drug and alcohol policies;
 - regularly inspect vehicles maintenance and safety records;
 - implement contingency procedures when the transport route is disrupted;
 - respond to emergencies;
 - transport processing reagents safely;
 - minimise disruption to community events and festivals, in consultation with event organisers;
 - implement reasonable and feasible measures to minimise amenity impacts to local communities, including minimising night time truck movements and compression braking in urban areas as far as practicable; and
 - ensure compliance with and enforcement of the protocol.



6.6.2 Impact Assessment Review

Potential impacts of the Modification on road traffic movements, key intersection performance and road safety are assessed in Appendix D and are summarised below.

The key potential road transport impacts of the Modification would be associated with (Appendix D):

- changes to vehicle movements associated with the increased construction phase workforce and accommodation camp capacity;
- changes to construction phase heavy vehicle movements;
- increased construction phase duration from two to three years;
- changes to operational phase heavy vehicle movements associated with revisions to processing plant reagent types, rates and storage volumes;
- increased operational phase heavy vehicle movements between the mine and processing facility and the rail siding associated with the transport of metal sulphate and ammonium sulphate products which would no longer be backloaded;
- additional operational phase heavy vehicle movements to and from the rail siding associated with the distribution of ammonium sulphate from the rail siding;
- revised rail siding location; and
- two new mine and processing facility vehicle site access points on Wilmatha Road.

Modified Project Traffic Generation

The following maximum case traffic scenarios were investigated to determine the potential impact of the modified Project on the local road network, having regard to the modified Project traffic volumes and other traffic volumes throughout the life of the Project:

- peak construction activity including construction of the mine and processing facility, rail siding and road upgrades and is expected to occur in the second year of construction (nominally in 2023); and
- peak operational activity including peak production and changes in non-Project traffic over a further 10 year period (nominally 2033).

Table 18 summarises the approved and modified Project forecast daily vehicle movements (traffic in both directions) for the mine and processing facility and rail siding for both the construction and operational phases. Traffic associated with other Project components would remain generally unchanged.

The Modification would result in a significant decrease in Project-related daily vehicle movements during the construction phase principally due to the introduction of shuttle buses to transport the Project construction workforce between surrounding towns and the mine and processing facility and rail siding (Table 18 and Appendix D).

The Modification would not significantly change the Project-related daily vehicle movements during the operations phase with the exception of increases in the vicinity of the modified rail siding associated with the transport of ammonium sulphate (a fertiliser) to agricultural operations in the region by road (Section 3.3.2) (Appendix D).

Table 18

Approved and Modified Mine and Processing Facility, Accommodation Camp and Rail Siding Daily Traffic Generation

Project Component	Approved Project	Modified Project					
Construction Phase (Peak)							
Mine and Processing Facility/Accommodation Camp ¹	470	308					
Rail Siding	130	24					
Operational Phase (Peak)							
Mine and Processing Facility	304	270					
Rail Siding	54	84					

Source: After Appendix D.

¹ Excludes movements between the mine and processing facility and accommodation camp.



The Modification would result in the following changes to Project-related daily vehicle movements in Trundle:

- Construction Phase 124 fewer light vehicle trips per day, 14 additional bus trips per day, and 12 fewer heavy vehicle trips per day.
- Operational Phase 22 additional light vehicle trips per day, four additional bus trips per day and two fewer heavy vehicle trips per day.

Cumulative Future Traffic Volumes

Tables 19 and 20 present the total predicted future traffic volumes on key roads (Figure 25), incorporating modified Project traffic and estimated background traffic growth, for the construction and operational scenarios, respectively. These predictions are made away from intersections (i.e. midblock).

The Austroads (2020) *Guide to Traffic Management Part 3: Traffic Studies and Analysis* provides guidelines for the capacity and performance of two lane, two-way rural roads. Austroads (2020) define Levels of Service as a qualitative measure describing the operational conditions within a traffic stream (in terms of speed, travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety) as perceived by drivers and/or passengers.

Level of Service A provides the best traffic conditions, with no restrictions on desired travel speed or overtaking. Levels of Service B to D describe progressively worse traffic conditions, with Level of Service E for traffic conditions that are at or close to capacity, with virtually no freedom to select desired speeds or manoeuvre in the traffic stream.

The Modification would not change the existing Level of Service on key roads surrounding the modified Project (i.e. Level of Service A) (Appendix D).

The potential cumulative road transport impacts associated with the other "relevant" projects as defined in the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b) (Section 2.3) have also been considered by TTPP (Appendix D).

Further consideration of the potential cumulative impacts associated with the "relevant" project listed above is provided in Appendix D.

Intersection Performance

TTPP (2021) 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 modified Project (Appendix D).

Rail Level Crossings

There are two railway lines that operate in the vicinity of the Project: the Orange Broken Hill Railway and the Bogan Gate Tottenham Railway (Figure 1). Rail level crossings on key Project routes are located on Henry Parkes Way, The Bogan Way, Fifield Road and Scotson Lane.

As the Modification would not significantly increase Project-related vehicles at these level crossings or change the approved Project rail movements, the Modification is not expected to have a perceptible impact on the operation of these level crossings (Appendix D).

Road Safety Review

The review of the road crash history of the routes that would be used by the modified Project traffic does not highlight any specific concerns regarding the safety of those routes or any specific location with a poor crash history.

The modified Project would not result in significant impacts on the safety of the road network with implementation of the proposed mitigation measures (Section 6.6.3) (Appendix D).

6.6.3 Mitigation Measures, Management and Monitoring

Road and Intersection Upgrades and Maintenance

The Modification would include the following additional road and intersection upgrades:

- two additional vehicle site access points from Wilmatha Road to the mine and processing facility (Section 3.2.8); and
- an extension of the Scotson Lane road upgrade to reflect the modified rail siding location (Section 3.3.8).



		Approved Project				Modified Project				
Site	Location	Light Vehicles	Buses	Heavy Vehicles	Total	Light Vehicles	Buses	Heavy Vehicles	Total	
1	The Bogan Way between Trundle Road	669	10	163	842	545	24	139	708	
2	The Bogan Way between Bogan Gate and Middle Trundle Road	393	6	49	448	385	10	119	514	
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	534	6	126	666	426	16	32	474	
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	363	4	110	477	199	22	96	317	
4	Platina Road/Fifield-Trundle Road between Road Upgrades and The Bogan Way	339	4	110	453	199	22	94	315	
5	Fifield Road between Slee Street and Platina Road	613	26	317	956	431	48	305	784	
6	Fifield Road between Platina Road and Springvale Road	341	24	217	582	267	28	231	526	
7	Wilmatha Road between Sunrise Lane and Project access	815	0	96	911	99	72	110	281	
7	Wilmatha Road between Fifield Road and Sunrise Lane	371	4	126	501	199	26	114	339	
8	Melrose Plains Road between Fifield Road and Wilmatha Road	13	0	4	17	13	0	4	17	

 Table 19

 Predicted Cumulative Traffic Volumes – Construction Phase

Source: After Appendix D.

¹ Refer to Figure 25.

Table 20
Predicted Cumulative Traffic Volumes – Operational Phase

	Approved Project				Modified Project				
Site	Location	Light Vehicles	Buses	Heavy Vehicles	Total	Light Vehicles	Buses	Heavy Vehicles	Total
1	The Bogan Way between Trundle and Fifield-Trundle Road	591	14	143	748	613	18	141	772
2	The Bogan Way between Bogan Gate and Middle Trundle Road	451	6	123	580	463	10	121	594
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	436	10	36	482	474	10	36	520
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	168	6	173	347	170	10	175	355
4	Platina Road/Fifield-Trundle Road between Road Upgrades and The Bogan Way	168	6	133	307	186	10	139	335
5	Fifield Road between Slee Street and Platina Road	424	42	447	913	404	46	443	893
6	Fifield Road between Platina Road and Springvale Road	284	38	286	608	302	38	284	624
7	Wilmatha Road between Fifield Road and Project Access	144	12	185	341	110	16	181	307
8	Melrose Plains Road between Fifield Road and Wilmatha Road	13	0	4	17	13	0	4	17

Source: After Appendix D.

¹ Refer to Figure 25.



These additional road and intersection upgrades would be conducted in consultation with the LSC and PSC.

SEM will continue to make road maintenance contributions in accordance with Development Consent (DA 374-11-00) and the VPA.

Road Upgrades and Maintenance Strategy and Traffic Management Plan

The approved Road Upgrades and Maintenance Strategy (Clean TeQ, 2019c) and Traffic Management Plan (Clean TeQ, 2019h) would be updated to incorporate the Modification.

6.7 HAZARD AND RISKS

The potential hazards associated with the Modification would be related to the modified mine and processing facility and rail siding (Section 6.1).

A PHA has been prepared for the Modification by Pinnacle Risk Management and is provided as Appendix E.

6.7.1 Background

Previous Assessments

A PHA was prepared for the original Project EIS by SHE Pacific (2000) in accordance with the general principles of risk evaluation and assessment provided in *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning* and *Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis* (NSW Department of Urban Affairs and Planning, 1992a; 1992b).

SHE Pacific (2000) assessed the following aspects of the mine and processing facility:

- gaseous releases including 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.

SHE Pacific (2000) concluded that most incidences related to the mine and processing facility would have negligible impacts as a result of the distance between the processing facility, the site boundary and the nearest occupied residence (SHE Pacific, 2000).

More recently, a PHA was prepared for the Project Modification 4 by Pinnacle Risk Management (2017) in accordance with the *Hazardous Industry Planning Advisory Paper No 6 – Hazard Analysis* (DoP, 2011a).

Pinnacle Risk Management (2017) considered the main additional potential risk events associated with the changes to the mine and processing facility approved by Modification 4, which comprised:

- decomposition of the ammonium nitrate emulsion (explosives) to be used for blasting at the mine and processing facility;
- large loss of containment of ammonia (e.g. tank or transfer pipe/hose failure); and
- irregular release of sulphur dioxide or sulphur trioxide (e.g. equipment failure)

Pinnacle Risk Management (2017) found that the distances from the processing facility to the site boundary and nearest residences were generally found to control the significance of the incidents and their potential hazardous impacts, consistent with the findings of SHE Pacific (2000).

Societal risk, area cumulative risk, propagation risk, transport risk and environmental risk were also concluded to be acceptable by Pinnacle Risk Management (2017).

Management Regime

In accordance with Conditions 52 and 53, Schedule 3 of Development Consent (DA 374-11-00), SEM will prepare a range of pre-construction and pre-commissioning hazard studies for the processing facility and gas pipeline, including a Final Hazard Analysis, Construction Safety Study, Hazard and Operability Study, Transport of Hazardous Materials Study, Emergency Plan and a Safety Management System.
6.7.2 Impact Assessment Review

The PHA for the Modification used a risk-based assessment for credible events that have the potential for off-site impacts. The methodology for the hazard analysis and risk assessment included (Appendix E):

- review of the relevant Modification components to identify credible, potential hazardous events, their causes and consequences;
- estimate of the consequences of the potential hazardous events that could have off-site impacts;
- analysis of the risk of propagation within the modified mine and processing facility and rail siding; and
- assessment of the risk levels to check if they are within the criteria stipulated in Hazardous and Offensive Development Application Guidelines, Applying SEPP 33 (DoP, 2011b).

The main potential risk events associated with the modified Project would include (Appendix E):

- natural gas due to failure of the natural gas supply pipeline with subsequent ignition. This can occur anywhere along the pipeline;
- incident involving the explosives storages where the explosives detonate; and
- sulphur oxides and ammonia due to a large release and dispersion downwind.

Pinnacle Risk Management (Appendix E) found that the modified mine and processing facility and rail siding show compliance with all DoP (2011b) risk criteria.

Societal risk, area cumulative risk, propagation risk, transport risk and environmental risk are also concluded to be acceptable (Appendix E).

The primary reason for the low risk levels from the modified mine and processing facility is the separation distances between the potentially hazardous materials and equipment to the nearest private residences and also the site boundaries (Appendix E).

For the modified rail siding, the primary reasons for the low risk levels are the low risk nature of the materials stored and the separation distances to the nearest private residences (Appendix E).

6.7.3 Mitigation Measures, Management and Monitoring

The PHA for the Modification (Appendix E) concluded that the recommended mitigation measures specific to lowering the risk of off-site impacts associated with potential releases of ammonia identified by Pinnacle Risk Management (2017) remain valid for the modified mine and processing facility.

No specific mitigation measures were identified in the PHA for the modified rail siding (Appendix E).

The hazard related mitigation measures for the modified Project would be considered as part of the hazard studies to be prepared in accordance with Conditions 52 and 53, Schedule 3 of Development Consent (DA 374-11-00).

6.8 BIODIVERSITY

The potential biodiversity impacts of the Modification would be associated with the modified rail siding (Section 6.1).

A Biodiversity Review has been prepared for the modified rail siding by Biodiversity Australia in accordance with the requirements of clause 30A(2)(c) of the *Biodiversity Conservation* (Savings and Transitional) Regulation 2017 and is provided as Appendix F.

6.8.1 Background

Survey Results

Ecological surveys of the approved and modified rail siding surface development areas were carried out from 30 October to 2 November 2020 by Biodiversity Australia (Appendix F).

The surveys involved vegetation assessments in accordance with the *Biodiversity Assessment Method* (BAM) (DPIE, 2020d), threatened flora traverses in accordance with the *Surveying threatened plants and their habitats* (DPIE, 2020e), habitat assessments and mapping of Plant Community Types (PCTs) (Appendix F).

The PCTs identified in the approved and modified rail siding surface development areas are listed in Table 21 and shown on Figure 26. The remainder of the approved and modified rail siding surface development areas comprised previously cleared exotic grassland (Appendix F).





Vegetation Communities Poplar Box Grassy Woodland (Good) (PCT 244)* Derived Native Grassland (PCT 244)

 LEGEND Modified Rail Siding Surface Development Area

Approved Rail Siding Surface Development Area

Note: * Endangered Ecological Community listed under the EPBC Act. Source: Black Range Minerals (2000); NSW Spatial Services (2020); Clean Teq (2021); Biodiversity Australia (2021). Orthophoto: © NSW Spatial Services (2020)



CTL-20-08 MOD 7_MT_214A

				Clearance (ha)		
Vegetation Zone	РСТ	PCT Name	Condition	Approved Rail Siding Surface Development Area	Modified Rail Siding Surface Development Area	Modification
1	244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of Central NSW	Woodland (Good)*	1.95	1.02	0.93 ha less clearance
2	244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of Central NSW	DNG	1.38	1.97	0.59 ha greater clearance
			Total	3.33	2.99	0.34 ha less clearance

 Table 21

 Approved and Modified Rail Sidings – Plant Community Types

Poplar Box Grassy Woodland on Alluvial Plains listed under the EPBC Act.

The woodland form of PCT 244 (Vegetation Zone 1) is equivalent to Poplar Box EEC listed under the EPBC Act. The Derived Native Grassland (DNG) form of PCT 244 (Vegetation Zone 2) is not considered Poplar Box EEC because it does not meet the Key Diagnostic Characteristics outlined within the EBPC Conservation Advice (DAWE, 2020). The Modification would result in 0.93 ha less clearance of Poplar Box EEC (Table 21).

No threatened flora species listed under the BC Act or EPBC Act were recorded within the approved or modified rail siding surface development areas (Appendix F).

Field surveys recorded two threatened fauna species, namely the Grey-crowned Babbler (*Pomatostomus temporalis*) (vulnerable under the BC Act), and Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) (vulnerable under the BC Act) (Appendix F).

The Grey-crowned Babbler was only heard calling from adjacent habitats, however would be likely to use the habitats within the approved and modified rail siding surface development areas for foraging. The Major Mitchell's Cockatoo was observed flying overhead in the modified rail siding site. No breeding sites were located during the surveys (Appendix F).

Management and Monitoring Regime

In accordance with Condition 35, Schedule 3 of Development Consent (DA 374-11-00), a Biodiversity Management Plan and Revegetation Strategy (Clean TeQ, 2019i) has been prepared for the approved Project, and includes:

- a Vegetation Clearance Protocol;
- threatened species management measures;
- tailings storage facility management;
- weed control and monitoring measures;
- feral animal control and monitoring measures;
- controlling erosion measures;
- bushfire management measures;
- road management measures;
- revegetation area monitoring and management areas; and
- a staff and contractor education program.



6.8.2 Impact Assessment Review

The potential biodiversity impacts of the Modification would be associated with the revised rail siding location and layout.

In general, the vegetation condition and habitat values identified within the approved and modified rail siding surface development areas are considered similar, based on species diversity, structural diversity and non-endemic species invasion (Appendix F).

Table 22 provides an assessment of the impacts of the Modification on biodiversity values. In summary, the Modification would not increase impacts on vegetation abundance, vegetation integrity, habitat suitability, threatened species abundance, habitat connectivity, threatened species movement, flight path integrity or hydrological processes that are known to sustain a threatened species or ecological community.

As the Modification would not increase impacts on biodiversity values, it is considered that a BDAR is not required (Appendix F).

Cumulative Impacts

Given that the Modification would not result in an increased impact on biodiversity values, it is considered that the Modification would not increase cumulative biodiversity impacts in the region.

6.8.3 Mitigation Measures, Management and Monitoring

Given that the Modification would not result in an increased impact on biodiversity values, there would be no change to the approved mitigation, management and monitoring measures for the Project.

Notwithstanding, the Biodiversity Management Plan and Revegetation Strategy (Clean TeQ, 2019i) would be reviewed and, if necessary, revised by SEM to include the Modification (subject to any modified Development Consent conditions).

Biodiversity Value	Meaning	Relevant (√ or NA)*	Explanation
Vegetation abundance	Occurrence and abundance of vegetation at a particular site	1	The Modification would not result in an increased impact on vegetation abundance.
1.4(b) BC Regulation			The Modification would result in 0.34 ha less clearance of native vegetation overall and a 0.93 ha reduction in the clearance of PCT 244 woodland (equivalent to Poplar Box EEC) (Table 21).
Vegetation integrity 1.5(2)(a) BC Act	Degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state	*	The Modification would not result in an increased impact on vegetation integrity.
			In general, the vegetation condition and habitat values identified within the approved and modified rail siding surface development areas are considered similar, based on species diversity, structural diversity and non-endemic species invasion.
			The approved rail siding surface development area contains a greater area of extant woodland than the modified rail siding surface development area (Table 21).
Habitat suitability 1.5(2)(b) BC Act	Degree to which the habitat needs of threatened species are present at a particular site	*	The Modification would not result in an increased impact on habitat suitability.
			The habitat present in the approved and modified rail siding surface development areas provide marginal habitat for threatened fauna (e.g. Grey-crowned Babbler) due to the past disturbance and lack of suitable tree hollows.
			No threatened flora species were recorded at either the approved or modified rail siding.
			The Modification has been designed to avoid impacts on habitat by predominantly locating the modified rail siding components in previously cleared exotic grassland and DNG rather than woodland.
			The Modification would not impact rocks, karst, caves, crevices, cliffs, human made structures or non-native vegetation known to be associated with any threatened species.
			The Modification is unlikely to cause a greater impact on any adjacent habitat due to noise, dust or light spill during construction or operation.

 Table 22

 Impacts of the Modification on Biodiversity Values



Table 22 (Continued)	
Impacts of the Modification on Biodiversity Value	es

Biodiversity Value	Meaning	Relevant (√ or NA)*	Explanation
ThreatenedOspeciesaabundancet1.4(a) BCtRegulationfs	Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site	~	The Modification would not impact the occurrence and abundance of threatened species, or their habitat, in the locality.
			The Modification would result in 0.34 ha less clearance of native vegetation overall and a 0.93 ha reduction in the clearance of PCT 244 woodland (Table 21).
			No threatened flora species were recorded in either site. The habitat in the approved and modified rail siding sites provide marginal habitat for threatened fauna.
Habitat connectivity	Degree to which a particular site	~	The Modification would not result in an increased impact on habitat connectivity.
1.4(c) BC Regulation	connects different areas of habitat of threatened species to facilitate the movement of those species across their range		The woodland that would be cleared in the modified rail siding surface development area is on the edge of a larger patch of woodland and therefore does not provide a connection between two woodland habitats.
Threatened species movement 1.4(d) BC Regulation	Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle	N/A	The Modification is not likely to impact a well-defined movement pattern for any particular species, given the majority of clearance would be of previously cleared exotic grassland and DNG.
			As described above, the woodland that would be cleared in the modified rail siding surface development area is on the edge of a larger patch of woodland and therefore does not provide a connection between two woodland habitats.
Flight path integrity	Degree to which the flight paths of	N/A	The Modification would not interfere with any flight paths of protected animals.
1.4(e) BC Regulation	protected animals over a particular site are free from interference		
Water sustainability 1.4(f) BC Regulation	Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site	N/A	The Modification would not impact water quality, water bodies or hydrological processes that are known to sustain a threatened species or threatened ecological community.

Source: Appendix F.

A biodiversity value is not relevant to a proposed development if the value is not present on the development site and there is no potential for direct or indirect impacts on the biodiversity value if it occurs off-site (Department of Planning & Environment, 2018).



6.9 ABORIGINAL CULTURAL HERITAGE

The potential Aboriginal cultural heritage impacts of the Modification would be associated with the modified rail siding (Section 6.1).

An ACHA has been prepared for the modified rail siding by Landskape Natural and Cultural Heritage Management (Landskape) (2021) and is presented in Appendix G.

6.9.1 Background

Aboriginal Cultural Heritage Assessment

The ACHA has been undertaken in consideration of relevant requirements of various advisory documents and guidelines, including but not limited to:

- Aboriginal cultural heritage consultation requirements for proponents 2010 (the Consultation Guidelines) (DECCW, 2010a);
- Code of Practice for Archaeological
 Investigation of Aboriginal Objects in New
 South Wales (DECCW, 2010b); and
- Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH, 2011).

The ACHA (Appendix G) incorporates relevant information from previous assessments (including for the Project), the results of the field survey and associated consultation with the Aboriginal community, including:

- results from extensive fieldwork and archaeological and cultural investigations previously undertaken at the Project and surrounds;
- search results from the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) database;
- results from extensive consultation with the Aboriginal community regarding archaeological and cultural heritage values; and
- a detailed description of the methods implemented and the results of the archaeological and cultural field survey conducted by archaeologists and representatives of the Aboriginal community for the Modification on 23 February 2021.

The key steps involved in the preparation of the ACHA and associated consultation are described below.

Aboriginal History

Aboriginal people of the Wiradjuri language group were traditionally affiliated with the region encompassing the Macquarie, Lachlan and Murrumbidgee Rivers. The Wiradjuri appear to have had a semi-sedentary lifestyle, being hunter-fisher-gatherers, and were often situated on a particular waterway or drainage catchment area where resources were plentiful (Appendix G).

Aboriginal settlement patterns of the south-west slopes are possibly reflected in the distribution of modified trees. Aboriginal people seem to have spent most of their time situated within close proximity to reliable water sources. Areas that people occupied were also influenced by available food sources, including waterbirds, kangaroos, wallabies, and various plant foods (Appendix G).

Previous Archaeological Investigations

Several Aboriginal heritage surveys and assessments have been undertaken in proximity to the modified rail siding area, including studies by Appleton (2000 and 2005) and Landskape (2017a, 2017b and 2018) for the Project and subsequent modifications. Also relevant is a more recent study by OzArk Environment and Heritage (2020) *draft Aboriginal Cultural Heritage Study of the Lachlan Shire*, prepared for the LSC.

A detailed description of the investigations and surveys undertaken in proximity to the modified rail siding area and surrounds is provided in Appendix G.

Previously Recorded Aboriginal Cultural Heritage Sites

There are no previously recorded Aboriginal cultural heritage sites within or immediately adjacent to the modified rail siding area (Appendix G). The closest previously recorded Aboriginal cultural heritage sites are two isolated finds of stone artefacts (AHIMS site numbers 35-5-0170 and 35-5-0171), located north of Platina Road approximately 5 km west of the modified rail siding area (Landskape, 2017b).

Community Consultation

The ACHA for the Modification included consultation with 10 RAPs, consistent with the Consultation Guidelines (DECCW, 2010a) and the *NSW National Parks and Wildlife Regulation 2009*.



Consultation with the RAPs regarding the approved Project and the Modification has been extensive and involved various methods including on-site meetings, written and verbal correspondence, archaeological survey attendance and on-site inspections.

Table 23 summaries the main stages of the Aboriginal cultural heritage consultation process undertaken for the Modification. A detailed account of the consultation process (including consultation records and a detailed consultation log) is provided in Appendix G.

Survey Design and Methodology

The archaeological field survey for the Modification was undertaken on 23 February 2021 by suitably qualified archaeologists Dr Matt Cupper and Dr Tim Stone, with the assistance of Aboriginal community representatives.

The area investigated included the modified rail siding area and immediate surrounds. The field investigation involved inspection on foot, and the field teams examined the ground surface for any archaeological traces such as stone artefacts, hearths, hearthstones, shells, bones and mounds. All mature trees in the area of proposed disturbance were inspected for scarring or carving by Aboriginal people. Particular attention was paid to areas with high ground surface visibility such as along stock and vehicle tracks and in scalds, gullies and other eroded areas.

Archaeological Findings

No Aboriginal cultural heritage sites were identified during the field survey, despite the intensive nature of the survey. This result was attributed to the landscape setting of the modified rail siding area, situated in the hinterland plain away from water sources, as well as past disturbance by agriculture which is likely to have removed any pre-existing Aboriginal cultural heritage sites (Appendix G).

A more detailed discussion of the survey results is provided in Appendix G.

Archaeological and Cultural Heritage Values

During the archaeological survey the attending RAPs did not identify any specific locations within the modified rail siding area or wider surrounds as being of high or specific cultural significance. It is noted, however, that all land has cultural significance for individual Aboriginal people and for the Aboriginal community collectively and disturbance of land is often contrary to principle Aboriginal beliefs regarding the land and its cultural significance and values.

Table 23
Summary of Aboriginal Heritage Consultation Undertaken for the Modification

Date	Consultation Conducted		
Notification of Project and Registrations			
19 and 20 January 2021	Letters were sent out to the existing 10 RAPs for the Project to advise them of the Modification and notify them that they have been automatically registered as RAPs for the Modification.		
9 February 2021	The list of RAPs for the Modification, along with the written notifications, were provided to the Condobolin Local Aboriginal Land Council and the West Wyalong Local Aboriginal Land Council.		
17 February 2021	The list of RAPs for the Modification, along with the written notifications, were provided to Heritage NSW.		
Proposed Methodology Review and Information Session			
22 and 23 January 2021	The Proposed Methodology for undertaking the ACHA was distributed to the RAPs for review and comment. An invitation to an information session for the Proposed Methodology and a field survey of the ACHA Study Area (Appendix G) was also extended in this correspondence.		
23 February 2021	Information session held for the Modification ACHA and Proposed Methodology.		
Field Surveys			
23 February 2021	An Aboriginal cultural heritage survey was conducted by archaeologists from Landskape accompanied by representatives of the RAPs. The cultural significance of the modified rail siding area was discussed with attending representatives.		
Draft ACHA Review			
19 March 2021	A copy of the draft ACHA was provided to all RAPs for their review and comment. The draft ACHA included survey results, archaeological and cultural significance assessment (based on feedback received during consultation and fieldwork), potential impacts and proposed mitigation and management measures. No comments specific to the draft ACHA content were provided by the RAPs.		

Source: Appendix G



Management and Monitoring Regime

In accordance with Condition 40, Schedule 3 of Development Consent (DA 374-11-00), a Heritage Management Plan (Clean TeQ, 2019j) has been prepared for the Project, and includes:

- a protocol for the management of recorded and previously unrecorded Aboriginal heritage sites;
- a protocol for ongoing involvement of the Aboriginal community;
- a management and monitoring program for Aboriginal cultural heritage sites; and
- an Aboriginal cultural heritage awareness training program.

6.9.2 Impact Assessment Review

Potential Direct and Indirect Impacts

No Aboriginal cultural heritage sites were identified in the archaeological field surveys and, therefore, no known Aboriginal cultural heritage sites, items or values would be impacted due to the Modification.

Although the modified rail siding area and surrounds was sufficiently surveyed, there remains a very low potential for additional Aboriginal cultural heritage sites to be located within this area (e.g. sites that may have been obscured by grass or soil at the time of survey). Such previously unidentified features, should they occur, would most likely be isolated finds or low-density concentrations of stone artefacts (Appendix G).

The shallow soils of the modified rail siding area, coupled with past disturbance from pastoralism, agriculture, and track and fence construction, means that significant in situ subsurface cultural deposits are highly improbable (Appendix G).

Potential Cumulative Impacts

Given that no Aboriginal cultural heritage places or objects have been identified in the modified rail siding area and surrounds, coupled with the very low potential to occur, it is considered that the Modification would not increase cumulative impacts to Aboriginal cultural heritage in the region (Appendix G).

6.9.3 Mitigation Measures, Management and Monitoring

Given that the Modification would not result in an increased impact on Aboriginal cultural heritage, there would be no change to the approved mitigation, management and monitoring measures for the Project.

Notwithstanding, the Heritage Management Plan (Clean TeQ, 2019j) would be reviewed and, if necessary, revised by SEM to include the Modification (subject to any modified Development Consent conditions).

6.10 HISTORIC HERITAGE

The potential historic heritage impacts of the Modification would be associated with the modified rail siding (Section 6.1).

6.10.1 Background

Recorded Historic Heritage Sites

There are no previously recorded historic heritage sites at the modified rail siding.

In addition, no items of State or local heritage significance are listed as occurring in the modified rail siding surface development area in the Parkes LEP or the Heritage NSW (2021) *State Heritage Inventory*.

Field Survey and Results

A field survey of the modified rail siding area and surrounds was undertaken by suitably qualified archaeologist Dr Matt Cupper (Landskape, 2021) on 23 February 2021.

No historic heritage sites were identified in the field surveys and it is considered unlikely that any historical cultural heritage places or objects would occur (Appendix G).

Management and Monitoring Regime

In accordance with Condition 40, Schedule 3 of Development Consent (DA 374-11-00), a Heritage Management Plan (Clean TeQ, 2019j) has been prepared for the Project, and includes:

- a protocol for the management of recorded and previously unrecorded historic heritage sites;
- a monitoring program for historic heritage sites; and



• a protocol for the establishment and maintenance of a historic heritage site database.

6.10.2 Impact Assessment Review

The Modification would not result in additional potential historic heritage impacts as no historic heritage sites are located within the modified rail siding area (Appendix G).

6.10.3 Mitigation Measures, Management and Monitoring

Given that the Modification would not result in an increased impact on historic heritage, there would be no change to the approved mitigation, management and monitoring measures for the Project.

Notwithstanding, the Heritage Management Plan (Clean TeQ, 2019j) would be reviewed and, if necessary, revised by SEM to include the Modification (subject to any modified Development Consent conditions).

6.11 LAND AND AGRICULTURAL RESOURCES

The potential land and agricultural resource impacts of the Modification would be associated with the modified rail siding (Section 6.1).

6.11.1 Background

Landform

The landform at the modified rail siding has limited relief, and has a gentle gradient (approximately 1 to 2%) from north-west to south-east. Elevation at the modified rail siding area ranges from approximately 264 m AHD in the north-west to approximately 259 m AHD in the south-east (Appendix H).

Land Use and Soil Capability

Existing land uses in the vicinity of the modified rail siding are characterised by a combination of agricultural enterprises (grazing and dryland cropping), roads and the Bogan Gate Tottenham Railway. The Land and Soil Capability classification system is used to give an indication of the land management practices that can be applied to a parcel of agricultural land. Agricultural land is classified by evaluating biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards (OEH, 2012).

The approved and modified rail siding surface development areas are identified as having Land and Soil Capability Class of 4 ("moderate capability land"). This Land and Soil Capability Class is defined as (OEH, 2012):

> Class 4 land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.

Land Contamination

A Land Contamination Assessment was undertaken for the modified rail siding by Ground Doctor Pty Ltd (Ground Doctor) in the form of a Stage 1 (or Preliminary Investigation) Land Contamination Assessment, and is provided as Appendix H.

The Land Contamination Assessment was prepared in accordance with clause 7 of SEPP 55, *Managing Land Contamination Planning Guidelines SEPP 55* – *Remediation of Land* (Department of Urban Affairs and Planning and EPA, 1998) and *Consultants reporting on contaminated land* – *Contaminated Land Guidelines* (EPA, 2020).

On the basis of the Stage 1 (or Preliminary Investigation) Land Contamination Assessment result, the modified rail siding surface development area is suitable for the proposed commercial/industrial development (i.e. the modified rail siding) (Appendix H).

Management and Monitoring Regime

In accordance with Condition 35, Schedule 3 of Development Consent (DA 374-11-00), a Biodiversity Management Plan and Revegetation Strategy (Clean TeQ, 2019i) has been prepared for the Project, and includes:

- a Vegetation Clearance Protocol;
- threatened species management measures;

- tailings storage facility management;
- weed control and monitoring measures;
- feral animal control and monitoring measures;
- controlling erosion measures;
- bushfire management measures;
- road management measures;
- revegetation area monitoring and management areas; and
- a staff and contractor education program.

In accordance with Condition 57, Schedule 3 of Development Consent (DA 374-11-00), a Rehabilitation Management Plan (Clean TeQ, 2019k) has been prepared for the Project, and includes:

- rehabilitation objectives and principles;
- a rehabilitation implementation strategy;
- performance measures and completion criteria;
- a rehabilitation monitoring program; and
- rehabilitation contingency measures and remedial action.

Further, and in accordance with Condition 30(b), Schedule 3 of Development Consent (DA 374-11-00), the Surface Water Management Plan (Clean TeQ, 2019e) developed for the Project includes a range of erosion and sediment control measures (e.g. sediment dams would be designed, constructed and operated in accordance with the relevant requirements of *Managing Urban Stormwater: Soils and Construction* – Volume 1 [Landcom, 2004]).

6.11.2 Impact Assessment Review

The potential land resource impacts of the Modification would be associated with the construction and operation of the modified rail siding. The Modification would result in a net increase in surface development area associated with the relocation of the rail siding of approximately 2.1 ha.

Landform

The modified rail siding would primarily comprise hardstand and water management infrastructure areas, as well as a number of buildings (e.g. the ammonium sulphate storage and distribution facility) and other infrastructure. Given the above, the modified rail siding would not have a significant impact on the existing landform.

Land Use and Soil Capability

The approved and modified rail siding surface development areas are identified as being comprised entirely of Land and Soil Capability Class 4 (Section 6.11.1).

Given that the Modification would only result in a minor increase in the amount of potential agricultural land that would be disturbed by the rail siding (i.e. approximately 2.1 ha), no significant change to the approved land use and capability impacts of the rail siding is expected as part of the Modification.

In addition, the approved final decommissioning land use options for the approved rail siding (i.e. agriculture) (Section 3.3.10) would not change for the modified rail siding.

Land Contamination

Potential land contamination risks associated with the modified rail siding would primarily be related to contamination from spillage of metal sulphate and ammonium sulphate products, fuels, sulphur and other chemicals.

Soils and Erosion

Potential impacts of the Modification on soils would relate primarily to:

- disturbance of in situ soil resources within the modified rail siding surface development area; and
- increased erosion and sediment movement due to exposure of soils during construction.

During construction of the modified rail siding, erosion and sedimentation controls would be designed, installed and maintained in accordance with the relevant requirements of *Managing Urban Stormwater: Soils and Construction* including Volume 1 (Landcom, 2004), Volume 2A – Installation of Services (DECC, 2008a) and Volume 2C – Unsealed Roads (DECC 2008b).

Sediment dams would be constructed within the footprint of the rail siding to collect rainfall runoff from hardstand and infrastructure areas during operations. The sediment dams would be designed, constructed and operated in accordance with the relevant requirements of *Managing Urban Stormwater: Soils and Construction* – Volume 1 (Landcom, 2004).



Through the implementation of the erosion and sediment control measures above, the modified rail siding is not expected to result in any significant soil erosion impacts.

6.11.3 Mitigation Measures, Management and Monitoring

The approved Biodiversity Management Plan and Revegetation Strategy (Clean TeQ, 2019i), Rehabilitation Management Plan (Clean TeQ, 2019k) and Surface Water Management Plan (Clean TeQ, 2019e) would be updated to include the Modification (subject to any modified Development Consent conditions).

General measures to reduce the potential for contamination of land would include the following:

- Storage of ammonium sulphate on impermeable surfaces inside a predominantly enclosed ammonium sulphate storage and distribution facility.
- Metal sulphate products and sulphur prill will be stored in sealed shipping containers and would be stored on impermeable surfaces.
- Contractors transporting dangerous goods loads would be appropriately licensed in accordance with the provisions of the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission, 2007).
- On-site consumable storage areas would be designed with appropriate bunding and would be operated, where applicable, in compliance with the requirements of *Australian Standard* (*AS*) 1940-2017: The Storage and Handling of Flammable and Combustible Liquids.
- Fuel storage areas would be regularly inspected and maintained. In addition, during construction and operations, diesel and chemicals would be managed to minimise the risk of spills which could cause soil contamination.
- Sediment dams would be constructed within the footprint of the rail siding to collect rainfall runoff from hardstand and infrastructure areas during operations. The sediment dams would be designed, constructed and operated in accordance with the relevant requirements of *Managing Urban Stormwater: Soils and Construction* – Volume 1 (Landcom, 2004).

6.12 VISUAL AMENITY

The potential visual impacts of the Modification would be associated with the modified mine and processing facility and accommodation camp, and modified rail siding (Section 6.1).

6.12.1 Background

Visual Character

Mine and Processing Facility and Accommodation Camp

The mine and processing facility and accommodation camp and the surrounding environment is characterised by a combination of agricultural enterprises (grazing and dryland cropping), carbon offset properties and forestry operations (Fifield State Forest). Previous mining areas exist to the south-east and north-east, and within the north-eastern portion of ML 1770 (Black Range Minerals, 2000).

The Fifield community is located approximately 4.5 km to the south-east. The closest privately-owned sensitive receivers to the mine and processing facility include 'Currajong Park', 'Slapdown' and 'Brooklyn' (Figure 16).

Views of the mine and processing facility from the surrounding region will be limited due to the lack of public vantage points, the relatively flat topography and shielding roadside vegetation (Black Range Minerals, 2000).

The southern portion of the mine and processing facility will be visible from Fifield Road and from Wilmatha Road. The northern view from Melrose Plains Road will be limited due to vegetation along the northern boundary of the site (Black Range Minerals, 2000).

The accommodation camp will be visible from Sunrise Lane.

Rail Siding

The approved and modified rail siding sites and the surrounding environment is characterised by a combination of agricultural enterprises (grazing and dryland cropping).



The modified rail siding is located between Scotson Lane (with an adjacent band of remnant vegetation to the east associated with a travelling stock reserve), and the Bogan Gate Tottenham Railway to the west. The modified rail siding area has limited relief and views are available from Scotson Lane, The Bogan Way and the Tottenham to Bogan Gate Railway.

The closest privately-owned sensitive receiver to the approved and modified rail siding is 'Glen Rock' (Figure 18). The 'Glen Rock' residence is located approximately 1 km south-west and 1.1 km west from the approved and modified rail siding, respectively.

Previous Assessment

Resource Strategies (2000) conducted a Visual Impacts Assessment for the mine and processing facility and rail siding for the Syerston Project EIS, and a summary of these findings are provided below.

Mine and Processing Facility

Resource Strategies (2000) found that the limited population residing in the vicinity of the mine and processing facility minimises the potential for visual impacts, and that views of the mine and processing facility would be limited by the vegetation screens, existing vegetation (e.g. roadside vegetation) and the absence of elevated public viewpoints surrounding the mine and processing facility.

With regard to night-lighting, Resource Strategies (2000) found the main regional impact of light emissions is that a glow would be seen in the night sky above the mine and processing facility from the surrounding region and residences. Fixed (buildings and stacks) and mobile lights, such as those used on the waste emplacements, would be visible from some roads and on occasions at some of the surrounding properties.

Accommodation Camp

The potential visual impacts of the approved accommodation camp were concluded to be low (Clean TeQ, 2018).

In addition, any potential impacts associated with night lighting will be insignificant compared to the mine and processing facility (Clean TeQ, 2018).

Rail Siding

Resource Strategies (2000) found that views of the approved rail siding will be obscured in part by vegetation on adjacent properties, however views of the approved rail siding would be available at close proximity due to the lack of screening vegetation between The Bogan Way and the Tottenham to Bogan Gate Railway, and the approved rail siding.

Resource Strategies (2000) also found that views from the "Glen Rock" homestead will be available, however, the level of visual impact will be minimal due to the proposed lowset rail siding infrastructure.

With regard to the potential night lighting of the approved rail siding, Resource Strategies (2000) concluded that lighting at the approved rail siding would be restricted due to low levels of night activities and is considered to be of minor impact.

Mitigation Measures

In accordance with Condition 48, Schedule 3 of Development Consent (DA 374-11-00), SEM will implement the following visual mitigation measures at the Project:

- implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts;
- ensure that all external lighting complies with Australian Standard AS4282 (INT) 1995 -Control of Obtrusive Effects of Outdoor Lighting (or its latest version);
- take all practical measures to shield views of the Project from users of public roads and privately-owned residences; and
- ensure the visual appearance of all ancillary infrastructure (including paint colours, specifications and screening) blends in as far as possible with the surrounding landscape; and
- establish and maintain vegetation screens (Figure 2) at the mine and processing facility for the life of the Project (unless otherwise agreed by the Secretary).

The approved rail siding includes vegetation screens along the boundaries of the approved rail siding (Black Range Minerals, 2000).



6.12.2 Impact Assessment Review

Mine and Processing Facility

The key potential visual impacts of the modified mine and processing facility would be associated with:

- changes to waste rock emplacement sequencing;
- revised tailings storage facility cell construction sequence and the addition of a decant transfer pond;
- the relocated evaporation pond; and
- a reduced sulphuric acid plant stack height from 80 m to 40 m.

The Modification would not change the approved final design and extents of the waste rock emplacements (i.e. approximately 20 m and 30 m high for the eastern and western waste rock emplacements, respectively [Figure 9]).

In addition, the Modification would not change the approved tailings storage facility design or location (Section 3.2.5).

Given the above, although there may be changes to the timing of the approved visual impacts, the Modification would not significantly change the approved visual impacts associated with the waste rock emplacements and tailings storage facility post-mining.

The relocated evaporation pond would be visible from Fifield Road consistent with the approved evaporation pond. The level of visual modification associated with the relocated evaporation pond in the context of the approved mine and processing facility would not be significant.

The reduced sulphuric acid plant stack height (i.e. from 80 m to 40 m) would result in a reduction to the potential visual amenity impacts for the sensitive receivers in the vicinity of the mine and processing facility.

The scale and intensity of night-lighting for the modified mine and processing facility would be of a similar intensity when compared to the approved night-lighting at the mine and processing facility.

Accommodation Camp

Potential visual impacts associated with the modified accommodation camp would primarily be related to the additional accommodation facilities (i.e. conventional demountable components) (Figure 14). The additional accommodation facilities would be visible from Sunrise Lane consistent with the approved accommodation camp.

The level of visual modification associated with the modified accommodation camp in the context of the approved accommodation camp would not be significant. Given this, the Modification would not significantly change the approved level of visual impact associated with the accommodation camp.

The scale and intensity of night-lighting for the modified accommodation camp would be of a similar intensity when compared to the approved night-lighting at the accommodation camp.

Rail Siding

The potential visual impacts of the modified rail siding would primarily be associated with the revised location and layout and the addition of an ammonium sulphate storage and distribution facility (approximately 500 m south of the approved location).

The modified rail siding would be visible from The Bogan Way, Scotson Lane and potentially from nearby residences.

As The Bogan Way and Scotson Lane users would be exposed to the views of the modified rail siding for a relatively short period of time and the number of users is limited, the visual sensitivity of users on these roads would be low. Consistent with the approved rail siding mitigation measures, vegetation screens would be included along the boundaries of the modified rail siding (Figure 13) to minimise views for vehicles approaching from both ways on The Bogan Way and Scotson Lane.

The ammonium sulphate storage and distribution facility would be a predominantly enclosed shed that would be designed to blend in as far as possible with the surrounding landscape consistent with Condition 48, Schedule 3 of Development Consent (DA 374-11-00).



Consistent with Condition 48, Schedule 3 of Development Consent (DA 374-11-00), night lighting at the modified rail siding would comply with *Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting* (or its latest version).

In consideration of the above, the Modification is not expected to significantly change the approved visual impacts of the rail siding.

6.12.3 Mitigation Measures, Management and Monitoring

SEM would implement the visual mitigation measures consistent with Condition 48, Schedule 3 of Development Consent (DA 374 11-00) for the modified mine and processing facility and accommodation camp, and modified rail siding.

In addition, vegetation screens would be included along the boundaries of the modified rail siding (Figure 13) to minimise views from The Bogan Way and Scotson Lane.

6.13 SOCIAL

A Social Impact Review for the Modification was undertaken by SPSP and is presented as Appendix I.

The Social Impact Review considers the principles in the draft Social Impact Assessment Guideline State significant projects (DPIE, 2020f) and the Technical Supplement to support the Social Impact Assessment Guideline for State significant projects (DPIE, 2020g).

6.13.1 Background

Social Locality

The Social Impact Review defines the Project's "Social Locality" as the LGAs in direct proximity to, and with the potential to be impacted by the Project – namely the LSC, FSC and PSC (Appendix I).

Previous Assessment

A Community Infrastructure Assessment (Martin and Associates, 2000) was completed as part of the *Syerston* (now Sunrise) *Nickel Cobalt Project Environmental Impact Statement* (Black Range Minerals, 2000). The Social Impact Review drew on aspects of the Modification to review and update the social impacts identified in the Community Infrastructure Assessment (Martin and Associates, 2000).

Consultation

Consultation undertaken by SPSP for the Social Impact Review included meetings with representatives of the LSC, FSC and PSC. SPSP sought feedback from the three Councils on the potential social impacts they anticipated from the Modification.

In addition, information was gathered as to the Councils preferences for impact mitigation and benefit enhancement measures and community priorities and concerns.

Key concerns raised regarding the potential impacts and benefits of the modified Project identified during consultation are discussed in Section 6.13.2.

Social Baseline

A description of the social baseline is provided in Appendix I, with respect to:

- population trends;
- income;
- employment;
- housing;
- health; and
- education and other services and facilities.

Existing Management Measures

The existing social management measures committed to by SEM for the approved Project include:

- preferentially sourcing suppliers from the Social Locality where they are cost and quality competitive;
- deploying a community information and engagement program, and a complaints and grievance process, so that potentially affected communities are aware of impacts and have opportunities to raise concerns with SEM;
- operating in accordance with an approved Traffic Management Plan (Clean TeQ, 2019h) and undertaking road and intersection upgrades and maintenance (in accordance with Development Consent [DA 374-11-00] and the VPA) to address the safety, road performance and quality aspects of the traffic changes;



- operating in accordance with an approved Air Quality Management Plan (Clean TeQ, 2019d) and Noise Management Plan (Clean TeQ, 2020c) (in accordance with Development Consent [DA 374-11-00]) to minimise potential amenity impacts associated with the approved Project;
- providing operational workforce bus transport from towns in the Social Locality to minimise workforce-related road traffic;
- operating high-capacity trucks to transport limestone and other materials and products to and from the mine and processing facility, to minimise heavy vehicle traffic volumes; and
- continuing to make community contributions in accordance with the VPA (Section 1.1.3), to support positive social outcomes, social infrastructure investments and/or community resilience improvements.

6.13.2 Impact Assessment Review

SPSP (2021) has assessed potential negative and positive social impacts in the Social Locality for the construction and operational phases of the modified Project.

Construction Phase

Employment and Business Opportunities

The Modification would include an increase in the peak construction phase workforce from approximately 1,000 personnel to approximately 1,900 personnel, peaking for approximately two months (Figure 27). The average construction phase workforce would increase from approximately 611 personnel to 784 personnel (Appendix I).

The duration of the construction phase would also increase from two to three years as part of the Modification.

A monthly breakdown of the indicative modified construction workforce numbers, as well as indicative construction timing for each construction activity, is provided on Figure 27.

Due to the highly specialised, skilled nature of the construction workforce, it is expected that the majority of roles would be filled by non-local workers and the remaining roles would be filled by local residents already residing in the region. Over the construction phase, an average of approximately 78 local residents are expected to find employment at the modified Project. During peak construction, up to 190 local residents are expected to find employment at the modified Project (Appendix I).

Consultation with the LSC, PSC and FSC identified anticipation for local employment and business opportunities as a key expectation within the community. Local employment for the modified Project is likely to be experienced positively by the local community, including jobseekers and businesses.

This positive impact is expected to last the duration of the construction phase, albeit at varying intensities (Appendix I).

Pressure on Local Housing Markets Prior to Accommodation Camp Commissioning

The Modification would increase the duration of the initial construction phase where the accommodation camp would not be available (as it is being constructed) from approximately three months to six months. During this initial construction phase, the construction workforce size would average 211 personnel and peak at approximately 300 personnel (Figure 27) (Appendix I).

Demand for single accommodation during this six month initial construction phase is expected to be up to 270 units. It is likely that the short-term accommodation and rental markets in the Social Locality would be able to cater for the additional non-local workforce during the initial construction phase. Notwithstanding, the increased demand may contribute to localised and short-term rent increases, depending on where the demand eventuates and whether other projects in the region contribute to cumulative pressures (Appendix I).

Pressure on Local Housing Markets After Accommodation Camp Commissioning

Once the accommodation camp is operational, the majority of non-local personnel would reside in the accommodation camp and the remaining personnel would be local residents already residing in the region. The Modification is therefore not expected to impact the local housing market for the remainder of the construction phase (Appendix I).

Notwithstanding, it is possible that the Modification would give rise to some additional indirect or induced demand for housing, however this is likely to be small (Appendix I).

Demand for Health, Schooling and Other Services

Consultation with LSC, PSC and FSC revealed some concern about the potential for impacts to existing services and facilities including health and social facilities (Appendix I).



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Source: Clean TeQ (2021)



Indicative Modified Construction Workforce and Construction Timing

LEGEND

Accommodation Camp Capacity

Indicative Project Construction Workforce

The Community Infrastructure Assessment (Martin & Associates Pty Ltd, 2000) considered that existing services and facilities, including health services and schools would be able to mostly absorb additional demand induced by the construction workforce and accompanying families. SPSP (2021) concluded that the additional student demand brought about by the incremental change in the construction workforce for the Modification is expected to be negligible (Appendix I).

As the majority of the modified construction workforce is expected to reside in the accommodation camp, with the remaining personnel being local residents already residing in the region, there is expected to be negligible demand for schooling and other services (Appendix I).

Road Traffic Related Impacts

Consultation with LSC, PSC and FSC and an analysis of submissions on previous modifications suggest traffic related impacts are of concern to the community, particularly in Trundle.

The Modification would change traffic volumes stemming from the increased construction workforce requirements and to deliver construction equipment, materials, components and consumables. Workforce traffic which is likely to predominantly comprise buses, would mostly originate from Parkes (including the Parkes airport), Condobolin and Forbes.

Construction phase daily traffic movements would significantly reduce, principally due to the introduction of shuttle buses to transport the Project construction workforce between surrounding towns and the mine and processing facility (Appendix D).

The potential changes to traffic movements were considered to have a low impact on people's way of life and health and wellbeing (Appendix I).

Operational Phase

Potential social impacts associated with the operational phase of the modified Project would be associated with:

- the increase in the workforce from approximately 335 personnel to approximately 340 personnel (the rail siding workforce would increase from five to 10 personnel);
- changes to amenity impacts at the mine and processing facility and rail siding; and
- changes to Project traffic movements.

SPSP (2021) concluded that the relatively minor change in the operational workforce (approximately 1%) would not significantly change the approved employment and business opportunities; pressure on local housing markets; and the demand for schooling and other services and facilities.

The Modification would not significantly change the Project-related daily vehicle movements during the operations phase with the exception of increases in the vicinity of the modified rail siding (Appendix D).

The potential changes to amenity impacts and traffic movements were considered to have a low impact on people's way of life and health and wellbeing (Appendix I).

Cumulative Impacts

The potential cumulative social impacts of the modified Project with "relevant" projects as defined in the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (DPIE, 2020b) (Section 2.3) were considered by SPSP (Appendix I).

SPSP found that the risk of cumulative social impacts of the Modification, in conjunction with other "relevant" projects, is considered manageable, due to the small scale of the other projects and their distance from the Project (Appendix I).

6.13.3 Mitigation Measures, Management and Monitoring

The existing social impact mitigation measures committed to by SEM (Section 6.13.1) are generally considered to be sufficient to address the potential social impacts associated with the Modification, with the following additions (SPSP, 2021):

- increasing the size of the construction workforce accommodation camp to accommodate all non-residential construction workers;
- mitigation upon request rights for one property in accordance with the VLAMP (NSW Government, 2018) to reduce noise levels at the residence (e.g. mechanical ventilation, upgraded façade elements or roof insulation); and
- providing construction workforce transport (i.e. buses) from towns in the Social Locality to minimise workforce-related road traffic.



6.14 ECONOMIC EFFECTS

6.14.1 Background

The approved Project will provide employment opportunities for up to 1,000 personnel during the two year construction phase and 300 personnel during the 21 year operational phase.

SEM will use local suppliers preferentially where local suppliers can be cost and quality competitive with other potential suppliers.

SEM will pay substantial taxes to the Commonwealth Government, royalties and other taxes to the NSW Government, as well as annual community contributions to the LSC, PSC and FSC in accordance with the VPA (Section 1.1.3).

In addition to these benefits, the Project will give rise to incremental flow-on impacts on the NSW economy associated with additional disposable income and direct benefits to businesses and their employees associated with additional operating expenditures.

6.14.2 Impact Assessment Review

The Modification would include an increase in the peak construction phase workforce from approximately 1,000 personnel to approximately 1,900 personnel. In addition, the duration of the construction phase would increase from two to three years as part of the Modification (Section 3.2.3).

The Modification would therefore provide additional employment and business opportunities during the construction phase of the Project that would result in increased economic benefits (e.g. increased wages, business turnover) in the NSW economy.

The significant approved employment and business opportunities during the operations phase of the Project would be unchanged by the Modification.

6.14.3 Mitigation Measures, Management and Monitoring

Given that the Modification would result in positive economic impacts, no specific management measures are proposed as part of the Modification.

6.15 GREENHOUSE GAS EMISSIONS

An assessment of the potential greenhouse gas emissions of the modified Project has been prepared by Jacobs (2021) and is included in Appendix A.

6.15.1 Quantitative Assessment of Potential Greenhouse Gas Emissions

Greenhouse Gas Protocol

The Greenhouse Gas Protocol (GHG Protocol) contains methodologies for assessing and calculating greenhouse gas emissions (World Business Council for Sustainable Development [WBCSD] and World Resources Institute [WRI], 2015). The GHG Protocol provides standards and guidance for companies and other types of organisations preparing a greenhouse gas emissions inventory. It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol.

Under the GHG Protocol the establishment of operational boundaries involves identifying emissions associated with an entity's operations, categorising them as direct or indirect emissions, and identifying the scope of accounting and reporting for indirect emissions.

Three "Scopes" of emissions (Scope 1, Scope 2 and Scope 3) are defined for greenhouse gas accounting and reporting purposes. Scopes 1 and 2 have been carefully defined to ensure that two or more entities would not account for emissions in the same Scope.

Scope 1: Direct Greenhouse Gas Emissions

Direct greenhouse gas emissions (Scope 1) are defined as those emissions that occur from sources that are owned or controlled by the entity (WBCSD and WRI, 2015). Scope 1 emissions are those emissions that are principally the result of the following types of activities undertaken by an entity and include:

- Generation of electricity, heat or steam these emissions result from combustion of fuels in stationary sources (e.g. boilers, furnaces and turbines).
- Physical or chemical processing most of these emissions result from manufacture or processing of chemicals and materials (e.g. the manufacture of cement, aluminium, adipic acid and ammonia, or waste processing).

- Transportation of materials, products, waste, and employees – these emissions result from the combustion of fuels in entity owned/controlled mobile combustion sources (e.g. trucks, trains, ships, aeroplanes, buses and cars).
- Fugitive emissions these emissions result from intentional or unintentional releases (e.g. equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbons emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport) (WBCSD and WRI, 2015).

Scope 2: Electricity Indirect Greenhouse Gas Emissions

Scope 2 emissions are a category of indirect emissions that accounts for greenhouse gas emissions from the generation of purchased electricity consumed by an entity.

Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the entity (WBCSD and WRI, 2015). Scope 2 emissions physically occur at the facility where electricity is generated (WBCSD and WRI, 2015). Entities report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as Scope 2.

Scope 3: Other Indirect Greenhouse Gas Emissions

Under the GHG Protocol, Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions.

Scope 3 emissions are defined as those emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled by that entity. Examples of Scope 3 activities provided in the GHG Protocol are extraction and production of purchased materials, transportation of purchased fuels, and use of sold products and services (WBCSD and WRI, 2015).

The GHG Protocol notes that reporting Scope 3 emissions can result in double counting of emissions (e.g. when compiling national inventories) and can also make comparisons between organisations and/or projects difficult because reporting is voluntary.

Greenhouse Gas Estimation Methodology

Direct and indirect greenhouse gas emissions of the modified Project have been estimated by Jacobs (Appendix A) using emission factors from a range of sources including:

- National Greenhouse Accounts Factors (NGAF) (Department of Industry, Science, Energy and Resources [DISER], 2020);
- National Greenhouse Gas Inventory Paris Agreement Inventory (DISER, 2021);
- Freighting goods / freight train (Department for Environment, Food and Rural Affairs, 2019); and
- estimates from Ramboll Environ (2017).

The NGAF (DISER, 2020) provide greenhouse gas emission factors for carbon dioxide (CO₂), methane and nitrous oxide.

Emission factors are standardised for each of these greenhouse gases by being expressed as a carbon dioxide equivalent (CO_2 -e) based on their Global Warming Potential. This is determined by the differing periods that greenhouse gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation (DISER, 2020).

Modified Project Greenhouse Gas Emissions

Key potential direct and indirect greenhouse gas emission sources of the modified mine and processing facility (including key transport activities) have been considered in the greenhouse gas emission estimates and their respective scopes include (Appendix A):

- combustion of diesel fuel usage from mobile mining equipment (Scopes 1 and 3);
- combustion of diesel fuel usage from the processing facility (Scope 1);
- emissions from the use of explosives (Scope 1); and
- emissions associated with the transport of product (Scope 3).

As no electricity would be imported to the mine and processing facility from off-site, there would be no Scope 2 emissions.



Power for the mine and processing facility would be provided by a power plant and a diesel-powered backup generator. The steam for the power plant is approved to be generated through heat recovery from the sulphuric acid plant or steam generated by gas. Steam generation would also be supported by auxiliary diesel boilers.

As per the approved Project, if the heat recovery from the sulphuric acid plant supported by the auxiliary diesel boiler is able to meet the power requirements of the mine and processing facility, there would be no need for the external gas supply.

As no electricity would be imported to the mine and processing facility from off-site, there would be no Scope 2 emissions.

It has conservatively been assumed that auxiliary diesel boiler and diesel generators (rather than gas) will be required to power the mine and processing facility as this would represent the maximum case scenario (Appendix A).

The modified mine and processing facility would result in the following greenhouse gas emissions over the life of the Project (Appendix A):

- Scope 1 emissions 6.68 Mt of CO₂-e.
- Scope 2 emissions 0 Mt CO₂-e.
- Scope 3 emissions 0.09 Mt CO₂-e.

The greenhouse gas emissions from the modified rail siding would not significantly change relative to the approved rail siding.

6.15.2 Mitigation Measures, Management and Monitoring

The modified Project would use various mitigation measures to minimise the overall generation of greenhouse gas emissions to the greatest extent practicable.

The mitigation measures to reduce the level of future greenhouse gas emissions from the Project include (Clean TeQ, 2019d):

- minimising the re-handling of material;
- maintaining the mobile fleet in good operating order; and
- optimising the design of roads to minimise the distance travelled between working areas.

Greenhouse gas emissions from the Project would be tracked and reported each year in the Annual Review, prepared in accordance with Condition 5, Schedule 5 of Development Consent (DA 374-11-00), and through the National Greenhouse and Energy Reporting Scheme, if the relevant reporting thresholds are met.



7 EVALUATION OF MERITS

SEM has continued to review and optimise the Project design, construction and operation as part of preparations for Project execution. The outcomes of this review are outlined in the Project Execution Plan (Clean TeQ, 2020b).

The Project Execution Plan (Clean TeQ, 2020b) identified a number of changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities.

SEM proposes to modify Development Consent (DA 374-11-00) to incorporate these Project Execution Plan changes to allow for the optimisation of the construction and operation of the Project.

7.1 STAKEHOLDER ENGAGEMENT OVERVIEW

SEM has consulted with a number of stakeholders during the development of the Modification, including:

- DPIE;
- other relevant NSW Government agencies;
- LSC, PSC and FSC;
- relevant infrastructure owners and service providers;
- neighbouring tenement holders;
- Aboriginal stakeholders;
- CCC; and
- the local community.

The outcomes of engagement with these stakeholders have informed the development of the scope of the Modification and SEM's preparation of the Modification Report.

7.2 SUITABILITY OF THE SITE

The Modification would involve changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities (Section 3).

The Modification would allow for the efficient and economic recovery of the approved mineral resources within ML 1770.

Existing land uses in the vicinity of the mine and processing facility and accommodation camp are characterised by a combination of agricultural enterprises (grazing and dryland cropping), carbon offset properties and forestry operations (Fifield State Forest).

Existing land uses in the vicinity of the modified rail siding are characterised by a combination of agricultural enterprises (grazing and dryland cropping), roads and the Bogan Gate Tottenham Railway. The Bogan Gate Tottenham Railway provides access to the Port of Newcastle, Port Botany and Port Kembla.

SEM owns or holds relevant access agreements to the mine and processing facility, accommodation camp and modified rail siding sites.

The Modification components are considered to be compatible with existing and future land uses in the vicinity of the Project.

SEM would implement a range of measures to avoid or minimise incompatibility of the modified Project with existing and future land uses in the area. This would be achieved through the implementation of the existing Environmental Management Strategy (Clean TeQ, 2019a), with updates to the relevant environmental management plans listed in Section 1.1.2.

Further, the rehabilitation strategy for the modified Project would include post-mining land uses that would be consistent with surrounding existing land uses (i.e. a combination of agriculture [pasture for grazing] and endemic woodland areas) (Section 3.2.10).

7.3 CONSOLIDATED SUMMARY OF IMPACTS

SEM will operate in accordance with its approved environmental management plans and environmental monitoring programs (Section 1.1.2).

SEM has undertaken a review of the potential environmental impacts of the Modification to identify key potential environmental aspects requiring assessment. The key environmental aspects identified are summarised in Table 24.



 Table 24

 Key Outcomes of Environmental Review of the Modified Project

Environmental Aspect	Summary of Key Environmental Review Conclusions
Air Quality	Compliance with the relevant air quality criteria is predicted at privately-owned sensitive receivers surrounding the modified mine and processing facility and rail siding.
Noise	• Two "moderate" exceedances and five "negligible" exceedances are predicted at privately-owned sensitive receivers in the vicinity of the mine and processing facility with the implementation of reasonable and feasible mitigation measures.
	• The privately owned dwellings with a "moderate" exceedance would be afforded noise mitigation measures upon request rights in accordance with the VLAMP.
	Compliance with the relevant noise criteria is predicted at the modified rail siding.
Surface Water	• The water balance modelling demonstrates that the modified site water management system has sufficient capacity and flexibility to accommodate a wide range of climate scenarios.
	• No overflows are predicted from the tailings storage facility, decant transfer pond, evaporation pond, mine water dams or processing plant runoff dams over the Project life.
	• The predicted average and maximum annual off-site water requirements for the Project would not significantly change.
	Potential surface water impacts associated with the Modification are not considered to be significant.
Groundwater	 No significant change to approved groundwater impacts are predicted as a result of the Modification.
	The Modification would have "minimal impact" as defined in the AIP.
Hazard and Risks	• The PHA concluded that the modified Project would comply with all relevant risk criteria (including societal risk, area cumulative risk, propagation risk, transport risk and environmental risk).
Road Transport	Construction phase daily traffic movements would significantly reduce.
	Operational phase daily traffic movements would not significantly change.
	Construction and operational phase truck traffic in Trundle main street would reduce.
	 The road and intersection upgrades required by Development Consent (DA 374-11-00) and the VPA are appropriate for the modified Project with the addition of the extension of the approved Scotson Lane upgrade to the modified rail siding access and two additional vehicle site access points.
	• No significant impacts to road performance, capacity, efficiency or safety are expected as a result of the traffic associated with the Modification.
Biodiversity	• No increase to impacts on vegetation abundance, vegetation integrity, habitat suitability, threatened species abundance, habitat connectivity, threatened species movement, flight path integrity or hydrological processes that are known to sustain a threatened species or ecological community.
	As there would be no increase in impacts on biodiversity values, a BDAR is not required.
Aboriginal Cultural Heritage	No additional Aboriginal cultural heritage sites would be impacted by the Modification.
Historic Heritage	No additional historic heritage sites would be impacted by the Modification.
Visual	The Modification is not expected to significantly change the visual impacts associated with the mine and processing facility, accommodation camp and rail siding.
Social	• All identified social impacts associated with the Modification are evaluated as low significance, with the exception of two positive impacts rated as medium significance.
Economic Effects	• The Modification would provide additional employment opportunities during the construction phase of the Project that would result in increased economic benefits (e.g. increased wages, business turnover) in the NSW economy.
Greenhouse Gas Emissions	 The total greenhouse gases directly generated as a result of the modified Project (Scope 1 emissions) would be less than the approved Project.



7.4 JUSTIFICATION OF IMPACTS

Approval of the Modification is considered to be justified given:

- The Modification would allow for the optimisation of the construction and operation of the approved Project.
- The Modification would increase the peak construction phase workforce from approximately 1,000 personnel to approximately 1,900 personnel and the duration of the construction phase would increase from two to three years providing additional employment opportunities and economic benefits.
- The Modification would include the development of NSW mineral resources in a manner that minimises environmental impacts through the implementation of the Environmental Management Strategy (Section 1.1.2) and other measures (Section 6).

7.5 CONCLUSION

The modified Project would be substantially the same as the existing/approved Project.

In weighing up the main environmental impacts (costs and benefits) associated with the proposal as assessed and described in this Modification Report, the Modification is, on balance, considered to be in the public interest of the State of NSW.



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