Planning Panels Victoria

Goschen Mineral Sands and Rare Earths Project

Inquiry and Advisory Committee Report

Environment Effects Act 1978

Planning and Environment Act 1987

27 June 2024

VICTORIA State Government

Planning Panels Victoria acknowledges the Wurundjeri Woi Wurrung People as the traditional custodians of the land on which our office is located. We pay our respects to their Elders past and present.

Environment Effects Act 1978

Inquiry Report under section 9(1)

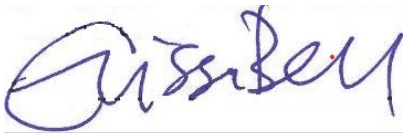
Planning and Environment Act 1987

Advisory Committee Report under section 151(1)

Goschen Mineral Sands and Rare Earths Project

27 June 2024

Michael Kirsch, Chair



Elissa Bell, Member

Colin McIntosh, Member

Planning Panels Victoria

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Glossary and abbreviations

AEP	annual exceedance probability
AERMOD	US EPA regulatory air dispersion mode adopted by the Environment Protection Authority of Victoria
AHD	Australian height datum
APAC	Air Pollution Assessment Criterion
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
BDEC	Bendigo and District Environment Council
Bq	Bequeral
CBA	cost benefit analysis
CEMP	construction environmental management plan
CGE	computable general equilibrium
CHMP	cultural heritage management plan
CNVMP	construction noise and vibration management plan
CPS	components, processes and services
D#	Document number
Db	decibel
DbA	A-weighted decibel
DEECA	Department of Energy, Environment and Climate Change
DELWP	Department of Environment, Land, Water and Planning (former)
DTP	Department of Transport and Planning
EE Act	*Environment Effects Act 1978*
EES	Environment Effects Statement
EIA	Economic impact assessment
EM38	Electromagnetic soil mapping
EMF	Environmental management framework
EMP	Environmental management plan
EPA	Environment Protection Authority Victoria
EP Act	*Environment Protection Act 2017*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERML	Environmental Radiation Monitoring Locations

ERR	Earth Resources Regulation
ERS	Environmental Reference Standard
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FZ	Farming Zone
GED	General Environmental Duty established under the *Environment Protection Act 2017*
GL/y	gigalitres per year
GMW	Goulburn-Murray Water
GSC	Gannawarra Shire Council
Gy	Gray
HHRA	Human health risk assessment
hydromet	hydrometallurgical circuit
IAC	Inquiry and Advisory Committee
Incorporated Document	Goschen Rare Earths and Mineral Sands Project Incorporated Document, August 2023
ITR	Independent technical reviewer
LFN	Low frequency noise
LFN Guidelines	Noise guidelines: Assessing low frequency noise, EPA publication 1996
LNG	Liquefied natural gas
LOR	Limit of reporting
LPG	Liquefied petroleum gas
LVIA	Landscape and visual impact assessment
m bgl	metres below ground level
MFMF	Mine Free Mallee Farms Inc
mg/L	milligrams per litre
ML	megalitre
MLA	Mining licence area
MNES	Matters of national environmental significance
MoU	Memorandum of understanding
MRSD Act	*Mineral Resources (Sustainable Development) Act 1990*
MRSDMI Regulations	Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019

mSv/y	Millisieverts per year
MUP	Mining unit plant
MW	megawatt
Native Vegetation Guidelines	Guidelines for the removal, destruction or lopping of native vegetation 2017
Natural grasslands community	Natural Grasslands of the Murray Valley Plains community
NDVI	Normalised difference vegetation index
NMP	Noise management plan
Noise protocol	Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (EPA Publication 1826.4)
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPI	National Pollutant Inventory
P&E Act	*Planning and Environment Act 1987*
PCRZ	Public Conservation and Recreation Zone
PIL	Project infrastructure land
Plains mallee box woodlands	Plains Malle Box Woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions
PM_{10}	Particles with a diameter of 10 micrometres or less
PM_{25}	Particles with a diameter of 2.5 micrometres or less
PPF	Planning policy framework
Project	Goschen Mineral Sands and Rare Earths Project
Proponent	VHM Limited
PSA	Planning Scheme Amendment GC218
RCS	Respirable Crystalline Silica
REMC	rare earth mineral concentrate
RFI	Request for Information
RIA	Radiation impact assessment
RMP	Radiation management plan
RWMP	Radioactive waste management plan
S#	Submission number
SCO4	Specific Controls Overlay – Schedule 4

Scoping Requirements	Scoping Requirements for Goschen Mineral Sands Project Environment Effects Statement May 2019
SHRCC	Swan Hill Rural City Council
SIA	Social impact assessment
Significant impact guidelines	Matters of National Environmental Significance Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1990
SLIM	Sustainable Living in the Mallee
SPSG	Southern purple spotted gudgeon
SWMP	surface water management plan
TARP	Trigger action response plan
TDS	Total dissolved solids
TEU	twenty-foot equivalent units
TIA	Traffic Impact Assessment
TMP	Traffic management plan
TN	Technical note
ToR	Terms of Reference
TSP	Total Suspended Particles
µg/m^3	Microgram per cubic metre
µGy/hr	Microgray per year
Ultima Terminal	QUBE Ultima Intermodal Terminal
WWAC	Wemba Wamba Aboriginal Corporation

Overview

Project summary	
The Project	Goschen Mineral Sands and Rare Earths Project
Brief description	The Project involves the mining and processing of rare earth minerals and heavy mineral sands over a 20–25 year mine life. The proposed mine would be an open pit mine with approximately 5 million tonnes of ore being extracted per annum. Mine products would be transported via road and rail for export overseas.
Project location	The Project site is located approximately 275 kilometres northwest of Melbourne and 35 kilometres south of Swan Hill. It covers an area of approximately 1,480 hectares.
The Proponent	VHM Limited
EES	The Minister for Planning determined that an EES was required for the Project on 10 October 2018.
The draft Planning Scheme Amendment (PSA)	GC218 to the Gannawarra and Swan Hill Planning Schemes
Exhibition	20 November 2023 to 17 January 2024 (40 business days)
Submissions	Number of submissions: 182 Submitters are listed in Appendix B

Inquiry and Advisory Committee (IAC) process	
The IAC	Michael Kirsch, Chair Elissa Bell, Member Colin McIntosh, Member
Supported by	Amy Selvaraj, Manager Major Projects, Planning Panels Victoria Gabrielle Trouse, Project Officer, Planning Panels Victoria
Directions Hearing	Video conference, 13 February 2024
Hearing	Video conference and in person: - Melbourne (Planning Panels Victoria), 25, 26, 27 and 28 March, 2024 - Swan Hill, 2, 3, 4, 5, 8, 9, 10, 11, 12, 15, 16, 17, 18, 22, 23 and 24 April 2024 Video conference: - 29 and 30 April 2024
Site inspections	Unaccompanied, 28 December 2023 (IAC Chair) Accompanied, 2 and 12 April 2024 (all members)
Parties to the Hearing	Parties are listed in Appendix C
Citation	Goschen Mineral Sands & Rare Earths IAC [2024] PPV
Date of this report	27 June 2024

Executive summary

(i) The Project

The Goschen Mineral Sands and Rare Earths Project (the Project) proposes the mining and processing of mineral sands and rare earths on a site approximately 35 kilometres south of Swan Hill. The site has an area of approximately 1,480 hectares and is located within a broadacre farming area.

The main elements of the Project include:

- open pit mining
- the extraction of approximately five million tonnes of ore per annum
- processing of the ore on-site
- mining and processing occurring 24 hours a day, seven days a week
- water supplied via a pipeline from Kangaroo Lake
- mine areas progressively rehabilitated for agricultural use
- product transported from the site by road and rail for export overseas
- a project life of 20-25 years.

Key design and operational features of the Project include:

- the mining area and water pipeline route have largely avoided areas of remnant vegetation and habitat
- mining would occur above the natural groundwater table
- topsoil, overburden and tailings would be progressively returned to the mine pits
- the Project is within a broad acre farming area that has a low density of sensitive receptors
- the Proponent has entered voluntary contracts to purchase the land required for the Project.

(ii) The Environment Effects Statement

The Environment Effects Statement (EES) was exhibited for 40 business days between November 2023 and January 2024. It included various summary and technical reports, together with an Environmental Management Framework (EMF), draft Planning Scheme Amendment (PSA), draft rehabilitation plan and work plan, and development licence application.

The EMF applies to all of the Project.

The draft PSA applies to the area outside the mining licence area and provides for works associated with the Project, including road works and water supply.

The draft work plan and rehabilitation plan require approval under the *Mineral Resources (Sustainable Development) Act* 1990.

Development licences are required for sewage treatment and power generation under the *Environment Protection Act* 2017. An application will be lodged for a discharge of waste to an aquifer permit.

(iii) Submissions

The EES exhibition attracted 182 submissions, most of which opposed the Project. The opposing submissions raised a broad range of concerns about environmental, health, amenity, social, agricultural and other impacts. These submitters included many landowners in the vicinity of the Project who were also concerned about direct impacts on their properties and families.

Some submitters raised broader issues about the adequacy of the EES, the EES consultation arrangements and the regulatory framework for various elements of the Project.

Submissions in support of the Project highlighted economic, employment and social benefits.

(iv) The Inquiry and Advisory Committee

The Goschen Mineral Sands and Rare Earths Project Inquiry and Advisory Committee (IAC) was appointed by the Minister for Planning as an:

- Inquiry under the *Environment Effects Act* 1978
- Advisory Committee under the *Planning and Environment Act* 1987.

The IAC's Terms of Reference (ToR) also require it to:

- review impacts on matters of national environmental significance (MNES) under the *Environment Protection, Biodiversity and Conservation Act* 1999 (Cth)
- review and provide advice on the development licence application under the *Environment Protection Act* 2017.

The IAC Hearing was held over 21 days in March and April 2024.

(v) Assessment and conclusions

The IAC has considered the EES, all submissions, evidence and other material presented during the Hearing process and concluded there are no environmental impacts that preclude the Project proceeding. It is satisfied the EES has adequately assessed the Project's potential environmental effects and any adverse effects will not be significant.

The IAC's findings are contingent on its recommendations being applied, including further investigations, analysis or monitoring in relation to:

- native vegetation and habitat impacts
- road upgrades and design
- the water pipeline route
- landscape impacts
- noise modelling
- dust prevention
- groundwater impacts
- rehabilitation for agriculture
- radiation baselines and impact assessment.

These recommendations, particularly those that require the Proponent to undertake further work, are intended to improve the environmental performance of the Project and refine the Project's controls. They are not necessary to establish whether the Project should proceed.

The IAC is generally satisfied the impact assessments in the EES are sound and notes that the associated modelling typically relied on conservative assumptions that likely overstate potential impacts. Many potential impacts have been mitigated by the design and siting of the Project's

mining and processing operations and the relatively remote location of the site. Impacts will be further mitigated by the extensive recommended changes to the exhibited EMF resulting from submissions and evidence during the Hearing.

The IAC acknowledges the real concerns and anxiety experienced by submitters, particularly those in the vicinity of the Project. These concerns are not just about the impacts of the exhibited Project, but also what might happen in the future, including the cumulative impacts of other possible mining projects and whether their land might be required for those projects.

The IAC believes many of the concerns raised by submitters in relation to the exhibited Project will not eventuate or are overstated, although this does not address the broader concerns about the possibility of other mines being developed in the area. While the IAC is satisfied the current proposal can proceed, it cannot comment on what might happen in relation to other mining or processing projects.

In response to its ToR, the IAC finds:

- The IAC recommended EMF will provide an appropriate framework to manage the Project's environmental effects. It is substantially improved over the exhibited version and has benefited from the extensive evidence and submissions that were provided during the EES process.
- The draft PSA provides an appropriate framework for managing environmental effects outside the mining licence area. It should be approved, subject to including the IAC's recommended Incorporated Document.
- Further approvals will have an important role in addressing many detailed issues of concern raised in submissions, including approvals under the:
  - *Mineral Resources (Sustainable Development) Act* 1990
  - *Environment Protection Act* 2017
  - *Radiation Act* 2005.
- The Project is not expected to have significant impacts on relevant MNES under the *Environment Protection, Biodiversity and Conservation Act* 1999.
- There are no reasons why the development licence application under the *Environment Protection Act* should not proceed, subject to addressing matters raised by the IAC.
- The work plan application under the *Mineral Resources (Sustainable Development) Act* and exhibited as part of the EES requires revision, additional material and further review before being considered for approval.

The IAC is satisfied the Project's environmental effects can be managed to an acceptable level and the Project can be approved, subject to the following recommendations.

(vi) Recommendations

The IAC recommends:

Environment Management Framework

1 Approve the Environmental Management Framework included at appendix E of this report.

Draft Planning Scheme Amendment GC218

2 Approve draft Planning Scheme Amendment GC218, subject to:

a) including the Goschen Rare Earths and Mineral Sands Project Incorporated Document included at appendix F of this report

b) extending the Specific Controls Overlay – Schedule 4 mapping to include water pipeline option A2.

K01 (Power generation) development licence

3 The Proponent should address the following in support of the development licence application:

a) Confirm the dimensions of the power station and pump station and the dimensions of any nearby structures.

b) Confirm stack heights are adequate to ensure good dispersion.

c) Confirm the intention expressed in section 8.1.2 of the exhibited development licence application that emissions from the power station and pump station have been minimised as far as reasonably practicable by using selective catalytic reduction such as AdBlue or equivalent technology.

d) Provide piping and instrumentation diagrams or equivalent to demonstrate there are no other air discharge points that must be included within the application.

e) Periodically report to the Environment Protection Authority Victoria on the availability of an alternative green power supply for its operations.

f) Re-run air dispersion model AERMOD for emissions from the diesel generators using selective catalytic reduction and alternative fuels (liquefied natural gas and liquified petroleum gas) and ensure that the exhaust plume is discharged at least 3 metres above the roofline of the power station or at a height where it can demonstrate plume downwash is minimised.

4 The Environment Protection Authority Victoria should review emissions from the processing plant to establish whether the prescribed exemptions for general discharges or emissions to the atmosphere apply.

PART A: INTRODUCTION AND BACKGROUND

1 The Inquiry process

1.1 The Inquiry and Advisory Committee

The Inquiry and Advisory Committee (IAC) was appointed by the Minister for Planning under section 9(1) of the *Environmental Effects Act* 1978 (EE Act) to hold an inquiry into and report on the environmental effects of the Project.

The IAC was also appointed as an Advisory Committee under section 151(1) of the *Planning and Environment Act* 1987 (P&E Act).

The appointments were made on 11 August 2023.

1.2 The IAC's role

The IAC's role is described in clauses 4, 5 and 6 of its ToR. A copy of the ToR is included at appendix A of this report.

As an inquiry under the EE Act, the IAC is to:

A. review and consider the environment effects statement (EES), the other exhibited documents, and submissions received in relation to the project;
B. consider and report on the potential significant environmental effects of the project having regard to the evaluation objectives in the EES scoping requirements and relevant policy and legislation;
C. consider and report on potential significant impacts on relevant matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act);
D. identify any project modifications or additional measures beyond those identified in the EES the IAC considers necessary and effective to avoid, mitigate or manage the environmental effects of the project consistent with relevant policy and legislation;
E. advise on how these modifications or measures should be implemented through the necessary approvals and consents for the project; and
F. review the development licence application and relevant submissions and provide advice that can be used to inform the EPA's consideration of the application prepared by the proponent for the project.

As an Advisory Committee under the P&E Act, the IAC is to:

A. review draft Amendment GC218 to the Gannawarra and Swan Hill Planning Schemes (PSA), which is proposed to facilitate the project;
B. consider any relevant issues raised in public submissions received in relation to the draft PSA;
C. recommend any changes to the draft PSA that it considers necessary to ensure consistency with relevant policy and legislation.

The IAC is to produce a report of its findings and recommendations for the Minister for Planning to inform the Minister's assessment under the EE Act, which will be considered by statutory decision makers for the Project.

Clause 38 of its ToR require the IAC to prepare a written report for the Minister for Planning that contains its:

a. analysis and conclusions with respect to the environmental effects of the project and their significance and acceptability;

b. findings on whether acceptable environmental outcomes can be achieved, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;
c. recommendations and/or specific measures that it considers necessary and appropriate to prevent, mitigate or offset adverse environmental effects;
d. recommendations as to any feasible modifications to the design or management of the project that would offer improved environmental outcomes;
e. recommendations for any appropriate conditions that may be lawfully imposed on any approval for the project, including with respect to the content of a work plan or conditions that might appropriately be attached to approval of a work plan if issued under the [*Mineral Resources (Sustainable Development Act 1990*] MRSD Act;
f. recommendations as to the structure and content of the proposed environmental management framework, including with respect to monitoring of environmental effects, contingency plans and site rehabilitation;
g. recommendations with respect to the merits, structure and content of the draft PSA;
h. recommendations with respect to the development licence applications, including conditions that might appropriately be attached to the development licences if issued; and
i. specific findings and recommendations about the predicted impacts on matters of national environmental significance and their acceptability, including appropriate controls and environmental management.

1.3 Scoping Requirements

The matters to be investigated and documented in the EES are described in the report Scoping Requirements for Goschen Mineral Sands Project Environment Effects Statement May 2019 (Scoping requirements).

The Scoping Requirements include the following draft evaluation objectives:

Resource development

To achieve the best use of available mineral sands resources, in an economic and environmentally sustainable way, including while maintaining viability of local industries.

Biodiversity and habitat

To avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and commonwealth policies.

Water, catchment values and hydrology

To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Kerang Wetlands Ramsar site) over the short and long-term.

Amenity and environmental quality

To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.

Social, land use and infrastructure

To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.

Cultural heritage

To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values.

Landscape and visual

To minimise adverse effects on landscape and visual amenity associated with the environs of the project site.

The draft evaluation objectives are discussed in the relevant chapters of this report.

1.4 Exhibition and submissions

The EES was exhibited for 40 business days between 20 November 2023 and 17 January 2024 and attracted 182 submissions (refer to appendix B).

During the exhibition period the IAC received several requests to either extend the exhibition period or agree to receive late submissions. The exhibition period was determined by the Minister for Planning and could not be altered by the IAC. However, the IAC allowed 28 submitters to lodge late submissions by noon, 31 January 2024.

During the exhibition period the Proponent sought the IAC's consent that submissions from parties who had an affiliation with the Proponent be withdrawn and replaced with revised submissions that disclosed that affiliation. The IAC agreed to this request and seven submissions were withdrawn and replaced. The Proponent subsequently advised of a further four submitters who had an affiliation with the Proponent (D4).

The Proponent provided a summary of key issues raised in submissions (D68 and 93) that was criticised by some submitters for being inaccurate or not identifying all issues raised in submissions. The IAC found the summary to be useful document but has read all submissions regardless of whether the submitters presented at the Hearing.

1.5 Request for Information

The IAC prepared a Request for Information (RFI) (D5) that was provided to the Proponent and tabled at the Directions Hearing. The RFI directed the Proponent to provide further information about various matters based on the IAC's preliminary review of the EES and submissions.

The Proponent responded to the RFI through written responses (D94 and D248), submissions, evidence, technical notes (TN) and various other information that was tabled during the Hearing.

Technical notes included:

- TN01 Fate of flocculant in groundwater (D95)
- TN02 Tailings leachate analysis (D145)
- TN03 Landscape and visual (D187)
- TN04 Crop radionuclide uptake impact assessment (D188)
- TN05 Water pipeline route (D267)
- TN06 Roads (D268).

1.6 Site inspections

The IAC Chair undertook an unaccompanied inspection of the general Project area on 28 December 2023. The inspection route was confined to public areas.

An accompanied inspection was held on 2 April 2024 with all IAC members, the Proponent and various submitters. The inspection included Lake Boga, the Kangaroo Lake water pump site, the pipeline route, the mining and processing areas, areas of native vegetation, receptor sites, various

roads, the towns of Lalbert and Ultima, and the QUBE Ultima Intermodal Freight Terminal (Ultima Terminal). The itinerary is documented in D39, 40, 41, 42, 126 and 127.

An accompanied inspection of the Proponent's Kerang warehouse facility was held on 12 April 2024.

1.7 Hearings

A Directions Hearing was held by video conference on 13 February 2024. At the Directions Hearing the IAC explained its role, made two declarations, noted the submissions and information received, discussed various procedural issues and proposed directions relating to the main Hearing and site inspections. An audio recording was made available on the Engage Victoria website.

The main Hearing was held in a hybrid format (a combination of in person and online) in Melbourne (week 1) and Swan Hill (weeks 2 to 5), and online (week 6) over 21 days between 25 March and 30 April 2024. Audio recordings of the Hearing and tabled documents were made available on the Engage Victoria website.

All IAC members attended the main Hearing either in person or online on all days.

1.8 Procedural and other issues

(i) Amendments to the Mineral Resources (Sustainable Development) Act

The Proponent provided advice on future changes to the MRSD Act through the *Mineral Resources (Sustainable Development) Amendment Act* 2023 that will be implemented on a date to be proclaimed or on 1 July 2027.

The Proponent highlighted two aspects of the changes:

> First, similar to the approach taken in the [*Environment Protection Act 2017*] EP Act, the Amendment Act would impose a general duty on the holders of mining licences to eliminate or minimise the risk of harm to the environment, the public, land, property or infrastructure arising from work (including rehabilitation) carried out by licence holders as far as reasonably practicable. The duty will be supplemented by obligations to comply with certain new regulatory instruments, including Codes of Compliance and prescribed standards.
>
> Second, as a result of the introduction of the general duty, the Amendment Act removes the need to submit and comply with an approved work plan for the particular project. Instead, it will be up to the duty holder to determine how to meet their obligations under the duty and any relevant instruments. Importantly, while work plans will no longer have any formal legal status, rehabilitation plans will continue to be required under the MRSD Act.[1]

The Proponent submitted the changes are relevant to the IAC's deliberations because they reflect a move away from a prescriptive regulatory approach to a more performance based approach and might influence the IAC's consideration of how conditions should be implemented.

The EPA submitted the IAC should consider how the Environmental Management Framework (EMF) might be implemented and enforced having regard to the proposed changes to the MRSD Act. It discussed this in the context of its recommendation that the EMF should be an enforceable document to achieve the General Environmental Duty (GED) under the *Environment Protection Act* 2017 (EP Act).

The Proponent concluded:

[1] D14, page 45

> VHM invites the IAC to proceed on the basis (and, if it sees fit, to include in its report an express conclusion that) it should be expected that the discharge of the duty under the amended MRSD Act will require implementation of the mitigation measures now proposed: that is, that its recommendations in respect of mitigation measures should not be considered irrelevant to the management of risks merely because a work plan will not be required after the MRSD Act amendments come into effect.[2]

The IAC has proceeded on the basis that the EMF will be implemented consistent with any relevant transition arrangements in place at the time, including consideration of how EMF conditions and requirements might be enforced. The IAC does not believe it can usefully comment on how this might occur other than to note its support for the Project is contingent on the EMF being implemented.

The issues raised by the EPA in relation to the status and enforceability of the EMF are discussed in chapter 17 of this report.

(ii) Future mining projects

Submissions raised concerns about possible future expansion of the Project, new mineral sands mines in the area and the cumulative impacts these might have. Some raised issues about possible revisions or additions to any work plan that might be issued for the Project and what opportunities there would be for public consultation about any expansion proposals.

The IAC expects these concerns were in part a response to the Proponent's initial EES referral that covered a much larger area (discussed in section 2.1 of this report) and an Australian Stock Exchange announcement from the Proponent during the Hearing that provided updated Area 2 mineral resource estimates.

The Proponent responded:

> VHM has continued to explore in other areas covered by its retention and exploration licences, as it is required to do under the conditions of its licences and the MRSD Act. If this exploration activity identifies any future potential projects outside Areas 1 and 3, the development of those potential projects would need to be separately assessed and approved, having regard to any cumulative impacts with the Goschen Project.
>
> VHM has no intention of developing any potential future projects unless it can enter into agreements with the relevant landowners.[3]

The Proponent indicated it was not aware of any other mineral sands mining proposals in the area that might have cumulative effects associated with the Goschen project and noted that any new mine would likely be subject to an EES process and an assessment of cumulative effects.

The IAC notes the concerns raised by submitters but can only consider the proposal that is described in the EES. Future expansion of the Project would require further approval/s, and likely a referral under the EE Act.

The IAC is not aware of any approved or proposed mining projects that require potential cumulative effects to be considered as part of this EES.

(iii) Aquatic evidence

Sustainable Living in the Mallee (SLIM) raised concerns during the Hearing about the Project's aquatic impacts and requested the Proponent's aquatic 'expert' be available for questioning.

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2 D264, page 18

3 D248, page 5

In response, the IAC indicated it did not believe it would be assisted by hearing aquatic evidence, but invited written submissions on the issue that were received from SLIM (D160), Mine Free Mallee Farms Inc (MFMF)[4] (D176) and the Proponent (D196).

SLIM submitted the Proponent should provide aquatic evidence so the impacts on *Environment Protection and Biodiversity Conservation Act* 1999 (Cth) (EPBC Act) and *Flora and Fauna Guarantee Act* 1988 (FFG Act) listed species and aquatic ecosystems could be fully examined.

MFMF submitted the IAC is a 'public authority' under the FFG Act and had to consider the effects on the FFG listed Southern purple spotted gudgeon (SPSG). It concluded the IAC would '…*fall into legal error if it considers that it would not be assisted by the hearing of expert aquatic ecological evidence in relation to this protected species*'.[5]

The Proponent submitted the IAC was not a 'public authority' under the FFG Act and there was no basis to suggest it would fall into 'legal error'. The Proponent noted the SPSG was discussed in EES chapter 7 and technical report B, and tabled a report prepared by the author of the EES aquatic assessment documenting the results of a targeted survey of the SPSG (D197).

The submissions were discussed on day 15 of the Hearing (17 April 2024). The IAC advised the parties it was satisfied it had appropriate technical material, knowledge and experience to assess aquatic effects and respond to submissions about aquatic issues, including the SPSG. For these reasons the IAC would not direct the Proponent provide aquatic evidence and it was not necessary that it respond to issues about its role under the FFG Act or whether its position constituted a 'legal error'. The IAC notes that SLIM and MMF did not raise the SPSG in their initial written submissions and chose not to provide aquatic evidence in support of their concerns during the Hearing.

There was further discussion about the SPSG in the closing submissions of MFMF (D259) and the Proponent (D264). Aquatic effects and the SPSG are discussed in section 4.3 of this report.

(iv) Dr Fawcett's evidence

The Proponent called groundwater evidence from Dr Fawcett that was provided in D27 and D144. Dr Fawcett presented his evidence on day 7 of the Hearing (5 April 2024).

During its cross examination of Dr Fawcett, MFMF noted that the University of Melbourne website did not record the conferral of the Doctor of Philosophy to Dr Fawcett and queried whether the degree had been awarded. Dr Fawcett indicated it had been awarded. The Proponent undertook to liaise with Dr Fawcett to provide evidence of the conferral and provided updates at various times during the Hearing.

MFMF discussed its concerns further in its Hearing submission (D176) and circulated an email (D184) on 14 April 2024 seeking a direction from the IAC that the Proponent produce all correspondence with the University of Melbourne regarding enquires that had been made about the conferral.

[4] MFMF represented the interests of approximately 50 members who live and work in the vicinity of the Project.

[5] D176, paragraph 49, page 11.

The Proponent agreed to do so and circulated relevant emails in D192 and D193 on 15 April 2024. D193 included correspondence from the University of Melbourne certifying that Dr Fawcett had been awarded the Doctor of Philosophy, backdated to 20 December 2006.

MFMF's concerns about the conferral were discussed on day 14 of the Hearing (16 April 2024) during which the IAC heard submissions from the Proponent and MFMF about the conferral and the weight it should give Dr Fawcett's evidence. The IAC noted the information from the University of Melbourne in D193 and advised the parties it would consider and determine what weight it would give Dr Fawcett's evidence when preparing its report.

MFMF circulated an email (D228) on 21 April 2024 that included correspondence between its representative, Ms Tannock, and the University of Melbourne that discussed, among other things, the process that led to the conferral being 'backdated' to 20 December 2006. The University advised that Dr Fawcett had completed the degree requirements on 9 March 2006 but there was no record of him attending a graduation ceremony that year. Consistent with its Graduation Policy, the University backdated the conferral of the degree to 20 December 2006, the date of two graduation ceremonies.

MFMF made submissions about the weight the IAC should give to Dr Fawcett's evidence in its closing submission (D259) on day 20 (29 April 2024). The Proponent responded to those matters in its closing submission (D264) on day 21 (30 April 2024).

The IAC has considered the various submissions about Dr Fawcett's degree and concludes the conferral process does not affect the weight it gives his evidence. Dr Fawcett's evidence in relation to groundwater impacts is discussed in chapter 11 of this report.

(v) Comments on the day 3 approval documents

In accordance with the IAC's Direction 41 (D6), parties were had an opportunity to comment on the Proponent's day 3 versions of the EMF (D265) and Goschen Mineral Sands and Rare Earths Incorporated Document, August 2023 (Incorporated Document) (D266) that were circulated on 29 April 2024. Comments had to be provided by 12 noon 7 May 2024 and be limited to drafting (form and content) matters. Comments were received from:

- Joanne Eastman (D275 and 276)
- Jane Hildebrant (D277)
- Leanne and Peter Pola Snr (D278)
- Swan Hill Rural City Council (SHRCC) (D279)
- Debbie Carruthers (D280)
- EPA (D281 and 282).

The IAC has reviewed the comments and where appropriate included discussions and relevant recommendations in its report.

(vi) Matters outside the scope of the Terms of Reference

Submissions raised various issues that were outside the scope of the IAC's ToR and considerations. These include:

- the timing and length of the EES exhibition period
- whether the EES was suitable for exhibition
- ownership of the Proponent and the Project
- the experience and competence of the Proponent

- sovereign risk associated with the sale of mine product
- financial viability of the Project
- the supply and demand for mineral products.

1.9 EES documentation

Figure 1 outlines the EES structure and content.

Figure 1 EES structure and content

Source: EES chapter 1

The EES includes the EMF (chapter 21) that provides an integrated framework to manage the Project's environmental effects. It outlines the relevant statutory approvals required for the Project and provides a set of mitigation, monitoring and other measures to be given effect by those approvals.

The draft PSA is provided at Attachment III and includes the Incorporated Document. The Incorporated Document provides the planning scheme mechanism for approving the Project components that are outside the mining licence area (MLA).

The IAC discusses the EMF and Incorporated Document throughout this report and provides its consolidated conclusions and recommendations in chapter 17 and appendices E and F.

The EES also includes a draft:

- Work plan (Attachment I)
- Work plan – Community Engagement Plan (Attachment I)
- Development licence (Attachment II)
- Rehabilitation plan (technical report P).

These documents are discussed in relevant chapters of this report, including chapters 16 and 17.

1.10 Report structure

The material before the IAC is significant and includes:

- the EES main chapters, attachments and technical reports
- 182 submissions
- 282 tabled documents including:
  - 20 evidence reports
  - six technical notes
  - extensive background and supporting material.

The IAC has considered all issues put to it but has not explicitly responded to every written submission or Hearing submission in this Report. The Report focuses on high- level key issues and what the IAC considers to be the determinative matters in its review, considerations, findings and recommendations. The Report addresses the requirements of the ToR and responds to the Scoping Requirements draft evaluation objectives.

The IAC's Report has four parts:

- Part A: Introduction and background
- Part B: Environmental effects
- Part C: Implementation and assessment
- Part D: Appendices.

The Appendices include:

- Terms of Reference
- List of submitters
- List of parties
- Document list
- IAC recommended Environmental Management Framework
- IAC recommended Incorporated Document.

The IAC's recommended versions of Project documents are based on the Proponent's day 3 versions (D265 and D266).

1.11 Acknowledgements

The IAC thanks everyone who participated in the Hearing process and acknowledges the time and effort put into written submissions, evidence and speaking at the Hearing.

The IAC thanks the Proponent for its administrative support, including hosting the Hearing, managing the document sharing platform, and providing technical support throughout the Hearing process.

The IAC particularly thanks staff at Planning Panels Victoria for their support and assistance throughout the process, with special acknowledgement to Amy Selvaraj, Manager Major Projects and Gabrielle Trouse, Project Officer.

2 The Project

This chapter provides a high-level overview of the key elements of the Project drawn from the EES and provides context for the discussion of specific issues in Parts B and C of this report. During the Hearing the Proponent provided additional and revised information about the Project. Where relevant, this information is discussed in Parts B and C.

Readers should refer to the relevant sections of the EES documentation and the Proponent's submissions for more specific or detailed information about the Project.

For the purposes of this report, the IAC uses the following terms to describe the areas affected by the Project:

- MLA – includes Areas 1 and 3, and the connecting services corridor within Shepherd Road (shown in figure 3). The MLA is also described as the MIN in various documents.
- The Project infrastructure land (PIL) – includes the water supply pipeline route, pump station site and various roads required to service the MLA. The PIL is subject to draft PSA GC218 and the proposed Specific Controls Overlay – Schedule 4 (SCO4).
- Project area – the broader area, including the MLA and PIL.

2.1 Project description

(i) Project overview

The Proponent is VHM Limited. The Project proposes the mining and processing of heavy mineral sands and rare earths in an area south of Swan Hill as shown on figure 2.

The Project is located within the area subject to Retention Licence 6806 granted under the MRSD Act. The Proponent lodged an application for a mining licence (application MIN007256) with Earth Resources Regulation (ERR) that was exhibited between 9 January and 2 February 2024. This process is separate to the EES process.

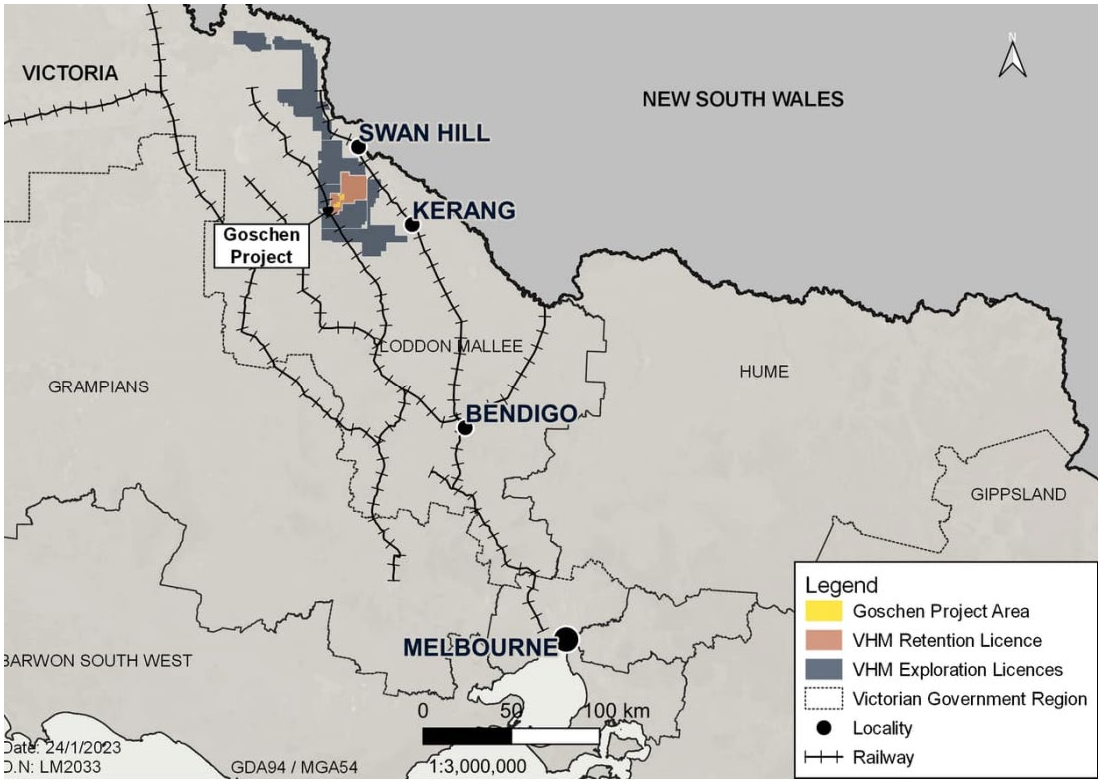
The MLA contains ore proposed to produce a range of products including mixed heavy mineral concentrate, zircon concentrate, rutile product, leucoxene products, ilmenite product, and rare earth mineral products. It is expected to generate approximately 325 direct full time equivalent local jobs during site establishment and construction, and 400 direct full time equivalent jobs during operation.

The MLA is shown in figure 3 and comprises:

- Area 1, which is approximately 722 hectares and has an estimated mineral resource of 82.2 million tonnes
- Area 3, which is approximately 754 hectares and has an estimated mineral resource of 140 million tonnes
- a connecting services corridor (less than 3 hectares, between Areas 1 and 3 within Shepherd Road).

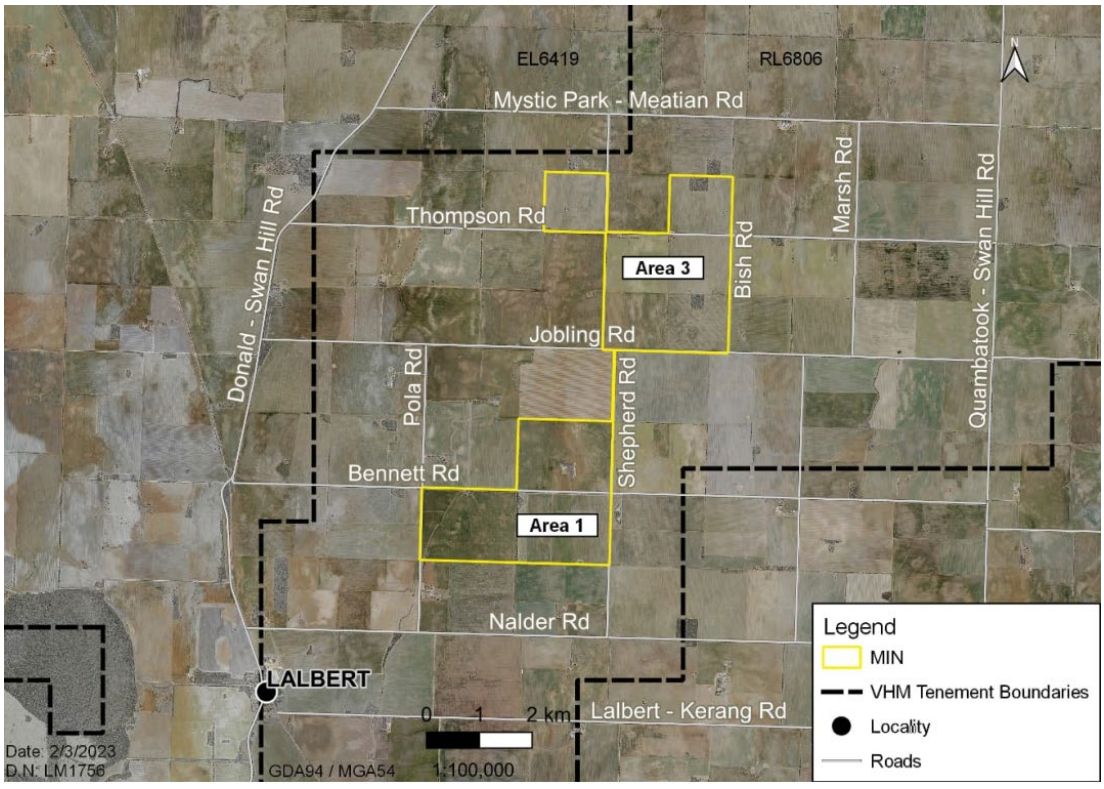
The active mining, processing and ancillary areas total approximately 750 hectares (approximately 49 per cent of the MLA.

Figure 2 Project location



Source: EES chapter 1

Figure 3 Mining licence area

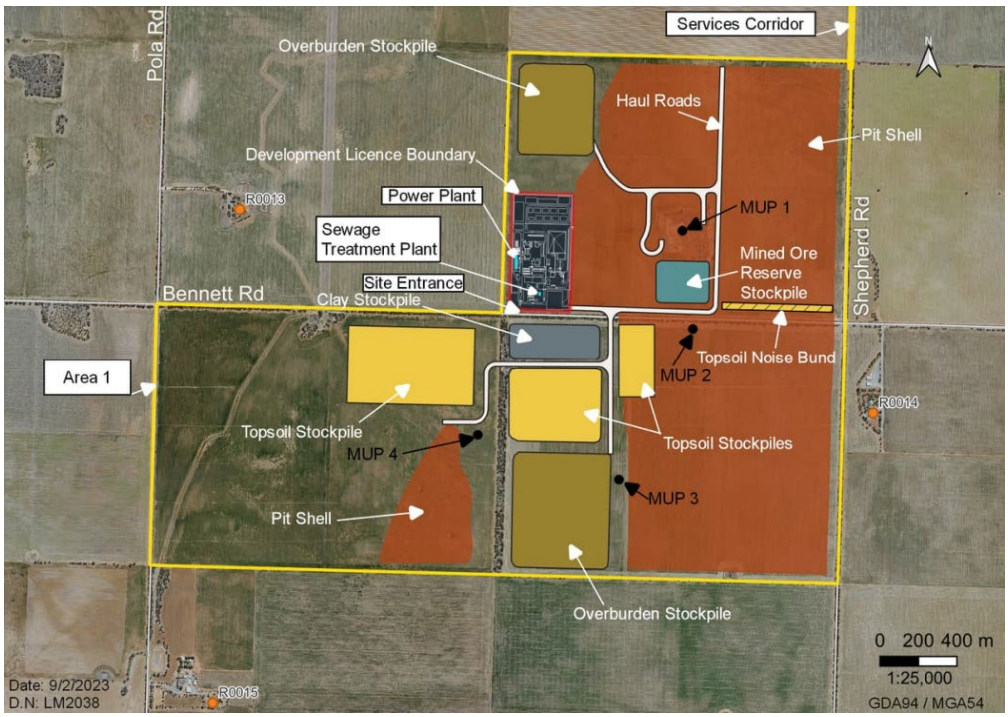


Source: EES chapter 3

The Proponent has entered into contracts to purchase the land within Areas 1 and 3.

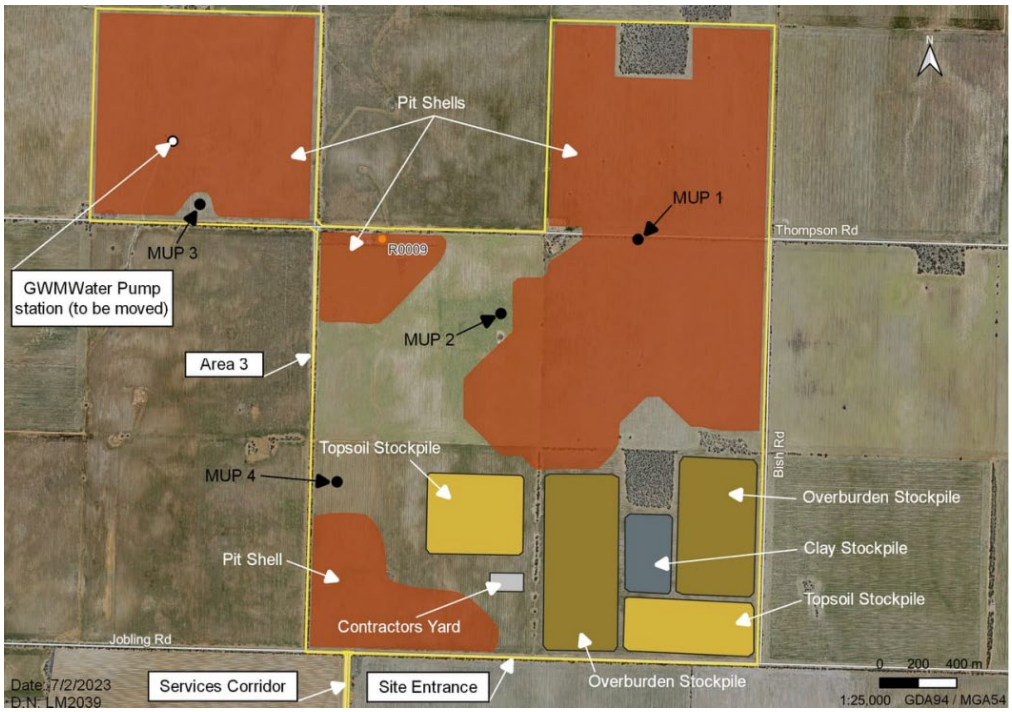
Conceptual layouts of Areas 1 and 3 are shown in figures 4 and 5. The mining unit plant (MUP) locations shown in the plans are indicative and will be moved as mining progresses.

Figure 4 Area 1 proposed layout



Source: EES chapter 3

Figure 5 Area 3 proposed layout

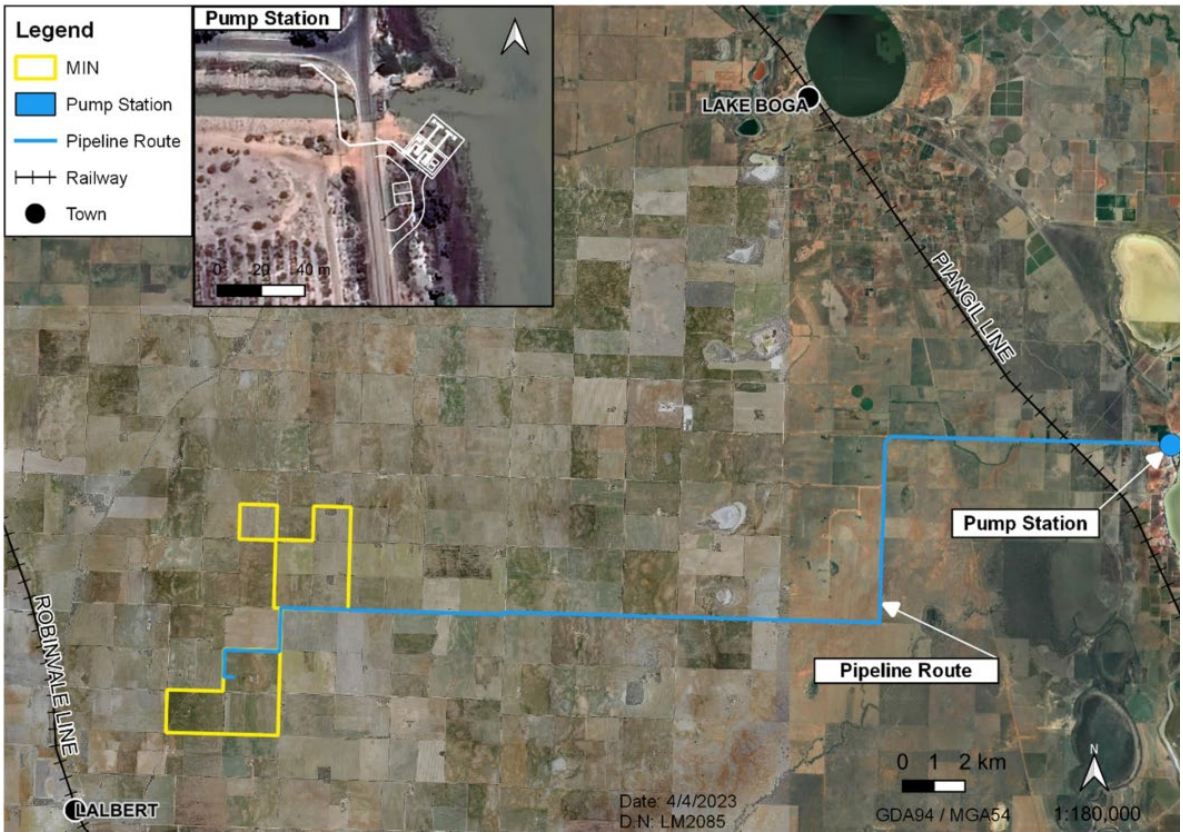


Source: EES chapter 3

Water would be supplied to the Project through a pipeline from Kangaroo Lake to the east of the MLA. The supply system would include a new intake pump at Kangaroo Lake and a 38-kilometre underground pipeline as shown in figure 6.

The EES investigated three route options for the pipeline - options A1, A2 and A3 as shown on figure 10.

Figure 6 Pump station and pipeline route



Source: EES chapter 3

(ii) Key Project components

Mining

Mining would operate every day for 24 hours a day over the 20–25 year life of the Project and generate 5 million tonnes per annum of ore that will feed the on-site processing plant. Strip mining would be employed with each mined segment (mining block) approximately 500 metres along-strike and variable in width to suit ground conditions. Mining blocks will be progressively rehabilitated, and it is expected that a nominal area (comprising up to 8 blocks) would be open for an estimated maximum 12 to 18 months.

Mining is intended to take place above the regional groundwater water table, with mining depth approximately 20 to 40 metres below ground level (m bgl). Mining will primarily be undertaken using excavators and trucks, and it is not anticipated that drilling and/or blasting will be required.

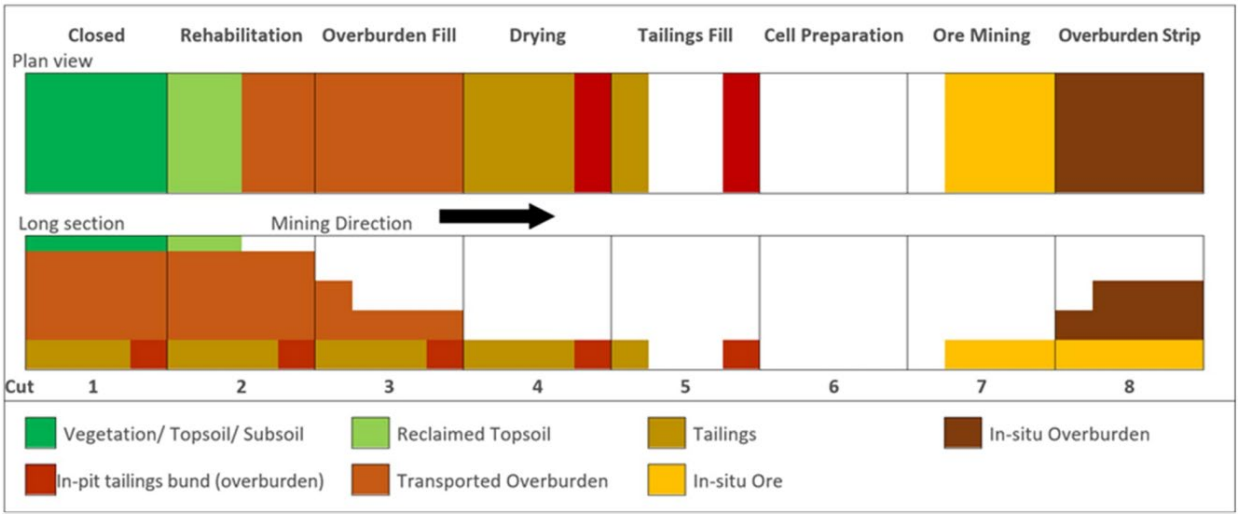
It is proposed that mining would commence in the north-east of Area 1 and continue to the south before moving back north. Once Area 1 has been mined, mining would begin in the east of Area 3 before heading west.

Extracted ore would be slurried in the MUP and conveyed via pipeline to the processing plant.

Mining would follow a sequential cycle, with the active mining pit wall moving across each area as mine blocks are progressively stripped, mined, filled with tailings and then rehabilitated. This would mean that although the total disturbed MLA is 1,479 hectares, at any one time the

disturbed area of mining operations would be approximately 60 hectares. The mining sequence is shown in the conceptualised plan at figure 7.

Figure 7 Mining sequence



Source: EES chapter 3

Processing

Mineral processing would operate every day for 24 hours a day with heavy mineral sands and rare earth ore separated on-site.

On-site processing would be established over three phases:

- Phase 1 would consist of a MUP, wet concentrator plant and a rare earth mineral concentrate (REMC) flotation plant.
- Within 6 to 12 months, Phase 1A would be commissioned and introduce a hydrometallurgical circuit (hydromet).
- Phase 2 would consist of an additional mineral separation plant, hot acid leach and chrome removal circuit and would commence construction approximately 24 months after Phase 1 production commences.

A summary of processing phases and mineral products is shown in figure 8.

The various products generated from Phases 1, 1A and 2 would be stored in covered sheds, in segregated bays, with packaging and loading into sea containers occurring under cover. Tailings from the various mineral processes would be homogenised at the plant and placed back into cells within the mine voids via pipelines.

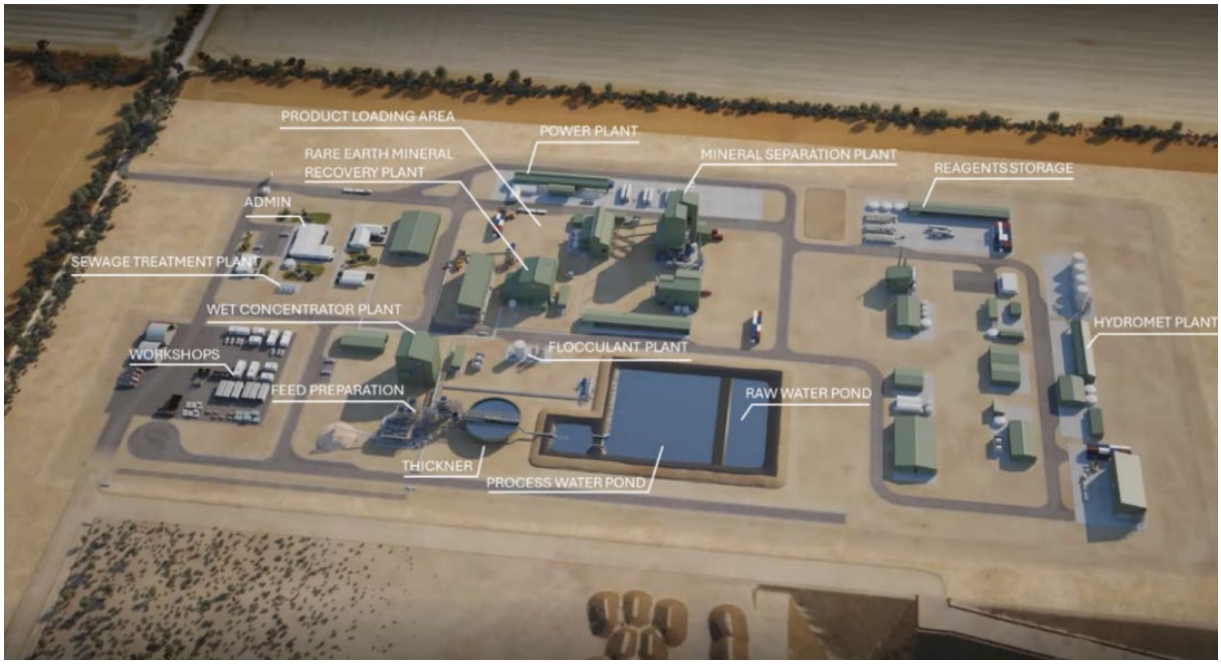
A conceptualised layout of the processing plant within Area 1 is shown at figure 9, with the Phase 2 plant located to the right of the plant.

Figure 8 Processing and products

	Processing		
Phase	**1**	**1A**	**2**
Timing	**At commencement of operations.**	**Construction planned to commence during Phase 1 construction to allow commissioning around 6 to 12 months after project commencement.**	**Construction planned to commence around 2 to 3 years after project commencement.**
Processing plant or circuit	**Mining unit plant (MUP)** **Wet concentrator plant (WCP)** **Rare earth mineral concentrate (REMC) flotation plant**	**MUP** **WCP** **REMC flotation plant** **Hydrometallurgical circuit**	**MUP** **WCP** **REMC flotation plant** **Hydrometallurgical circuit** **Mineral separation plant (MSP)**
Products	**Zircon/titania HMC** **REMC**	**Zircon/titania HMC** **REMC** **Mixed rare earth carbonate (MREC)**	**Zircon/titania HMC** **REMC** **MREC** **Premium zircon** **Zircon concentrate** **HiTi/rutile** **HiTi leucoxene** **Low chromium ilmenite**

Source: EES chapter 3

Figure 9 Process plant general layout



Source: EES chapter 3

Rehabilitation

The MLA is currently used for broad acre farming, and it is intended it will be rehabilitated to its original agricultural capacity or better. The EES describes various rehabilitation actions, including:

- removal of mine infrastructure and services
- controlled backfill with overburden, clay and topsoil following tailings dewatering
- soil preparation and revegetation
- reinstatement of public roads and other infrastructure (e.g. fences)

- removal of temporary environmental and drainage controls.

It is anticipated that the maximum disturbed area at any given point in time would be approximately 260 hectares, including the mining, processing and operational areas. A return to pre-mining crop yields would take approximately 3 to 5 years.

Water

The Project will require an off-site water source for construction earthworks, processing, dust suppression and rehabilitation, with demand peaking at 4.5 gigalitres per year (GL/y) for the start-up and 3.1 GL/y for operations (Phase 2 Processing). This water would be sourced from Goulburn-Murray Water (GMW) through the open water market and delivered via a new pump station adjacent to Kangaroo Lake and a 38-kilometre underground pipeline (option A3) to be constructed primarily within road reserves. This water infrastructure is shown in figure 6.

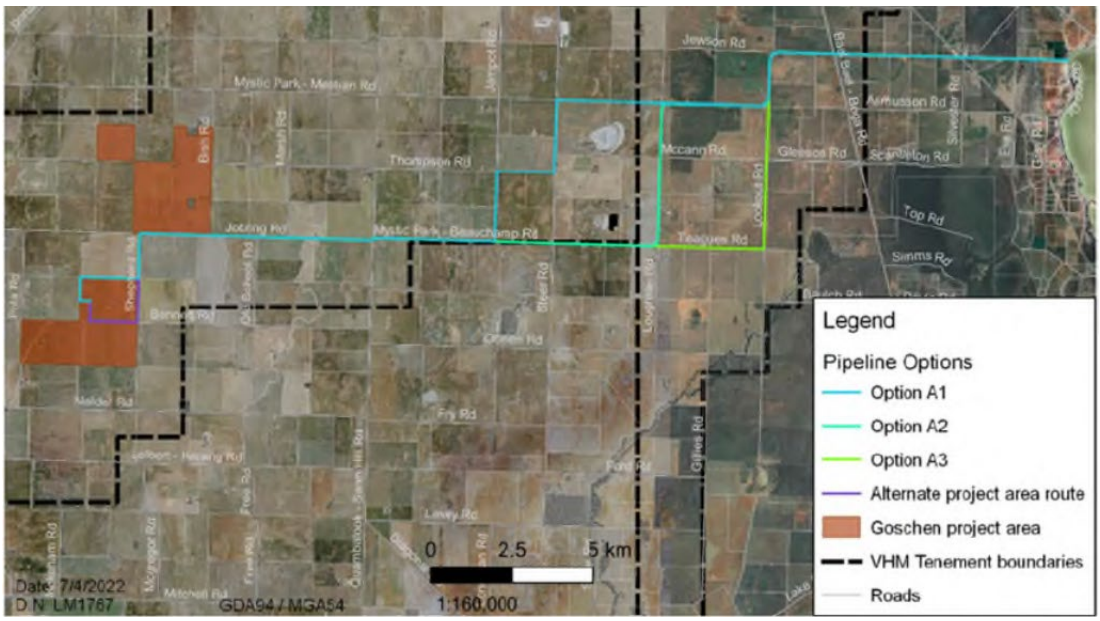
The EES indicates the preferred method of pipeline construction is open trenching, although trenchless construction methods may be needed at:

- Swan Hill railway line at Mystic Park
- Avoca siphon channel crossing
- channel crossings along Mystic Park-Beauchamp Road.

The notional diameter of the water supply pipe is 450 millimetres and would be installed in a nominal one-metre-wide trench (to a maximum depth of 1.5 metres depending on ground conditions and topography). Construction access will be required along a six-metre-wide corridor within the existing road reserves to install the pipeline. It would be progressively installed over an eight-month period. The water will be pumped to a 60 megalitre (ML) on-site process water pond within the process plant shown in figure 9.

In response to the flora evidence of Dr Callister, the Proponent provided further information during the Hearing about the three pipeline options considered in the EES (options A1, A2 and A3). These are shown in figure 10 and discussed in various chapters of this report, including chapter 3.

Figure 10 Water pipeline route options



Source: D267

Power

Power will be supplied from on-site generators that will be progressively installed to meet the energy requirements of the processing phases. The key features of the power station include:

- an indicative configuration of 12 tri-fuel generating sets with two standby generator sets
- a switch room with provision for alternative renewable energy inputs and future expansion
- fuel storage for diesel, liquified natural gas (LNG) and liquified petroleum gas (LPG) with sufficient storage capacity for 10 days operation
- power station controls and communications for remote monitoring of the power station.

The power station would be installed within the processing plant in Area 1 shown in figures 4 and 9.

The EES indicates a transition to renewables, hydrogen and/or battery is expected within five years of Project commencement as technologies and commercial viability increase and/or with future connection to the grid.

Transport

The construction and operation of the Project will require various works to local roads including widening, re-surfacing, acceleration, deceleration and turning lanes and expanding intersections for increased turning circles. Some roads will be closed over the medium or long term.

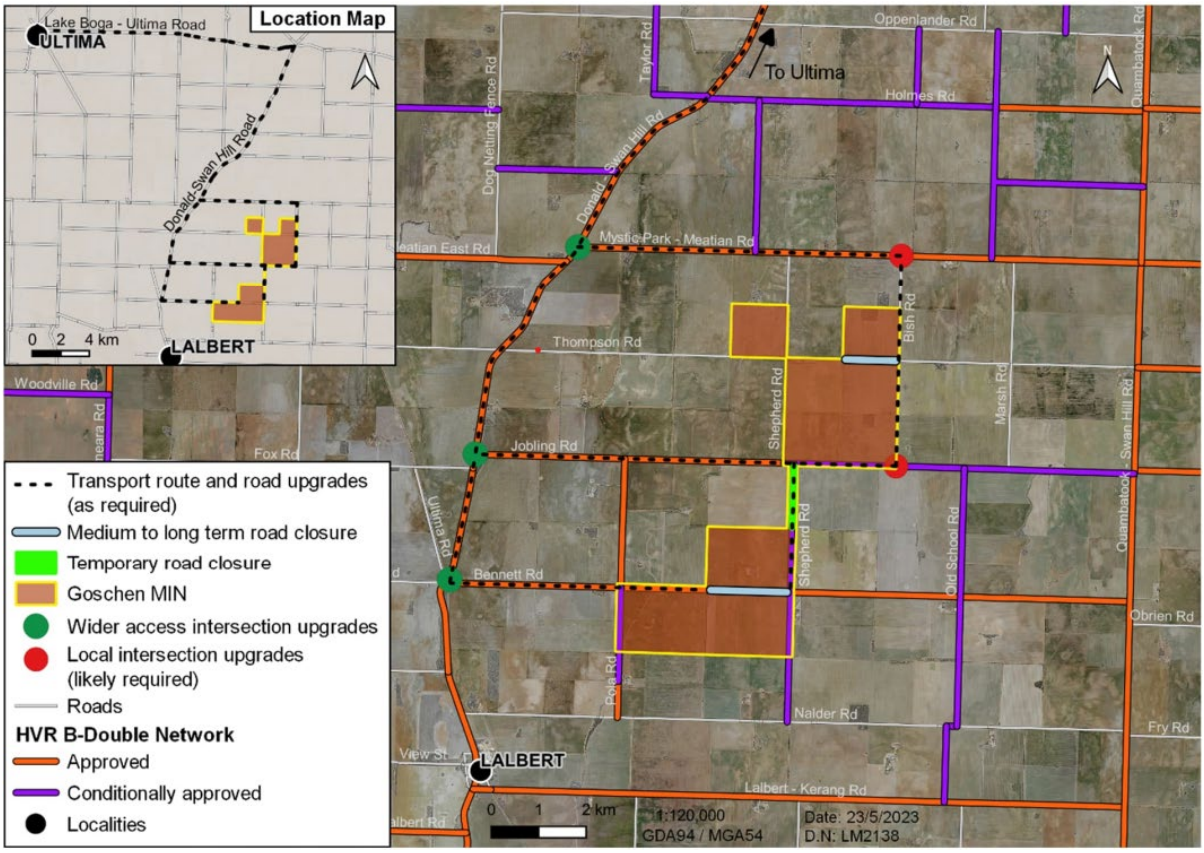
Product would be transported approximately 47 kilometres by road in 20-foot sealed sea containers to the Ultima Terminal. It is envisaged that approximately 12 A-double trucks would transport the containers each day.

It would then be transported by rail to the preferred Port of Melbourne, or alternatively the Port of Geelong. When the rail line is not accessible, the product would be transported by road to the Port of Melbourne.

The proposed transport routes, upgrades and closures exhibited in the EES are shown in figure 11.

The Proponent provided further information in relation to various road issues, including road closures, during the Hearing that are discussed in chapter 7 of this report.

Figure 11 Proposed road transport routes, upgrades and closures



Source: EES chapter 3

(iii) Project timing

Figure 12 provides the timeframes for Project planning, approvals and construction, operation and closure.

Figure 12 Project timeline

Source: EES chapter 1

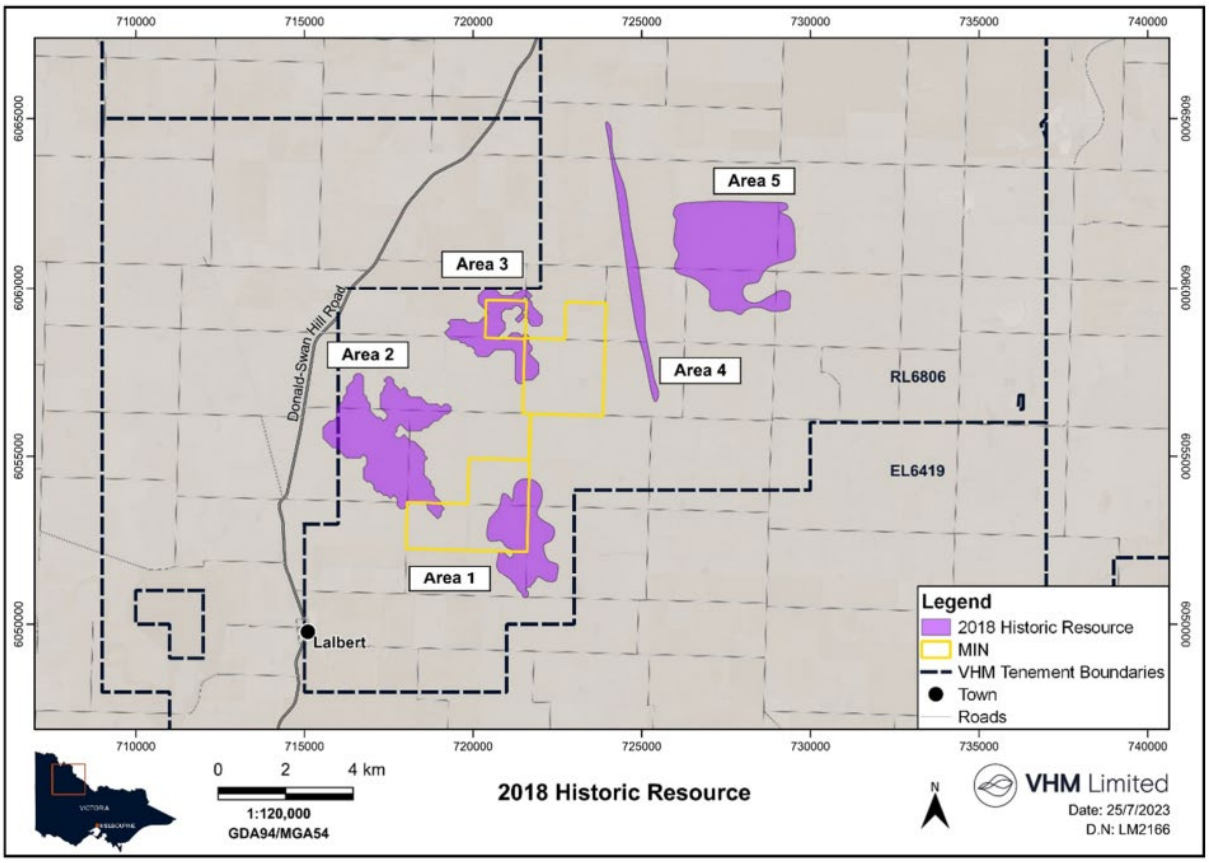
(iv) Project alternatives

EES chapter 4 describes the Project alternatives that were considered during its development and iterative review, consistent with section 3.5 of the Scoping Requirements. The alternatives related to various elements of the mining and processing operations, as well as power, water, transport, workforce and accommodation, and closure and rehabilitation options.

Chapter 4 explains the background to the Project and the selection of the MLA, noting that five potential mining areas had initially been investigated. These were the subject of the initial EES referral that included approximately 8,300 hectares and are shown in figure 13. Following further

investigations, including a reassessment of the extent of the ore reserve, the Proponent focussed on Areas 1 and 3 for the purposes of the Project and the scope of the EES was revised.

Figure 13 Investigation areas



Source: EES chapter 4, figure 4-1

2.2 Project area

(i) Description of the area

The Project is located on the traditional lands of the Wemba Wamba peoples and within Gannawarra Shire. The area to the north is within the SHRCC municipality, within which are various roads that will service the Project.

Swan Hill and Kerang are the major regional towns in the area and had 2021 populations of 11,225 and 3,882 people respectively. Other local settlements include Labert, Mystic Park, Lake Boga and Ultima.

The general area consists of large broad acre dryland farming properties, with associated dwellings and farming infrastructure. The overall density of development and housing in the area is low, although it is higher around Kangaroo Lake and Mystic Park in the vicinity of the proposed water pump and pipeline. The nearest urban area is the town of Lalbert, approximately 3.6 kilometres south-west of the MLA.

The topography of the area is flat to gently undulating and the Cannie Ridge is the main topographical landform in the area, located on the east side of the MLA, generally running from north to south. The area is predominantly cleared farming land although there are areas of remnant vegetation on road and water reserves and within various properties.

The MLA is used for broad acre farming and has an existing dwelling (R9) and farming infrastructure on-site. The Proponent has entered into contracts to purchase this land.

The proposed water pipeline route (Option A3, see figure 10) is mainly within existing road reserves that traverse the area from Kangaroo Lake to the MLA. Kangaroo Lake is a permanent freshwater lake supplied by the Torrumbarry Irrigation System and is part of the Ramsar listed Kerang Lakes. It is used for irrigation and various recreational activities and managed by GMW.

(ii) Planning scheme provisions

Areas 1 and 3, as well as the services corridor in Shepherd Road, are located entirely within the Farming Zone (FZ) and are not subject to any overlays.

The pump station site is situated within the Public Conservation and Recreation Zone (PCRZ) and Environmental Significance Overlay that apply to Kangaroo Lake. The pump station site is reserved Crown land under the control of Gannawarra Shire Council (GSC) as the committee of management.

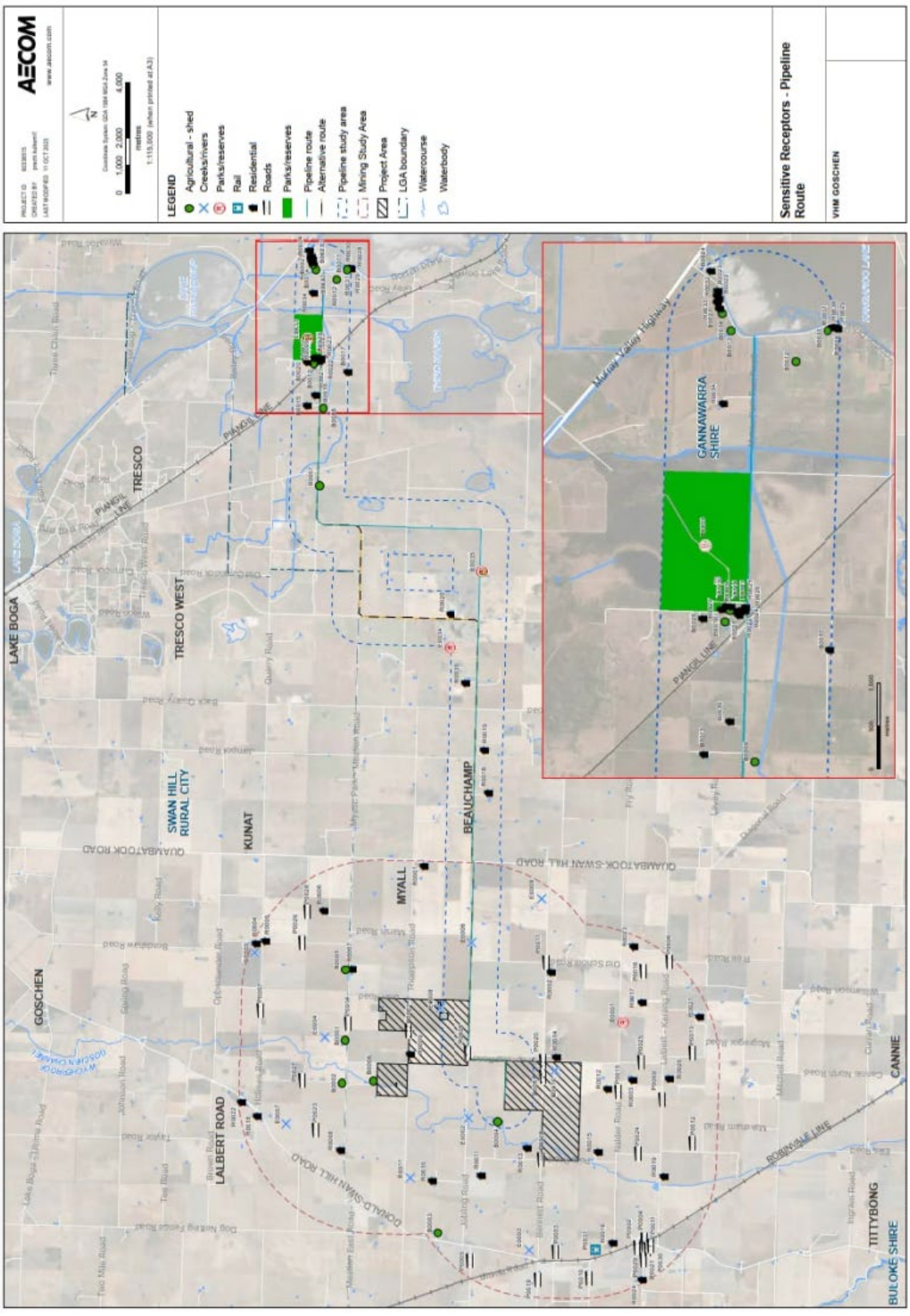
The water pipeline route is predominantly within the FZ, with small sections falling within the PCRZ, Township Zone and Transport Zone 1 at Mystic Park. The PCRZ also applies to sections of the route within Kangaroo Lake, Mystic Park Bushland Reserve and Mystic Park Recreation Reserve. Parts of the area are subject to various overlays including the Floodway Overlay, Vegetation Protection Overlay, Environmental Significance Overlay (Schedules 3 and 4), Specific Controls Overlay and Land Subject to Inundation Overlay.

(iii) Sensitive receptors

The EES identifies sensitive receptors in the vicinity of the Project, including several dwellings and reserves. Figure 14 shows receptors within five kilometres of the MLA and one kilometre of the pipeline route and pump station. Table 1 describes the distances of dwellings from the MLA boundary.

The EES notes that Receptor R14 will not be occupied during the Project and Receptor R9 will be used as a Project operations office when operations commence in Area 3. Consequently, they are not considered to be sensitive receptors for the purposes of the assessment of effects.

Figure 14 Sensitive receptors



Source: EES chapter 15

Table 1 Distances of dwellings from the mine boundary

ID	Description	Distance and direction from the mine boundary
R1	Residence	4.9km E (Area 3)
R2	Residence	3.2km E (Area 1)
R3	Residence	2.0km S (Area 1)
R4	Residence	5.0km NNE (Area 3)
R5	Residence	4.0km NNE (Area 3)
R6	Residence	4.0km NE (Area 3)
R7	Residence	1.6km NE (Area 3)
R8	Residence	2.3km NW (Area 3)
R9	Residence	0.0km (Area 3) (will be unoccupied once operations commence in Area 3)
R10	Residence	3.0km WNW (Area 1)
R11	Residence	2.6km WNW (Area 1)
R12	Residence	1.0km S (Area 1)
R13	Residence	0.6km NW (Area 1)
R14	Residence	0.2km SW (Area 1) (will be unoccupied for the duration of the Project)
R15	Residence	1.0km SW (Area 1)
R16	Residence	4.2km SWS (Area 1)
R17	Residence	3.1km SE (Area 1)
R18	Residence	4.3km N (Area 3)
R19	Residence	3.2km S (Area 1)
R20	Residence	3.2km S (Area 1)
R21	Residence	4.7km SE (Area 1)
R22	Residence	4.8km N (Area 3)
R23	Residence	4.6km SE (Area 1)
R24	Residence	4.8km SW (Area 1)

Source: EES chapter 15

2.3 Policy context and Project approvals

(i) Strategic and policy context

The Proponent's Part A submission (D14) and technical report K provide overviews of the strategic and policy context, including discussion of:

- Australia's Critical Minerals Strategy 2023–2030
- State of Discovery – Mineral Resources Strategy 2018-2023

- Loddon Mallee North Regional Growth Plan (2014)
- Gannawarra Shire Economic Development Strategy (2019-2024)
- Victoria's Regional Statement 2015
- Gannawarra Shire Council Economic Development Strategy 2019-2024
- Gannawarra Shire Council 2021-2025 Council Plan
- Gannawarra, Taking up the challenge, 2025
- Rural Land Use Strategy, 2016
- Swan Hill Region Economic Development Strategy (2017- 2022)
- Planning policy (as contained in the Gannawarra and Swan Hill Planning Schemes).

Some of these documents were referred to by submitters.

Land use policies are discussed in chapter 12 of this report.

The IAC has reviewed relevant elements of these documents and is satisfied the Project is broadly consistent with the strategic and policy context.

(ii) EES process

On 10 October 2018, the then Minister for Planning determined the Project required an EES for the following reasons:

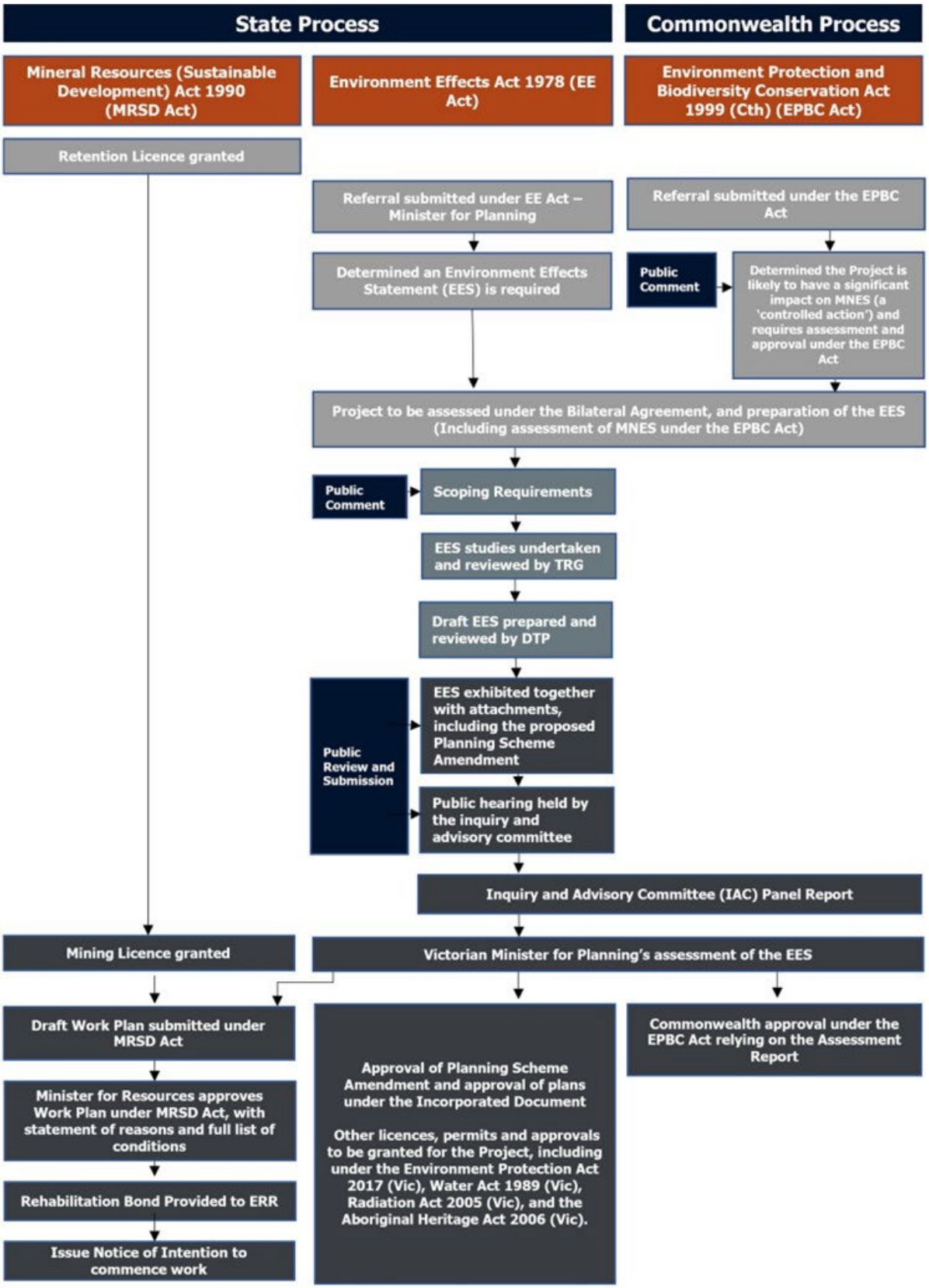
- The project has the potential for a range of significant environmental effects. In particular the project as proposed is likely to have significant effects on:
  - a very large extent of native vegetation and associated biodiversity values, including listed threatened species and communities;
  - surface water and groundwater (i.e. hydrology, quality, availability) and protected beneficial uses;
  - existing land uses, amenity (i.e. air quality, noise and traffic) and landscape values of the project area and those associated with the broader area; and
  - Aboriginal cultural heritage values.
- An integrated assessment is necessary to ensure the range of likely adverse effects and related uncertainties are sufficiently investigated, in terms of both their extent and significance, and how significant effects can be avoided and minimised to acceptable levels.
- An EES would enable a transparent and rigorous process for consideration of potentially significant adverse effects of the project, prior to any relevant statutory decision-making, including under the Mineral Resources (Sustainable Development) Act 1990, Aboriginal Heritage Act 2006 and Water Act 1989.[6]

The Project is being assessed through an EES administered by the Minister under the EE Act. Decision makers will be required to consider the Minister's assessment in determining whether to issue Project approvals.

Figure 15 outlines the EES process described by the Proponent in the EES.

[6] D141

Figure 15 EES process



Source: EES chapter 5

(iii) Approvals

EES chapter 5 describes the legislative framework and required approvals, including:

- a mining licence and work plan under the MRSD Act
- a planning scheme amendment to regulate the use and development of land outside the mining licence area
- a development licence under the EP Act for the on-site powerplant and sewerage plant
- a cultural heritage management plan under the *Aboriginal Heritage Act* 2006
- approval under the EPBC Act.

Work carried out under a mining licence, including the removal of native vegetation, must be authorised by a work plan approved by the Head of the Department of Energy, Environment and Climate Action (DEECA) or delegate. In accordance with the *Mineral Resources (Sustainable Development) (Mineral Industries) Regulations* 2019 (MRSDMI Regulations) work plans must address various matters including:

- the risks of the mining and what the licensee will do to eliminate or minimise those risks so far as reasonably practicable
- a community engagement plan
- a rehabilitation plan.

The Proponent advised that following a favourable assessment of the EES by the Minister for Planning, risk treatment plans would be prepared and included in the draft work plan during the detailed design of the Project.

Approvals would also be required under other legislation, including the:

- *Radiation Act* 2005
- *Local Government Act* 1989
- *Road Management Act 2004 and Road Safety Act* 1986
- *Flora and Fauna Guarantee* Act
- *Water Act* 1989.

Project approvals are discussed in chapter 17 of this report.

(iii) Environment Protection and Biodiversity Conservation Act

On 19 December 2018 the former Commonwealth Minister for the Environment's delegate determined the Project was a controlled action under the EPBC Act and would require assessment and a decision about whether it should be approved under that Act.

The following controlling provisions were determined to be relevant to the Project:

- Ramsar wetlands
- listed threatened species and communities
- nuclear actions.

On 30 January 2023 the Minister for the Environment's delegate accepted a variation of the proposal that reduced the proposed mining area and included the Kangaroo Lake pump station and water pipeline.

Under the bilateral assessment agreement between the Commonwealth and Victoria, the Victorian EES process is accredited to assess potential impacts on MNES for the purpose of the EPBC Act.

The EPBC Act and MNES are discussed in chapters 3, 4 and 17 of this report.

PART B: ENVIRONMENTAL EFFECTS

3 Flora

3.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> *To avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and commonwealth policies.*

Flora is discussed in EES chapter 7 and technical report A.

The exhibited EMF includes the following mitigation measures:

- MM-BD01 Minimise impacts to trees
- MM-BD02 Minimise impacts to native vegetation
- MM-BD03 Minimise impacts to remnant vegetation in vicinity of work areas
- MM-BD04 Control spread and/or introduction of weeds and/or pathogens – Vehicles
- MM-BD05 Control spread and/or introduction of weeds and/or pathogens – General
- MM-FE02 Minimise impact to native vegetation – Kangaroo Lake.

In response to the IAC's RFI and other issues raised at the Hearing, the Proponent provided the following technical notes:

- TN05 – Water pipeline
- TN06 – Roads.

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248).

Table 2 lists the flora evidence.

Table 2 Flora evidence

Party	Expert	Firm	Area of expertise
Proponent	Dr Kate Callister	Nature Advisory	Flora

3.2 Native vegetation

(i) The issue

The issue is whether the Project has appropriately addressed the objective to avoid and minimise effects on native vegetation.

(ii) What did the EES say?

The assessment of native vegetation impacts included the two mine site areas, the water supply pipeline and eight road intersections requiring modification. It did not assess potential road upgrades required to service the Project.

The EES described examples of how native vegetation impacts had been avoided and minimised within the MLA and concluded no further opportunities were feasible without compromising the Project.

These examples of avoidance included:

- Area 1 – retained 50 habitat zones, the largest zone (FEQ) being 5.686 hectares and the remainder mostly less than a hectare. In total, 15.442 hectares of native vegetation would be retained.
- Area 3 – retained 44 habitat zones, the largest zone (HBQ) being 8.289 hectares, three being between one and two hectares and the remainder less than a hectare. In total, 22.707 hectares of native vegetation would be retained.[7]

Along the pipeline route, native vegetation would largely be avoided through construction in the cleared road reserve. In addition, two pipeline routes (options A1 and A3) were assessed in technical report A to avoid and minimise impacts. Option A3 was considered to have significantly less native vegetation than A1 and was the preferred route in the EES (the pipeline route is discussed further in section 3.3 of this report).

Further opportunities to avoid and minimise impacts would be available through the EMF particularly MM-BD01 to MM-BD03 which include requirements relating to pipeline micro-siting and establishing vegetation protection zones around retained native vegetation.

(iii) Evidence and submissions

The Proponent submitted the Project had been designed to avoid and minimise native vegetation removal and relied on evidence of Dr Callister that potential impacts would be avoided, minimised or managed to required standards through the mitigation measures.

GSC submitted the avoidance of roadside native vegetation was a key reason for requesting the Proponent consider constructing the pipeline in the middle of the roads.

SHRCC submitted the EES lacked specific details about the avoidance and minimisation of effects within its road reserves. Dr Callister responded the impacts associated with intersection widening were relatively small (0.274 hectare) though the principles of avoid and minimise must still be applied and had been applied in selecting the chosen transport routes. To further minimise impacts she recommended an arborist survey of tree locations to inform swept path plans and construction techniques.

In closing, SHRCC submitted mitigation measures such as micro-siting to avoid tree impacts (MM-BD01) and revegetation of the pipeline route with local species (MM-BD02) should apply to future roadworks as well as the pipeline route.

The Proponent updated MM-BD01 to specifically adopt recommendations from the EES Arborist report to further reduce tree impacts by designating turning points to prevent compaction and tree damage and to carry out preventative pruning to protect branches from nearby works.

(iv) Discussion

The IAC accepts the Project has appropriately avoided and minimised native vegetation impacts along the pipeline route as documented in the EES. The IAC generally accepts efforts to avoid

[7] EES technical report A, sections 9.4.3 and 9.4.4

native vegetation within the MLA have been positive and notes the significant patches of native vegetation to be retained in Areas 1 and 3. The exception is the potential for additional native vegetation removal on roadsides within and adjacent to the MLA through encroachment within identified no-go zones. This is discussed later in this chapter.

Further opportunities to minimise impacts are provided through mitigation measures MM-BD01 and MM-BD02. The IAC supports the Proponent's day 3 changes to MM-BD01 and SHRCC's submissions for additional changes to MM-BD01 and MM-BD02. The IAC also agrees with Dr Callister's recommendation that an arborist survey should inform swept path design and construction techniques for the intersection upgrades and has included this in its recommended MM-BD01.

In response to a query from the IAC about language in the Incorporated Document, Dr Callister advised there was no difference between the terms "information" and "details" about native vegetation required by clauses 4.2.5 and 4.3.3 of the Incorporated Document. For consistency, the IAC has recommended the word "information" in clause 4.3.3 be replaced with "details".

(v) Findings

The IAC finds:

- The Project appropriately addresses the draft evaluation objective to avoid and minimise native vegetation effects for the MLA, pipeline route and eight intersections assessed in the EES.
- Mitigation measures provide further opportunities to avoid and minimise native vegetation removal.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-BD01 and MM-BD02 consistent with Swan Hill Rural City Council submissions that micro-siting and revegetation should apply to any works in road reserves

b) revised MM-BD01 for an arborist survey to inform swept path design and construction techniques for the intersection upgrades.

Incorporated Document

Include the following change:

a) replace the word "information" in clause 4.3.3 with "details".

These changes are included at appendices E and F.

3.3 Road upgrades

(i) The issues

The issues are whether potential flora and fauna impacts of proposed road upgrades have been appropriately assessed and are acceptable.

(ii) What did the EES say?

A number of local access roads to service the Project will require upgrades as described in EES chapter 3, table 3-6, including:

- Bennett Road (the intended principal vehicular and haulage access)
- Mystic Park- Meatian Road
- Bish Road
- Jobling Road
- Shepherd Road.

Technical report A did not assess the potential native vegetation removal for road upgrades except for eight discrete intersections. In relation to roadside vegetation, the technical report noted:

> As native vegetation in the study area has been historically cleared from cropping, most remnant vegetation persists in roadside reserves, many of which are relatively high quality.[8]

Technical report A noted the retention of several patches of roadside vegetation adjoining the MLA.

Technical report B only assessed fauna habitat in the MLA and along the pipeline options. It did not include surveys or assessments of the potential impact of habitat removal within road reserves other than those associated with the water supply pipeline options.

The EES Scoping Requirements noted the "*disruption to the movement of fauna between areas of habitat across the broader landscape*" was a key fauna assessment issue. The assessment of likely effects was to include those impacts on fauna movement corridors.

In response to this, technical report B noted fauna corridors are confined to roadside reserves and concluded:

> Except for the FFG listed eastern bearded dragon, the threatened species considered likely to occur or observed within the 'Project area' are highly mobile, e.g., birds. Habitat corridors along the road network are expected to continue to facilitate movement of avian fauna across the wider landscape.[9]

In acknowledging residual impacts to fauna habitat, technical report B stated:

> …habitat enhancement of native vegetation retained in-situ on roadsides and within the mining tenement forms a key component of reducing residual impacts.[10]

(iii) Evidence and submissions

Submitters raised concerns about native vegetation loss within road reserves. Submitter 28 emphasised the importance of roadside vegetation for habitat and wildlife movement, in the context of a farming landscape. The Cunnings (S40) submitted potential widening of Bish Road would require the removal of a large number of mature mallee trees that had not been included in the EES assessment. They submitted losing such roadside corridors would impede birdlife and their breeding habitat.

The Proponent initially advised (D93) no native vegetation removal was proposed for the widening of local roads. It relied on Dr Callister's evidence that native vegetation impacts for roads would be limited to the eight intersections identified in her witness statement (D28). Dr Callister emphasised roadside native vegetation was a critical element in a cropped landscape and had

8 EES technical report A, section 9.2.1, page 74
9 EES technical report B, section 14.2, page 123
10 EES technical report B, section 9.3.1, page 96

been considered through the assessment of three different water pipeline route options. This was echoed by GSC which advised it had encouraged the Proponent to use the cleared sections of roads for the pipeline to avoid important remnant vegetation along the sides of the roads.

Dr Callister gave evidence the seven FFG Act listed flora species identified in the Project area were *"primarily situated in road reserves"* where impacts would be limited (from the pipeline) and therefore habitat fragmentation was not expected.

The IAC asked Dr Callister about the potential for additional native vegetation impacts from road upgrades that had not yet been assessed. Specifically, if there were any opportunities to achieve the avoid, minimise, offset policy that might be lost if the assessment of these works is delayed to a later time. Dr Callister's evidence was that moving the possible impacts of road upgrades from valuable roadside native vegetation to adjacent cleared farmland within the MLA would be ideal from a native vegetation perspective. She added it would be unfortunate if opportunities to do so were lost because such works (if necessary) were not able to be assessed due to timing issues.

The Proponent agreed there was further work to be done, in consultation with road authorities, in finalising site access and associated road upgrades that might be required. It submitted the Incorporated Document, through the traffic management plan (TMP) requirements, provided a process for this to be finalised and approved by relevant road authorities. In closing, the Proponent submitted that any additional native vegetation impacts arising from such works[11] would need to be avoided, minimised and offset consistent with applicable State and Commonwealth requirements (D264).

TN06 (D268) included advice from the Proponent's traffic expert, Mr Warfe, which updated his EES conclusions in light of the Proponent nominating Bennett Road as its preferred Project access route. Mr Warfe's assessment indicated vegetation removal would be required for upgrades to all five roads identified in the EES plus Thompson Road.

The Proponent noted Mr Warfe's advice and agreed upgrades were likely to be required for Bennett Road, Shepherd Road and Jobling Road (west of Shepherd Road)[12] but did not expect upgrades would be required for Bish, Jobling or Thompson Roads.[13]

The Proponent noted[14] the only EPBC listed community identified along the roads was the Plains Malle Box Woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions (plains mallee box woodlands) which had been listed after the controlled action decision and so was not relevant for the approval process. There was an area of Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions north of Jobling Road, but it was located outside the Jobling Road and Donald-Swan Hill Road reserves.[15]

(iv) Discussion

The IAC accepts the Proponent's submission that the EPBC listed plains mallee box woodlands community is not relevant for the Commonwealth approval process due to the time of listing. At the State level, this vegetation is likely to correlate with Woorinen Mallee or Ridged Plains Mallee Ecological Vegetation Classes (EVCs) and impacts still need to be assessed at State level.

[11] That is, impacts beyond the eight intersections already assessed.
[12] D268, paragraphs 5 to 7
[13] D264 at paragraphs 145 and 143, respectively
[14] D264 at footnote 75
[15] EES technical report A, addendum, PDF page 27

The IAC agrees road reserves are very important for native vegetation, fauna habitat and movement corridors. The evidence of the flora and fauna experts demonstrated how the avoidance of roadside vegetation had influenced the pipeline route and retention of native vegetation on roadsides within and adjacent to the MLA perimeter. Both experts also relied on the continued function of intact roadside corridors for their assessments of likely residual impacts on habitat fragmentation.

The IAC understands the potential requirements for road upgrades are yet to be determined and need to be resolved with the approval of road authorities. Important policy objectives to avoid and minimise native vegetation loss need to be considered and should be a factor in determining which roads are to be used and what upgrades might be required. To the extent that upgrades will require vegetation removal, any impacts on native vegetation and fauna habitat should be assessed and factored into Project design and decision making.

The IAC is concerned road upgrades may encroach on native vegetation previously identified in no-go zones within and adjacent to the MLA - namely Bennett, Jobling, Shepherd and Bish Roads. This has implications for the avoid and minimise statement for the MLA. The IAC has considered whether sections of these roads or their function might be relocated or undertaken on cleared land within the MLA. It has also considered if Project traffic might be accommodated within the MLA if doing so would avoid the need for road upgrades and associated vegetation loss. The feasibility of these options was not able to be explored during the Hearing due to the timing of information from the Proponent and Mr Warfe about the need to clear further vegetation associated with the local access roads. Further investigation and integrated assessment are warranted prior to the final mine plan design and in consultation with the relevant road authorities.

For this reason, the IAC recommends that prior to detailed Project design (including the mine plan), the Proponent should investigate (in consultation with relevant road authorities) any feasible road haulage route upgrade options or alternative road alignments (such as the potential use of adjacent cleared land within the MLA) that will avoid and minimise impacts to remnant roadside vegetation and associated fauna habitat (including fauna corridors). This is included in new mitigation measure MM-BD07 recommended by the IAC.

Consistent with the *Guidelines for the removal, destruction or lopping of native vegetation* (Native Vegetation Guidelines), efforts should be focused on areas of native vegetation that have the most value. This assessment should be undertaken to the satisfaction of the Secretary of DEECA and will inform the avoid and minimise statement required by the application requirements. The IAC notes the Native Vegetation Guidelines are to be considered by the Incorporated Document and as part of the work plan process.[16]

(v) Findings

The IAC finds:

- The extent to which possible road upgrades will require removal of native vegetation, trees and fauna habitat (especially fauna corridors) is uncertain.
- Further assessment of potential impacts of local and haulage road upgrade options and alternatives on native vegetation, trees and fauna habitat is required.

[16] Exemptions from requiring a planning permit to remove, destroy or lop native vegetation – Guidance (DELWP, 2017)

- This assessment should investigate any feasible options that will avoid and minimise impacts to remnant roadside vegetation and associated fauna habitat.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) new MM-BD07 to require an assessment of road upgrade options and their impacts on native vegetation and habitat.

This is included at appendix E.

3.4 Pipeline route

(i) The issue

The issue is which pipeline route from Kangaroo Lake should be used.

(ii) What did the EES say?

Three pipeline routes (options A1, A2 and A3) were referred to in the EES as shown in figure 10. Following ecological assessment of the initial pipeline route (A1) two alternative routes (A2 and A3) were assessed to reduce impacts on native vegetation (including trees). Options A2 and A3 were each found to impact 61 trees. Technical report A only assessed options A1 and A3. Option A3 was preferred in the EES based on natural constraints along the route. This preference was reflected in the draft PSA that applied the SCO4 mapping to option A3 and referenced this option in the Incorporated Document.

(iii) Evidence and submissions

The Proponent's opening submission advised that following recent native vegetation surveys by Dr Callister, option A2 was now preferred from a native vegetation perspective. The Proponent considered it appropriate for route options to be explored through evidence at the Hearing prior to determining its preferred option.

Dr Callister explained further field surveys had been undertaken after the EES to assess a small number of habitat zones which had previously been assessed based on modelled condition scores from DEECA. In the two years since the EES survey, above average rainfall in the area resulted in improved growth and condition of native vegetation. As a result, additional vegetation was identified, including four patches of EPBC listed critically endangered Natural Grasslands of the Murray Valley Plains community (natural grasslands community) on Lookout Road which would likely result in a significant impact for this community.[17] For this reason, Dr Callister now preferred option A2 because of its lower native vegetation impact. Option A2 would result in predicted loss of 0.315 hectares of native vegetation compared with the updated predicted loss of 2.004 hectares for option A3. Additional updates to data resulting from this further survey work was described in Dr Callister's evidence.

[17] DoE 2013. Matters of National Environmental Significance Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1990, Department of the Environment Canberra.

The Proponent's fauna expert, Mr Gration, also supported option A2 due to lower vegetation impacts, with both options containing very consistent fauna habitat.

The Proponent explained Dr Callister's assessment of impacts from the pipeline was based on its preferred open trench pipeline construction.

The Proponent submitted the impacts of options A2 and A3 were generally similar (D267) with only minor differences for noise (nine receptors during construction for option A3 versus ten for A2) and surface water (option A2 being less susceptible to flooding). For noise, the short duration of works and community consultation program would appropriately reduce residual impacts.

The Proponent concluded it continued to prefer option A3 contingent on it being able to avoid any impact on the natural grasslands community by adopting construction methods outlined in TN06. Consistent with this, the Proponent sought flexibility in the Incorporated Document to permit either pipeline route option. To achieve this, it proposed minor changes to clauses 4.12 and 4.2.3, inclusion of a map at clause 4.1.2 and amendment to the map in Appendix A to illustrate the two options. These are included in the day 3 version of the Incorporated Document and are supported by the IAC.

(iv) Discussion

The IAC notes the Proponent's submission that other than native vegetation impacts, there was no other evidence to clearly prefer one option over the other. As discussed in chapter 8 of this report, option A2 would result in one additional Receptor being impacted by construction noise but this would be limited to daytime only and be of short duration.

The IAC accepts option A3 is the Proponent's preferred route provided impacts to natural grasslands community can be avoided. In the event these impacts cannot be entirely avoided by alternative construction methods, such as horizontal direct drilling, option A2 would be preferred.

Dr Callister's evidence was if the natural grasslands community could not be avoided it would likely result in a significant impact in accordance with the *Commonwealth guidelines Matters of national environmental significance – Significant impact guidelines 1.1; Environment Protection and Biodiversity Conservation Act* 1999 (significant impact guidelines). The IAC notes the natural grasslands community was listed prior to the controlled action decision[18] and therefore assessment of any potential impact is required.

Option A3 only presents an acceptable outcome if impacts to the natural grasslands community can be avoided entirely.

It is appropriate the Incorporated Document include route options, provided the contingent requirement for option A3 is included. To accommodate this, the Incorporated Document should require the development plan show how impacts to the EPBC listed natural grasslands community have been entirely avoided by the chosen pipeline route or construction methods.

Subject to this, the IAC accepts the changes proposed by the Proponent in its day 3 version of the Incorporated Document, although it notes that the SCO4 mapping will need to be extended to cover the A2 route. This is discussed further and recommended in section 17.2 of this report.

[18] Listed as critically endangered on 8 September 2012. DoE (2024) Natural Grasslands of the Murray Valley Plains in Community and Species Profile and Threats Database. Department of the Environment, Canberra. Available at: http://www.environment.gov.au/sprat.

(v) Findings

The IAC finds:

- Provided impacts to the EPBC listed natural grassland community are avoided entirely, either pipeline options A2 or A3 are acceptable.
- It is appropriate that the PSA provide flexibility for either pipeline option, subject to avoiding the EPBC listed natural grasslands community.

(vi) Recommendation

The IAC recommends:

Incorporated Document

Include the following change:

a) new requirement in clause 4.2.3 that the development plan demonstrate how areas of the EPBC listed Natural Grasslands of the Murray Valley Plains community are avoided entirely by the chosen pipeline route or construction methods.

This change is included at appendix F.

3.5 Potentially significant effects to flora

(i) The issues

The issues are whether the Project is likely to result in significant effects to flora and whether such impacts are acceptable.

(ii) What does the EES say?

The EES presented likely worst-case impacts to flora based on the Project including pipeline option A3. As discussed above, further surveys were undertaken of the pipeline routes after exhibition and Dr Callister provided a revised summary of impacts for both options.

Subsequently, and in response to questions, Dr Callister detected an error in previous GIS calculations (D223) and provided revised impacts for the Project. Predicted impacts and offset requirements as they have evolved through the process are summarised in table 3.

The EES noted the EPBC listed plains mallee box woodlands was found extensively throughout the study area and corresponded with most recorded patches of Woorinen Mallee (EVC 824) and Ridged Plains Mallee (EVC 96). While the Project impacted on this community it also retained it in patches in Areas 1 and 3. The EES concluded predicted impacts to the plains mallee box woodlands were likely to be significant based on the relevant significant impact criteria.[19] However, as the threatened community had been listed after the controlled action decision, significant impacts to this community could not be assessed.[20]

[19] DoE 2013. Matters of National Environmental Significance Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1990, Department of the Environment Canberra.

[20] As per section 158A of the EPBC Act.

Table 3 Summary of Project impacts on native vegetation and flora

	EES	Callister evidence D28	Final assessment D223
Impacts			
Large trees (total)	568	671 A3 or A2	684
Native vegetation (ha)	14.36	16.409 A3 14.720 A2	16.296 A3
Offset requirements			
Habitat (GHU)	4.819	7.229 A3 6.197 A2	7.532
Trees	568	671 A3 or A2	
Minimum strategic biodiversity value	0.179	0.180 A3 0.173 A2	0.181
Threatened species and communities			
EPBC listed plains mallee box woodlands (ha)	11.37	6.993 A3	9.566 A3
EPBC listed natural grasslands community (ha)		1.689 A3	
FFG listed flora species (number of individuals)	Bush minuria (18) Dwarf myall (1) Fragrant saltbush (11) Frosted goosefoot (54) Umbrella wattle (353) Yarran (17)	As per EES, plus Small burr-grass (55)	Unchanged

Notes: Abbreviations: GHU = General Habitat Units, Ha = hectares, A2 = for project with pipeline option A2; A3 = Project as exhibited with pipeline option A3 – where no option is specified impacts are for A3

The EPBC listed Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions, which is associated with the FFG listed Semi-arid Shrubby Pine-Buloke Woodland Community, was also identified in the Project area but will be entirely avoided.

In relation to the natural grasslands community, the EES did not consider it likely to occur within 10 kilometres of the Project area. The reason for this was described as follows:

> While some small treeless areas of native vegetation were recorded in roadsides within 10 kilometres of the Project area, these areas were considered to have been derived from the treed EVCs recorded broadly throughout the study area, namely the mallee EVCs and Black Box Woodland.[21]

[21] EES technical report A, table 8, page 62

It was further explained that, compared to treed patches, such treeless patches lacked any noticeable change in understory and did not meet the native flora species diversity requirements of the listing advice for this community.

The EES and Dr Callister's evidence also summarised threatened and protected flora species potentially present in the Project area but unlikely to be impacted. Some of these were identified in road reserves. No impacts are anticipated to EPBC listed flora species. Impacts to FFG listed flora species were summarised in the EES which concluded:

> Impacts are not anticipated to adversely affect habitat critical to the survival of these species, or lead to a long-term decrease in the size of the population.[22]

(iii) Evidence and submissions

Submissions raised general concerns about the potential removal of native vegetation and flora being inconsistent with relevant legislation and policy. Dr Callister gave evidence the Project had appropriately avoided and minimised impacts. In relation to FFG listed species, Dr Callister stated each of these were widely distributed across semi-arid eastern Australia, and *"…their overall populations are unlikely to be significantly impacted"*.

Her evidence was that impacts to the EPBC listed natural grasslands community from the pipeline, were they to occur, would likely be significant based on the relevant guidelines.[23]

SHRCC queried if it were possible the natural grasslands community was present at intersections requiring upgrades and whether further surveys at these locations prior to design should be undertaken. Dr Callister agreed this would be appropriate for intersections where natural grasslands community was probable, but unnecessary for intersections dominated by mallee vegetation.

SHRCC queried whether any revegetation or offset plans had been based on the conservation advice for the plains mallee box woodland. Dr Callister explained there was no requirement for EPBC offsets for this community as the listing had occurred after the controlled action decision. Nevertheless, inquiries had been made about offset availability and none were available at this time, likely due to the recent timing of the listing. Dr Callister agreed with SHRCC that it would be good practice to seek those offsets even though they were not required by the EPBC Act.

Bendigo and District Environment Council (BDEC) submitted plains mallee box woodland was difficult to impossible to revegetate and that if offsets were not to be obtained, the Project should not proceed.

(iv) Discussion

The Project is likely to result in significant impacts to the EPBC listed plains mallee box woodland community. The usual response for such an impact is to offset the loss. Due to this community being listed, after the controlled action decision, offsets cannot be required. The IAC agrees it would be good practice for the Proponent to mitigate this impact and supports further inquiries in this regard.

[22] EES technical report A, section 9.2.1, page 75

[23] DoE 2013. Matters of National Environmental Significance Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1990, Department of the Environment Canberra.

Despite this, the IAC notes that at a State level this vegetation will be offset in accordance with the Native Vegetation Guidelines.

The IAC notes evidence there may potentially be some intersections where the EPBC listed natural grasslands community may be present (where mallee woodland is absent) and that further survey should inform the design of those intersections. This is included in recommended changes to MM-BD02.

As previously described, the assessment of flora impacts for potential road upgrades was limited. Mapping indicates some of the FFG listed flora species are present in roadside vegetation along the roads potentially subject to upgrades. There is uncertainty as to the extent of potential impacts, but the evidence was these species were widely distributed across the area. As Dr Callister's evidence was limited to the intersections, the IAC was unable to explore whether there are any locations along the haulage route which might require further survey for natural grasslands community to inform possible haulage route options and upgrades. In light of the recent discovery of natural grasslands community along the pipeline route, the IAC considers it prudent for any previously identified 'treeless patches' likely to have natural grasslands community, to be re-surveyed to determine whether natural grasslands community exists. The IAC considers any such locations would likely be limited but believes this should be considered as part of the assessment of the potential impacts of the haulage route upgrade options and alternatives as recommended in section 3.2 of this report.

Subject to its recommendations the IAC is satisfied the Project is unlikely to have significant effects on any other Commonwealth or State listed flora species or communities.

(v) Findings

The IAC finds:

- It is possible natural grasslands community exists along the haulage route including relevant intersections and this needs to be considered as part of the recommended assessment of haulage route upgrade options and alternatives.
- The Project is likely to have significant effects on the EPBC listed plains mallee box woodlands but does not require offsets under the EPBC Act.
- The Proponent should make further inquiries about how impacts on the EPBC listed plains mallee box woodlands can be mitigated.
- The Project is unlikely to have significant effects on other flora, subject to applying the IAC's recommendations.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-BD02 to include requirement for pre-design survey for the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) listed Natural Grasslands of the Murray Valley Plains community at any intersections where it is considered it may exist.

This change is included at appendix E.

3.6 Revegetation and offsets

(i) The issues

The key issues are whether Project controls include appropriate revegetation[24] provisions and suitable offsets can be provided.

(ii) What did the EES say?

Technical report A included one specific mitigation measure (MGM06) to prepare land for rehabilitation during pre-construction. It required seed collection and log retention for on-site habitat and revegetation purposes.

The EMF included a requirement for impacted FFG listed species to be included in revegetation in relevant EVCs in the mine site rehabilitation phase (MM-BD02).

The offsets required for the proposed removal of native vegetation exhibited in the EES are outlined in table 3. Three available offsets sites were identified on the Native Vegetation Credit Register.

Offsets were not required for the EPBC listed plains mallee box woodlands because it was listed after the controlled action decision.

Once offsets are secured, impacts would be in line with the overarching State policy objective for 'no net loss' of biodiversity.

(iii) Evidence and submissions

Dr Callister's evidence was specific measures should be included in a revegetation plan for impacted areas of native vegetation along the pipeline route and within the MLA. She agreed these measures should be included in the Project's controls.

The day 3 EMF included amendments to MM-BD02 to account for seed and/or cuttings to be taken from impacted FFG listed plants for use in revegetation and for the rehabilitation plan (required under the work plan) to include requirements to revegetate closed portions of Bennett Road and Thompson Road in consultation with relevant road authorities.

Several submitters were concerned the provision of offsets elsewhere in the catchment management area would not achieve direct replacement of habitat. SHRCC submitted offsets should be in either council area, not just the relevant catchment management area. If such offsets could not be obtained, revegetation works including enhancements on public land would be the preferred offset method to ensure benefits remained local.

Dr Callister responded the proposed approach in the EES was consistent with the Native Vegetation Guidelines. It was her opinion revegetation works as proposed by SHRCC would not meet the offset requirements under these guidelines.

The Proponent proposed changes to the Incorporated Document to address some of SHRCC concerns by requiring an offset management plan be developed in consultation with both Councils and to the satisfaction of DEECA. In addition, it proposed to notify both Councils as soon as any

[24] The EES and Dr Callister's evidence refers to a rehabilitation plan. The EMF uses rehabilitation plan to specifically describe that required under the MRSD Act which covers matters beyond revegetation. To avoid confusion, the IAC has used the term "revegetation plan" in this section.

approval from the Secretary of DEECA was obtained to vary the timing of the offset requirement. SHRCC was supportive of these changes.

(iv) Discussion

Dr Callister's evidence gave detailed guidance with respect to revegetation requirements for the MLA and impacted roadsides adjacent to the pipeline route. These requirements should be included in the Project's controls. The IAC proposes a new mitigation measure MM-BD06 to implement these recommendations through the work plan and Incorporated Document. The IAC considers these measures should also apply to any roadside vegetation affected by road upgrades (if any). This will ensure suitable revegetation outcomes can be achieved and are included in the recommended EMF at appendix E. The Proponent's day 3 changes are supported.

The IAC accepts evidence the proposed offset approach is appropriate and consistent with the Native Vegetation Guidelines. The Incorporated Document requires that, excluding preparatory works, offsets and an offset management plan need to be approved to the satisfaction of the Secretary of DEECA. While the Project's offset requirements have changed since the EES exhibition (see table 3) and may continue to change as road upgrade requirements are finalised, the IAC is satisfied this condition ensures offsets will be provided prior to native vegetation removal occurring. The IAC accepts submissions and evidence that local revegetation/enhancement works would be desirable and provide ecological benefits, but they are not a requirement of, nor an acceptable substitute for offsets under the Native Vegetation Guidelines.

(v) Findings

The IAC finds:

- Revegetation measures should be included in the EMF.
- The proposed offset approach is appropriate and consistent with relevant policy.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) new MM-BD06 that includes all of Dr Callister's recommended measures relating to native vegetation revegetation.

This change is included at appendix E.

3.7 Indirect impacts on flora

(i) The issues

The issues are whether potential indirect effects on flora are likely to be significant and whether the proposed controls are appropriate.

(ii) What did the EES say?

Potential indirect effects to flora identified in the EES included:

- introduction of weeds and pathogens

- potential for chemical spills
- dust deposition
- erosion
- potential temporary decrease in surface water runoff to two patches of native vegetation to the west of Area 1.

Vegetation to the west of Area 1 was identified as Ridged Plains Mallee, Woorinen Mallee and Plains Savannah EVCs based on modelled data from NatureKit. These EVCs were not considered sensitive to such a minor reduction in surface water. Changes to the water levels on this vegetation is shown in figure 11 of technical report A.

Following the application of mitigation measures, the EES considered the residual risk to flora from these indirect impacts was 'medium' with a 'possible' likelihood.

(iii) Evidence and submissions

Many local landholders were concerned about the potential increase in and spread of weeds throughout the Project area.

The Polas submitted reduced surface water run-off would impact on native vegetation, including black box trees. In response to a query from the IAC, Dr Callister advised if this vegetation was actually Riverine Chenopod Woodland EVC this would change the sensitivity of the vegetation to changes in inundation as inundation is required to maintain the health of this EVC.

Dr Callister considered, subject to requirements of the relevant authorities for the roadsides, weed control measures proposed by the EMF should apply equally to the PIL.

SLIM was concerned with potential indirect effects from surface and groundwater to habitat at nearby Ramsar sites and other significant areas.

(iv) Discussion

The IAC generally accepts the assessment of indirect effects as described in the EES.

In relation to vegetation to the west of Area 1, the IAC does not consider the change in water levels is likely to result in a significant impact on this vegetation given the very small change in water level.

The currently drafted MM-BD05 to control the spread of weeds and pathogens is to be implemented through the work plan and would only apply to the MLA. Due to the potentially significant implications of weed spread for native vegetation, but also surrounding agricultural land uses, the IAC believes elements of these weed controls might also be relevant to construction works within the PIL, particularly along roadsides. To facilitate this, MM-BD05 should be modified to require this be considered within the environmental management plan under the Incorporated Document, as well as the work plan, in consultation with the relevant responsible authority.

The other potential indirect impacts rely upon credible risk pathways from surface and groundwater that are discussed in chapters 10 and 11 of this report. The IAC is satisfied any associated impacts would not be significant and can be managed through the recommended mitigation measures.

(v) Findings

The IAC finds:

- Potential indirect effects on native vegetation are not expected to be significant.
- The proposed controls to manage potential indirect effects on native vegetation are appropriate, subject to applying the IAC's recommendations.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-BD05 to provide for weed management in the project infrastructure land.

This change is included at appendix E.

3.8 Overall conclusions on flora effects

Subject to the IAC's recommendations, there are no flora impacts that preclude the Project being approved or the draft evaluation objective being achieved.

4 Fauna

4.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and commonwealth policies.

Fauna is discussed in EES chapter 7 and technical report B. Technical report B includes a number of stand-alone reports in its appendices, including:

- Appendix D – Plains wanderer survey report by EcoAerial
- Appendix E – Preliminary arboriculture impact assessment by Treetec
- Appendix F – Phase 1 Desktop aquatic ecology assessment of Kangaroo Lake by Aquatica Environmental.

The exhibited EMF includes the following mitigation measures:

- MM-FE01 Minimise impact to native fauna – fauna salvage
- MM-FE03 Minimise impact to native fauna
- MM-FE04 Minimise impact to native flora – Pipeline
- MM-FE05 Minimise impact to native flora – Kangaroo Lake
- MM-SW04 Spill control.

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248)
- the targeted survey for the SPSG (D197).

Table 4 lists the fauna evidence.

Table 4 Fauna evidence

Party	Expert	Firm	Area of expertise
Proponent	Rob Gration	EcoAerial	Fauna

4.2 Terrestrial fauna

(i) The issues

The issues are whether the Project is likely to result in significant effects to fauna and whether such effects are acceptable.

(ii) What did the EES say?

The Project would result in some loss of fauna habitat in the MLA and adjacent to the proposed pipeline route. This habitat loss would impact the availability of nesting, hollows and foraging resources for a range of fauna groups. Although 61 canopy trees would have their tree protection zone impacted by the pipeline route, these trees would remain in-situ and could continue to provide habitat in the future.

Changes to baseline conditions of the ecological character of Kangaroo Lake were not expected from water extraction.

The Project would not impact on habitat critical to the survival of any EPBC or FFG listed fauna species or communities.

There is a potential for fauna (especially birds and microbats that will not be restricted by perimeter fencing) to be attracted to the process water pond. The process water pond is unlikely to be suitable for migratory waders as it will have a steep gradient and will be lined with plastic minimising the potential for foraging resources such as sedges, reeds and aquatic insects. However, waterfowl, waterbirds and microbats are likely to try to access the process water pond if deterrents are not put in place. Ingestion of water from the process water pond has the potential to cause health issues if it contains contaminants of concern.

For these reasons, a range of options were investigated for restricting fauna from the process water pond. The recommended option was for bird deterrent disks to be used. Wires would be strung across at 10 metre intervals with bird deterrent disks hung below the wire at 5 metre spacings, approximately 50 centimetres above the water. Such discs would also act as an acoustic deterrent to microbats. These measures have been successfully deployed on powerlines at the Cheetham Wetlands.

(iii) Evidence and submissions

Submitters raised general concerns about the destruction of fauna habitat. Several submitters had concerns for specific species observed in the area that in their submissions had not been appropriately considered in the impact assessment.

Mr Gration gave evidence the Project had appropriately avoided and minimised impacts to native fauna as much as practicable and that no significant impacts to any EPBC Act or FFG Act listed fauna species or communities were expected. He gave evidence that technical report B acknowledged the presence of many of the species raised in submissions and clarified residual impacts to fauna habitat had considered all faunal groups including threatened and non-threatened species.

In addition, habitat enhancement activities would be undertaken in areas with vegetation to be retained, using salvaged materials (e.g., hollows and logs) from areas of impacted vegetation. This was included in the EMF (MM-FE01).

Submitters raised general concerns about impacts on native fauna including the potential for fauna, especially birds, to drink contaminated water from the processing plant and tailings cells, resulting in the consumption of flocculants and other chemicals.

Mr Gration explained the idea of using bird deterrent disks at the process water pond arose from experience at the Cheetham wetlands and a lack of other feasible options. A high instance of birds hitting powerlines coming into a particular pond at the Cheetham wetlands was reduced with the implementation of the deterrent. To adapt this to the Project, Mr Gration recommended having the disks at lower levels and closer intervals to reduce potential landing sites on the pond. Mr Gration emphasised, as with all measures in the EMF, monitoring and adaptive management of the bird disks would be critical to success.

In response to SLIM, Mr Gration stated in the event of any fauna deaths from the Project activities, including process water pond – carcasses would be kept and identified with an autopsy if needed.

Ms Eastman (D276) recommended changes to MM-FE01 to include a requirement for examination or autopsy of any fauna deaths and reporting to relevant agencies.

Mr Gration explained deterrent disks are not feasible for the tailings cells. Instead, impacts could be minimised by maximising dewatering efforts, monitoring the water quality, recording any deceased fauna and investigating the reasons for death. The installation of perimeter fencing around the mine site area would further reduce impacts to fauna. Mr Gration recommended chain mesh fencing installed around the mining areas be at least 2 metres in height.

In response to matters arising during the Hearing, the Proponent proposed changes to MM-FE01 to MM-FE04 including:

- providing more detail for habitat enhancement strategies including the provision for hollow translocation, where suitable (MM-FE01)
- minimising vehicle movement around Kangaroo Lake (MM-FE02)
- providing training to employees on how to deal with vehicle/native fauna interactions (MM-FE03)
- covering pipeline trenches if left open and installing a no-go zone around retained Samphire skink habitat (MM-FE04).

(iv) Discussion

Potential impacts on fauna habitat of potential road upgrades are discussed in section 3.2 of this report.

The IAC accepts the Project is unlikely to have significant effects on threatened fauna or fauna habitat and supports the Proponent's updates to the EMF discussed above.

The proposed use of bird deterrent disks over the process water pond is quite different to the example described in relation to the Cheetham wetlands where birds simply needed to avoid a powerline to land on a pond. This emphasises the need for adaptive management and contingency measures to be considered. The EMF (Table 21-7) already includes reporting of any fauna fatalities at the process water pond and pit tailings sites. A minor addition is recommended to explicitly include the requirement to investigate fauna deaths consistent with Mr Gration's evidence and for adaptive management and contingency measures to be implemented where necessary.

The EMF should specify for the perimeter fence to be at least 2 metres high consistent with Mr Gration's evidence.

(v) Findings

The IAC finds:

- The Project is not expected to have significant effects on terrestrial fauna.
- Any effects on terrestrial fauna can be suitably managed through the recommended EMF.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) **revised Table 21-7 to require investigation of any multiple fauna fatalities and implementation of adaptive management and contingency measures**
b) **revised MM-FE03 to include a minimum height of 2 metres for the perimeter fencing of Areas 1 and 3.**

These changes are included at appendix E.

4.3 Aquatic fauna

(i) The issue

The issue is whether the Project will have potentially significant impacts on aquatic fauna in Kangaroo Lake.

(ii) What did the EES say?

During the EES process, the former Department of Environment, Land, Water and Planning (DELWP) requested an assessment of potential impacts to the FFG listed SPSG. The Phase 1 assessment involved a desktop review, consultation with relevant agencies and a one-day site inspection to assess aquatic habitat and inform targeted surveys. Results of a high-level occurrence assessment for significant species is provided in table 5.

Table 5 Species likely to occur in Kangaroo Lake

Species	Significance	Likelihood of occurrence
Southern purple spotted gudgeon	FFG Act – Critically endangered	Known to occur
Murray cod	EPBC Act – Vulnerable FFG Act - Endangered	Known to occur – Victorian Fisheries Authority stocking 50,000 in 2020/1
Silver perch	EPBC Act – Critically endangered FFG Act – Endangered	Likely present
Murray River turtle	FFG Act – Critically endangered	Likely present
Murray hardyhead	EPBC Act – Endangered FFG Act – Critically endangered	Possibly present
Growling grass frog	EPBC Act – Vulnerable FFG Act - Vulnerable	Possibly present

Source: Section 1 of appendix F to technical appendix B

Despite being known to occur in Kangaroo Lake, it was identified that SPSG preferentially occur in areas with a denser and more complex aquatic flora community compared to that of the pump site.

Agencies were consulted regarding the status of aquatic values in the Lake and the potential for impacts. Overall, agencies identified no major concerns, provided suitable fish screens were installed for the pump station inlet.

The assessment supported this, concluding the primary potential impact from the Project was possible entrainment and impingement of fish, fish larvae (such as the approximately 4-millimetre long SPSG larvae) and other fauna in the inlet pump. Water drawdown from the Lake was

proportionately negligible and a low risk. The small and low-quality aquatic habitat loss was considered negligible compared with the total habitat available in the Lake.

An initial assessment of the potential significance of impacts to the EPBC Act protected species potentially present and the Kerang Lakes Ramsar site found the works were unlikely to result in a significant impact.

Detailed mitigation measures to avoid and reduce impacts were provided in section 7.2 of appendix F to technical report B.

(iii) Submissions

SLIM was concerned about impacts to Ramsar sites arising from anticipated Project impacts to surface and groundwater.

MFMF submitted there were only 50 individuals of the SPSG species in the world and queried whether potential impacts from changing the salinity of the Lake's water had been considered.

Mr Gration was unable to respond to questions related to the aquatic fauna assessment, except to provide support for the report's author and to support its recommendations. MM-FE04 included a requirement for inspection of the fish screen within 2 years of operation and Mr Gratian was unable to advise the basis for the 2-year frequency.

The Proponent provided a new targeted survey for the SPSG dated April 2024 (D197) which had been undertaken in accordance with the recommendations of appendix F to technical report B. The Proponent submitted based on this new report and existing records:

> …it is plain that the SPSG does not use habitat in or near the location of the proposed pump station, even as part of seasonal dispersal and movement. However, and in any case, the mitigation measures include requirements to avoid intake of the fish when water is pumped.[25]

The Proponent noted MFMF's submission about the abundance and distribution of the fish was *"entirely incorrect"* and that although very rare in the Kerang region, the species remains *"abundant elsewhere"*.

The targeted survey concluded it was *"highly unlikely"* there is a resident population of SPSG in or immediately near the proposed pump site. Further it was considered unlikely the SPSG used habitat near the proposed pump site *"even as part of seasonal dispersal or movement"*. Therefore, policy or legislation implications for the Project relating specifically to the SPSG were unlikely. Despite this, there remained potential for impacts to aquatic ecology and the mitigation measures identified in the Phase 1 assessment remained relevant.

Although the FFG and EPBC listed Murray cod was recorded during the survey, all individuals were juvenile and were likely to be fish stocked by the Victorian Fisheries Authority for recreational fishing purposes. Consequently, there are unlikely to be any policy implications.

The Proponent updated the EMF so that if a pump inlet fish screen could not adequately exclude fish larvae, water offtake during periods when larvae were likely to be present would be avoided (Table 21-7).

[25] D264, paragraph 135, page34

(iv) Discussion

The IAC agrees with the Proponent regarding the abundance and distribution of the SPSG.

The IAC accepts the conclusions of the EES and subsequent targeted survey that the Project is unlikely to have significant impact on aquatic fauna. While there is some overlap, the IAC considers there are some mitigation measures recommended in appendix F to technical report B that were not included in the EMF. Some of these measures are included in the Proponent's day 3 changes to MM-BD04 (with respect to control of weed spread from vehicles) and MM-SW01 (which calls up EPA Publication 1834 *Civil construction, building and demolition guide*). The IAC has recommended remaining mitigation measures recommended in appendix F to technical report B be added to the EMF.

The proposed 2-year time frame for inspection of the fish screen appears to be arbitrary and not based on any recommendations from the aquatic fauna studies. It would be more prudent for this inspection to occur within the first year as a minimum. An update to MM-FE04 to this effect has been recommended.

(v) Findings

The IAC finds:

- The Project is not expected to have significant effects on aquatic fauna.
- Any effects on aquatic fauna can be suitably managed through the recommended EMF.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-FE02, MM-FE04 and MM-FE05 that reflect the relevant recommendations in appendix F of EES technical report B

b) revised MM-FE04 to change the proposed inspection of the angled fish screen from two years to one year.

These changes are included at appendix E.

4.4 Overall conclusions on fauna effects

Subject to the IAC's recommendations, there are no fauna impacts that preclude the Project being approved or the draft evaluation objective being achieved.

5 Cultural heritage

5.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values.

Cultural heritage is discussed in EES chapter 8 and technical report C.

The exhibited EMF includes the following mitigation measures:

- MM-CH01 Protection of cultural heritage values
- MM-HH01 Protection of historic heritage values.

The IAC had regard to:

- relevant submissions
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248).

5.2 Aboriginal cultural heritage effects

(i) The issues

The issues are whether Aboriginal cultural heritage effects have been appropriately assessed and are acceptable.

(ii) What did the EES say?

The EES described the investigations undertaken in relation to Aboriginal cultural heritage effects, including consultation with First Peoples State Relations and the Wemba Wamba Aboriginal Corporation (WWAC). The investigations involved a desktop assessment followed by a standard assessment that included field surveys undertaken with WWAC representatives. These investigations did not identify any Aboriginal cultural heritage places and it was determined that a complex assessment was not required.

The EES concluded the study area has 'low' potential for the discovery of Aboriginal cultural heritage and noted that, if present, it is most likely to be "…*diffuse, low density stone artefact scatters in disturbed surface and shallow subsurface deposits*".[26] It noted most of the study area had been subject to disturbance associated with channelling, quarrying, agriculture and roads.

The EES outlined the process used to prepare a draft Cultural Heritage Management Plan (CHMP) required for the Project under section 49 of the *Aboriginal Heritage Act* 2006. The draft CHMP (17848) has been prepared in consultation with WWAC and informed the preparation of the exhibited EMP, including MM-CH01.

The Project cannot proceed without the CHMP being approved.

There is no approved Registered Aboriginal Party for the Project area, so the CHMP would be approved by the Secretary of the Department of Premier and Cabinet.

[26] EES technical report C, page 86

(iii) Submissions

The Proponent advised the draft CHMP was not included in the EES because it includes culturally sensitive material. It is waiting for the outcome of the EES process before submitting the CHMP for approval.

The Proponent noted the consultation undertaken with First Peoples State Relations and WWAC through the impact assessment and that MM-CH01 would require the Project be delivered in accordance with the CHMP.

The Proponent advised that it had engaged with the traditional custodians of the Project area, through the Wemba Wamba/Barapa Barapa Working Group. In addition to formal briefing meetings in 2018 and 2022, consultation has occurred on a regular and ongoing informal basis.

Some submitters raised general concerns about potential impacts on Aboriginal cultural heritage, as well as impacts on native title claims and indigenous land use agreements.

(iv) Discussion

The IAC is satisfied the investigations described in technical report C are appropriate for the purposes of the EES. The EMF and particularly the CHMP will provide the mechanisms to manage any impacts and assist in achieving the Scoping Requirements draft evaluation objective.

Submitter concerns about cultural heritage impacts and how the Project might affect native title processes were not substantiated.

The EES did not attract any submissions from Traditional Owner groups, however the IAC notes WWAC had the opportunity to participate in the impact assessment and the preparation of the draft CHMP.

The IAC is satisfied the potential effects from the Project will be avoided or minimised, consistent with the draft evaluation objective.

The exhibited MM-CH01 included a requirement the Project be delivered in accordance with an approved CHMP, including strategies in relation to the discovery of "*suspected human remains*". This was consistent with the recommendation in EES technical report C. This reference was subsequently changed to "*suspected cultural artefacts*" in D89, although the reason for the change was not documented. The IAC's recommended EMF has reverted to the version included in technical report C.

(v) Findings

The IAC finds:

- The EES appropriately assessed Aboriginal cultural heritage effects.
- Effects on Aboriginal cultural heritage can be suitably managed through the EMF and CHMP.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-CH01 that reflects the relevant recommendation in technical report C.

This change is included at appendix E.

5.3 Historic cultural heritage effects

(i) The issues

The issues are whether historical cultural heritage effects have been appropriately assessed and are acceptable.

(ii) What did the EES say?

The EES described the investigations that were undertaken to identify and assess historic cultural heritage effects, including a desktop assessment and subsequent field survey. These investigations did not identify any artefacts, sites or structures of historical significance within the study area, although it noted one site registered on the Victorian Heritage Inventory[27] that is located 150 metres north of the study area. This site would not be affected by the Project.

The EES noted that the study area has been extensively modified, including significant areas that have been regularly ploughed. It concluded there is a very low likelihood of historic cultural heritage values being impacted by the Project.

(iii) Submissions

The Proponent relied on the assessment in technical report C and submitted there is a very low likelihood of historical cultural heritage in the Project area and any heritage values are unlikely to be impacted by the Project.

The submissions from Leanne Pola and Peter Pola Senior noted the EES did not refer to the site of the former Gnarwee State School on the south side of Bennett Road, immediately west of the topsoil pit in Area 1. The Polas provided some background to the history of this site.

The Proponent acknowledged the local attachment to the school site, but noted it is not listed in the Victorian Heritage Register, is not subject to a Heritage Overlay and was not identified in technical report C as being of heritage significance.

(iv) Discussion

The IAC is satisfied the investigations described in technical report C are appropriate for the purposes of the EES. The MLA does not contain any documented or formally identified heritage values, and the EMF will provide a suitable mechanism to manage any unexpected heritage values through MM-HH01 and the Unexpected Finds Protocol.

In relation to the Gnarwee State School, the precise location of the site, whether any heritage values are present and to what extent it might be affected by the Project are not clear to the IAC. However, the IAC notes any associated artefacts or values that might be identified during the Project would be subject to MM-HH01 and its protection, management and recording requirements. This should address the concerns raised by the Polas.

The exhibited MM-HH01 provides for an Unexpected Finds Protocol to be implemented, consistent with the recommendations in technical report C. Technical report C also recommends a "*requirement for appropriate contractor induction to communicate the protections, requirements*

[27] H7626-0004 (Beauchamp State School No. 3560 and Memorial Hall)

and the Unexpected Finds Protocol".[28] There is a reference to maintaining records of relevant contractor induction in EMF table 21.7, but no corresponding requirement in MM-HH01. The IAC has included a suitable reference in the recommended EMF at appendix E.

(v) Findings

The IAC finds:

- The EES has appropriately assessed historic cultural heritage effects.
- Unexpected heritage finds can be suitably managed through the EMF and Unexpected Finds Protocol.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-HH01 that provides for contractor induction.

This change is included at appendix E.

5.4 Overall conclusions on cultural heritage effects

Subject to the IAC's recommendations, there are no cultural heritage impacts that preclude the Project being approved or the draft evaluation objective being achieved.

[28] EES technical report C, page 104

6 Landscape and visual

6.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To minimise adverse effects on landscape and visual amenity associated with the environs of the project site.

Landscape and visual effects are discussed in EES chapter 9 and technical report D.

The exhibited EMF includes the following mitigation measures:

- MM-LV01 Minimise adverse impacts on landscape and visual amenity
- MM-LV02 Minimise adverse impacts of visual amenity – lighting
- MM-LV03 Minimise adverse impacts on visual amenity.

In response to the IAC's RFI and other issues raised at the Hearing, the Proponent provided the following technical note:

- TN03 - Landscape and visual – Updated photomontages (D187).

Additionally, the IAC had regard to:

- relevant submissions
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248).

6.2 Methodology and effects

(i) The issues

The issues are the adequacy of the landscape and visual impact assessment (LVIA) methodology and whether the expected landscape and visual effects are acceptable.

(ii) What did the EES say?

EES technical report D described the LVIA methodology, including the description of the existing environment, the impact assessment and mitigation recommendations. The LVIA relied on an initial desktop assessment followed by ground truthing field assessments. The visual impact rating was based on the combined effect of visual sensitivity and visual magnitude.

The assessment relied on 18 viewpoints selected to represent views from areas likely to be impacted by the processing facility in Area 1. These viewpoints were taken from publicly accessible roads and were selected based on the degree of exposure or the number of people likely to be affected. The analysis was supported by photomontages for those viewpoints where further analysis was considered necessary, and impacts were expected to be greater.

The assessment concluded:

- 13 viewpoints would have 'low' potential visual impact
- two viewpoints would have 'low-moderate' potential impact
- three viewpoints would have 'moderate' potential visual impact.

The assessment did not factor in the extent to which mitigation measures would reduce the visual impact from these locations.

The LVIA also considered the impacts on 24 dwellings in the study area, and noted that factors such as distance, topography and vegetation would limit views of the processing facility from most of these dwellings. The assessment included a more detailed analysis of dwellings R0006, R0008 and R0012.

Night lighting was generally assessed as having low impact, subject to recommended mitigation measures.

The LVIA recommended various mitigation measures relating to design considerations, landscape screen planting and night lighting design. Elements of these mitigations were included in the exhibited EMF, but some were not.

In response to submissions and the IAC's RFI, the Proponent provided material from the author of technical report D (Moir Landscape Architecture) in relation to the visual impact of stockpiles (D187). The analysis in technical report D focussed on impacts associated with the processing facility and did not assess impacts of the stockpiles. The additional material included six revised viewpoint photomontages where stockpiles would potentially be visible together with explanatory text. Moir Landscape Architecture advised this additional material did not alter the conclusions of technical report D nor its recommendations.

(iii) Submissions

The Proponent submitted the landscape and visual effects of the Project were acceptable and relied on technical report D and the additional material provided during the Hearing, including TN06 and the revised mitigation measures in the EMF. The revised mitigation measures sought to include additional recommendations provided in technical report D in relation to the timing of landscape works, additional screen planting and minimising lighting impacts associated with the transport, placement or removal of overburden stockpiles. The Proponent noted that the highest level of visual impact was classed as 'moderate' and that only three viewpoints warranted this rating.

Submitters raised issues about the assessment methodology and the extent of impacts including:

- the relevance and suitability of the selected viewpoints
- relying on desktop assessment of views from dwellings rather than on-site assessments
- the accuracy of photomontages, including their location and the height and footprint of stockpiles
- the qualitative nature and accuracy of the impact assessments
- limitations with using vegetation for screening, including the sparsity of tree canopies, the low density of screening vegetation, slow growth rates and the removal of trees to accommodate road widening and other works
- basing the analysis on a poor understanding of the topography of the area, including the Cannie Ridge.

(iv) Discussion

The IAC generally accepts the impact assessment in technical report D and TN03 and agrees that landscape and visual effects will predominantly have low impact given the topography, existing vegetation and the distance of most viewpoints. Where views to the Project will exist, it is likely they will be filtered, distant views with limited impact on the public domain or residential amenity.

The IAC also notes that the impacts will be confined to the life of the Project, and that once the site is rehabilitated back to agricultural use there will be no continuing impacts.

While there was some criticism by submitters of the selection of viewpoints, the IAC is satisfied their number and location were appropriate for the purposes of the LVIA and a reasonable representation of the landscape and visual effects that would be expected. The EES would have benefited from addressing the visual impacts of stockpiles in the exhibited LVIA, but the additional information provided in TN03 is adequate for the IAC's assessment.

The analysis of impacts on dwellings might have been better informed by on-site inspections of relevant properties, although it is not known whether access was available to the Proponent. In any event, the desktop assessment and inspections (where possible) identified where additional mitigation might be required and the Proponent has agreed to include this in the EMF.

As submitters noted, the reliance on planting vegetation to screen views will be challenging given the nature of vegetation that is indigenous to the area and the expected slow growth rates. It is also likely that some vegetation clearance associated with various Project works will impact existing screening and exacerbate visual impacts. For these reasons it is important that landscape plans be prepared, and plantings be undertaken as soon as possible. This should be required in the EMF.

The LVIA recommended various boundary areas be planted, and existing roadside vegetation retained or augmented. It also recommended additional screen planting in association with receptors R12 and R15 (potentially through a neighbour agreement). While this additional boundary planting would have merit, it should occur on the Proponent's land and at the Proponent's cost. These works are shown in figure 18 and appendix C in technical report D and are referenced in the day 3 EMF at MM-LV01. The IAC supports these references in the EMF but has modified MM-LV01 to specify screen planting along the southern boundary of Area 1.

The IAC queried whether the EMF should require a landscape plan be prepared for the Project. Technical report D includes a recommendation that "… *detailed landscape management Plans are prepared and approved prior to commencement of construction*".[29] It includes a 'Preliminary Landscape Plan' for the processing area at appendix C. The Proponent submitted the requirement for a landscape plan "… *will be addressed through a risk management plan within the Work Plan*"[30]and need not be referenced in the EMF. The Proponent also noted that "… *reference to a [Landscape Management Plan] LMP was not, but should be, included in the list of management plans in Section 7.4 of the draft Work Plan*".[31]

The IAC believes that preparing and implementing appropriate landscape plans are fundamental in addressing landscape and visual effects and should be referenced in the EMF as a required mitigation measure that would also inform the work plan conditions. The IAC has included a suitable requirement in MM-LV01 based on the discussion in technical report D.

The IAC has also recommended additional changes to MM-LV01 to remove requirements that are dealt with elsewhere or that are related to final rehabilitation.

[29] EES technical report D, page 38
[30] D248, page 21
[31] D248, page 21

(v) Findings

The IAC finds:

- The EES has appropriately assessed landscape and visual effects.
- Landscape and visual effects can be appropriately managed through the recommended mitigation measures.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-LV01 requiring the preparation of Landscape Management Plans.

This change is included at appendix E.

6.3 Overall conclusions on landscape and visual effects

Subject to the IAC's recommendations, there are no landscape or visual impacts that preclude the Project being approved or the draft evaluation objective being achieved.

7 Traffic and transport

7.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.

Traffic and transport are discussed in EES chapter 10 and technical report E. Technical report E comprises the Transport Impact Assessment (TIA).

The exhibited EMF includes the following mitigation measures:

- MM-TP01 Minimise adverse social effects (consultation)
- MM-TP02 Minimise adverse social effects (traffic management plan)
- MM-TP04 Minimise adverse social effects from transport infrastructure
- MM-TP05 Site access strategy
- MM-TP06 Heavy vehicle transport route assessments
- MM-TP07 Sub-TMPs.

In response to the IAC's RFI and other issues raised at the Hearing, the Proponent provided the following technical note:

- TN06 – Roads.

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248).

Table 6 lists the traffic and transport evidence.

Table 6 Traffic and transport evidence

Party	Expert	Firm	Area of expertise
Proponent	James Warfe	AECOM	Transport

7.2 Traffic effects and mitigation

(i) The issues

The issues are the adequacy of the TIA and whether traffic and transport impacts can be acceptably mitigated.

(ii) What did the EES say?

The TIA described the existing environment, risks, Project construction, operation, and decommissioning impacts and mitigation, monitoring and contingency measures. Figure 11 shows the proposed road transport routes, upgrades, and closures described in the EES.

The TIA assumed:

- all product container delivery movements (empty and full) will be during daylight hours
- 12 twenty-foot equivalent units (TEUs) will be filled each day (84 TEUs per week)
- the haulage fleet will be A-double trailer configuration

- workers will be bused to and from the site with traffic peaks at the start/end of working shifts.

The risk assessment identified 15 potential threats and effects, 12 of which had a 'low' residual risk rating and three had a 'medium' residual risk rating. These related to access disruption and safety issues associated with road access locations. The TIA concluded:

> Anticipated residual impacts would be localised and short travel time increases to vehicles caused by both short and long term road closures in the vicinity of the project area. However, the intersection and road condition improvements would make the current road network a safer road environment for all road users when compared to its existing conditions.[32]

During the Hearing the Proponent advised that Bennett Road would be the primary access to Areas 1 and 3 with sections of Shepherd, Jobling and Bish roads used as the inter-area movement route. Consequently, only Bennett Road would need to be upgraded and sealed to A-double standard, with all other identified roads and intersections upgraded to all-weather B-double standard (unsealed) to support inter-area and temporary Project movements. These arrangements are shown in figure 16 and would involve Bennett Road being closed in Year 1 and Thompson Road in Year 7.

(iii) Evidence and submissions

The Proponent relied on the findings of the TIA and evidence of Mr Warfe and submitted that traffic generated by the Project would be well within the environmental capacity of the road network. It concluded that with appropriate traffic treatments and management in accordance the required TMP and other approvals, the Project's traffic and transport effects can be managed within acceptable parameters.

Mr Warfe reviewed the TIA and transport issues raised in submissions and concluded *"…any impacts of the project on the transport network and its users can be appropriately addressed through thorough application of the mitigation measures"*.[33]

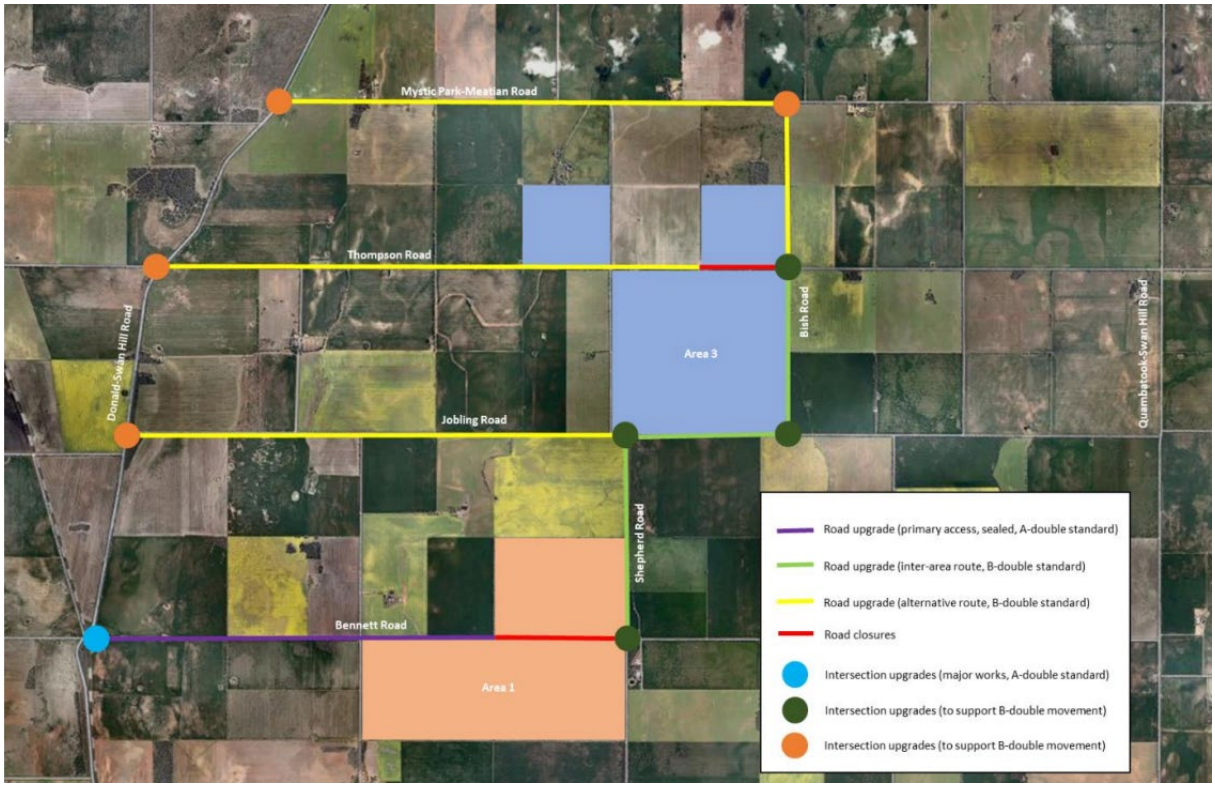
Following its consideration of evidence and submissions, the Proponent proposed various traffic related changes to the EMF and Incorporated Document, including requirements related to preparing a TMP.

The IAC queried whether the TIA should be revised to address proposed changes to the traffic arrangements arising from the use of Bennett Road for the primary access. In response, Mr Warfe provided a 'technical note' that was included in TN06 that recommended the description of recommended local road upgrades outlined in table 26 and figure 33 of the TIA be updated. His technical note includes a table that revises elements of the proposed road standards and upgrades provided in the TIA. He recommended that his technical note be appended to the TIA and that both documents be considered together.

[32] EES technical report E, page 87

[33] D17, page 12

Figure 16 Summary of local intersection and road upgrades



Source: TN06, Figure 2

The EPA submitted the off-site movement of ore should be restricted to the 'day period' as defined in the Environment Protection Regulations (7.00am to 6.00pm Monday to Saturday) as shown in D281.

GSC (D177) submitted the traffic movements associated with transporting products and the workforce would not be 'excessive', particularly having regard to truck and heavy vehicle movements during harvest. However, it did raise concerns in relation to road maintenance, capital upgrades, potential sealing of roads, access to the Swan hill – Donald Road, and truck and farm machinery movements associated harvesting activities. Council requested that it be involved in developing and approving TMPs and concluded the road network can be appropriately managed to meet the needs of all stakeholders.

SHRCC made comprehensive submissions about transport matters and sought various assurances about proposed works and funding, together with recommendations relating to the TMP, auditing, road standards and further consultation. These concerns were addressed in the exhibited EMF or in the Proponent's revisions to the EMF and Incorporated Document.

MFMF expressed concern about the lack of consultation with landowners during the preparation of the TIA and highlighted issues raised by landowners including road closures and access to properties, road capacity and safety, and whether detour roads would be passable in wet weather.

SLIM raised concerns about the cost of road upgrades and the cumulative impacts on road conditions. Ms Hildebrandt queried the calculation of vehicle movements and raised issues about road closures dust, noise, road damage, roadkill, funding and maintenance.

Many local landowners, including the Pola, Cunning, Bennett, Kennedy and Fox families raised concerns about impacts on property access, the need for all-weather access, increased traffic and

associated risk of accidents and road damage, amenity impacts and the movement of agricultural machinery during harvesting and other farming activities.

In response, the Proponent submitted:

- The characterisation of roads and road capacity in the TIA was accurate.
- Daily traffic volumes would be well under the theoretical capacity of the network.
- Road closures will be limited to the those shown in figure 16 and alternative access arrangements will be available.
- The TMP will require consultation with landowners about access and related issues.
- The TMP will require the approval of the Head of Transport for Victoria, GSC and SHRCC in relation to relevant roads.
- All inspections, road upgrades and maintenance of roads along the haulage and commuter routes that are required by the Project will be at the cost of the Proponent.
- The EMF requires the preparation of a community stakeholder and communications plan, road safety audits, a site access strategy and heavy vehicle transport route assessments.

The Proponent noted there is potential for occasional controlled access to be made available through active mining areas for neighbours who are most impacted by the road closures. This would be subject to the appropriate risk assessments being done and the controls required under the work plan being fully implemented.

(iv) Discussion

The IAC is satisfied the TIA analysis of the road network and the impacts of the Project are satisfactory, subject to addressing the changed access arrangements associated with the use of Bennett Road referred to earlier. There is sufficient capacity within the road network, subject to the recommended upgrades and further investigations, to safely accommodate traffic generated by the Project. In reaching these conclusions the IAC notes projected traffic levels will be well within network capacity and in that context the additional traffic movements generated by the Project will not be significant.

Local landowners are understandably concerned about altered access arrangements associated with local road closures, the provision of all-weather and emergency access and the need to accommodate the movement of farming equipment and trucks during peak periods such as harvesting.

As the Proponent noted in its closing submission (D264), detours will be available to accommodate the part closure of Bennett and Thompson Roads, however the full implications of these closures will be better understood when the TMP is prepared with direct landowner input. For the purposes of the EES, the IAC is satisfied alternative access arrangements will be available and the EMF and Incorporated Document include suitable consultation processes to identify and address access issues raised in submissions. These processes include the TMP requirements added to the Incorporated Document during the Hearing, and the further analysis that will follow from the Community Stakeholder and Communications Plan, the Site Access Strategy and the other investigations that will be required under the EMF.

Submitters were critical of the lack of direct consultation with landowners during the preparation of the TIA, which instead relied on indirect feedback through community information sessions. Mr Warfe explained that given the 'high level' nature and purpose of a TIA, it did not require direct

landowner consultation and that subsequent consultation processes would address more detailed issues raised by landowners and others. While this might be true, it is also likely that more direct consultation with landowners as part of the TIA would have alleviated some of the concerns and uncertainties that were evident in submissions.

The IAC accepts that for some landowners the road closures will increase travel distances and be an inconvenience. However, they will not preclude access within and through the area and are not expected to have any significant impacts on agricultural productivity. However, this does not lessen the importance of stakeholders engaging in the TMP process and the associated consultation mechanisms to ensure that traffic and access issues are communicated, understood and addressed by the Proponent and road authorities.

Submitters raised concerns about emergency and all-weather access arrangements, and Mr Warfe advised these would be addressed as part of the TMP process. The EMF includes emergency access requirements in MM-TP03 and MM-TP04, and the IAC has augmented these by including a specific reference to consulting with emergency service providers as part of the community stakeholder and communications plan required under MM-TP01. The TMP will also provide the process for considering issues associated with all-weather vehicular access.

Submitters raised concerns about the cost and funding of road upgrades and maintenance, with some assuming they would be the responsibility of the respective Councils. The Proponent confirmed its responsibility for funding relevant works by including the following requirement in the Incorporated Document:

> All inspections, road upgrades and maintenance of roads along the haulage and commuter routes are to be at the cost of the proponent.

This is included in the recommended Incorporated Document at appendix F.

The Proponent revised the exhibited MM-TP02 to require that the TMP include the items recommended in table 38 of the TIA. Table 38 lists the TIA recommended mitigation measures, most of which are already listed in the EMF, consequently the reference is superfluous and can be deleted. Instead, MM-TP02 should require that the TMP have regard to the identified road upgrades in the TIA, together with TN06 as recommended by Mr Warfe. These references are included in the recommended EMF at appendix E of this report.

The IAC has also recommended the restriction on moving ore/product within the 'day period' be consistent with the definition of daylight hours as sought by the EPA (7.00am to 6.00pm) but including Sundays.

Traffic amenity issues related to noise and dust are discussed in chapters 8 and 9 of this report.

(v) Findings

The IAC finds:

- The TIA has appropriately assessed the traffic and transport impacts of the Project.
- Detailed access and other issues raised by submitters can be addressed through the consultation and traffic management plan processes required under the EMF.
- Traffic and transport impacts can be acceptably mitigated through the recommended EMF and Incorporated Document.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-TP01 to require consultation with emergency service providers

b) revised MM-TP02 to require consideration of the recommendations in the TIA and TN06, and to clarify the reference to 'daylight hours'.

These changes are included at appendix E.

7.3 Haulage route

(i) The issue

The issue is whether the haulage route can safely accommodate the additional traffic generated by the Project.

(ii) What did the EES say?

The proposed product haulage route from the Project site to the Ultima Terminal is shown in figure 11 and includes the Donald-Swan Hill Road and Lake Boga-Ultima Roads. Primary haulage from the mine site would be along Bennett Road that will need to be upgraded.

The TIA found that the additional traffic haulage movements generated by the Project would result in negligible impacts on key local/arterial roads. It noted further approvals will be required in relation to the A-Double route and that intersection and road upgrades are also expected to be required. The EMF requires that the transport of product from the mine site only occur during daylight hours.

The TIA recommended various mitigation measures, elements of which were included in the exhibited EMF.

(iii) Evidence and submissions

The Proponent relied on the TIA and evidence of Mr Warfe that the haulage route can safely accommodate the additional traffic generated by the Project, subject to various works and upgrades. Mr Warfe noted the upgrades to the haulage route will require detailed design before they can be confirmed through the further approvals and investigations that will be required.

SHRCC submitted the haulage route roads should be improved to be fit for purpose, including upgrades to a six-metre-wide sealed road with 1.5 metre gravel shoulder. Council suggested an additional condition for a community engagement plan be included for neighbours along the haulage transport and the commuter route for workers within the 'Social and land use' section of the EMF.

Submitters, including the Fox family, highlighted concerns about the capacity and condition of the Lake Boga-Ultima and Donald-Swan Hill Roads and the amenity and safety impacts of increased traffic. Safety concerns related to road pavement condition and width, sightlines, bus pickups and drop-offs, and vehicular access to and from properties along the route.

(iv) Discussion

As noted earlier, the IAC accepts the findings of the TIA and Mr Warfe's evidence that the road network, including the haulage route, has sufficient capacity to accommodate the traffic generated by the Project. The TIA noted that approvals and road improvements will be required to ensure that traffic can be safely accommodated, including approval as an A-Double route and the implementation of required intersection and road upgrades through the TMP and road safety audits. These processes would enable the road standard and safety issues raised by SHRCC and other submitters to be addressed.

The IAC does not agree with submitters that increased traffic associated with the Project will have any significant or unreasonable amenity impacts given the role and capacity of the roads, and the relatively low traffic volumes that would be generated by the Project. It is also relevant that the movement of mine product will be limited to daylight hours.

In relation to SHRCC's support for specific consultation with landowners along the haulage route, the IAC is satisfied the EMF includes suitable mechanisms to address this, including MM-TP01.

(v) Findings

The IAC finds:

- The haulage route can accommodate the additional traffic that the Project will generate, subject to implementing the additional works and upgrades that will be required through further detailed investigations and approvals.

7.4 Pipeline route

(i) The issue

The issue is whether the construction of the water pipeline will have unacceptable traffic and access effects.

(ii) What did the EES say?

The TIA assessed the effects arising from constructing the pipeline based on:

- pipeline route option A3
- construction over an eight-month period
- construction commencing from each end, one from the mine and one from the pump station
- constructing approximately 70 metres of pipe per day
- rail crossing by directional drilling
- irrigation channel crossings either by a pipe bridge or directional drilling
- main road crossing by directional drilling.

Pipeline construction will require short term partial road closures, diversions, reduced speeds or limited access depending on the type of works at the time. The roads that will require closures include:

- Mystic Park East Road
- Mystic Park-Beauchamp Road
- Lookout Road Teagues Road
- Jobling Road

- Shepherd Road.

The TIA did not assess the impacts of adopting option A2 on the basis that it was not proposed to be constructed.[34]

(iii) Evidence and submissions

Following the exhibition of the EES, the Proponent sought information from a pipeline contractor in relation to construction methodology and possible access issues and road closures. This information was provided as attachment 2 in D17 and reviewed by Mr Warfe who noted:

- Pipeline installation adjacent to a typical block would take about 3 days, progressing at ~800-1,000m/day
- Given the width of Mystic Park East Road, there should be no difficulty in keeping a single lane open for traffic (under traffic control conditions)
- Keeping other stretches of road along the pipeline open for use by the general public will likely not be possible while construction works are underway, due to the narrower road carriageway. This will especially be the case for Jobling Road, Shepherd Road and Mystic Park-Beauchamp Road. However, local access to closed roads can be facilitated through active traffic management measures.[35]

Mr Warfe advised that additional engagement with affected stakeholders in the Jobling Road, Shepherd Road and Mystic Park-Beauchamp Road areas would be required to ensure that short-term closures (up to 3 days) are communicated and to avoid any critical agricultural periods.

Mr Warfe advised he had reviewed pipeline route A2 and that it provided the same level of 'constructability' as A3 and would require the same construction methodology. He did not believe that one option could be preferred over the other in terms of traffic impacts. Despite this, the Proponent submitted in closing that the construction of option A2 would have more traffic impacts, given the higher usage of the associated roads.

Submitters and landowners in the area noted that Mystic Park- Beauchamp Road is the main east-west all-weather access road and raised concerns about road closures, including:

- access to properties and dwellings on Mystic Park- Beauchamp Road
- access the school bus stop at the Quambatook Road
- constraints on moving farm equipment
- access for emergency services.

(iv) Discussion

The TIA and subsequent evidence and investigations indicate that the while the laying of the pipeline and associated road closures will cause inconvenience, it will be of limited duration and can be appropriately mitigated through consultation and project management. Mr Warfe described how this might occur through consultation with affected landowners and development staging. Emergency vehicle access protocols would be developed with emergency service providers through the TMP.

The IAC is satisfied the recommended mitigation measures in the EMF will enable potential effects to be identified and appropriately mitigated.

[34] EES technical report E, page 7

[35] D17, pages 11-12

The IAC accepts Mr Warfe's evidence in relation to route option A2 and agrees there are no traffic or transport reasons to prefer one option over the other.

(v) Findings

The IAC finds:

- The effects of constructing the pipeline can be effectively minimised through the recommended mitigation measures.
- There are no traffic reasons for preferring one pipeline route option over the other.

7.5 Ultima intermodal terminal and rail freight

(i) The issue

The issue is whether the Ultima Terminal and freight line can safely accommodate the shipment of mine product.

(ii) What did the EES say?

Mine product would be transported by road to the Ultima Terminal and then shipped to the Port of Melbourne by rail from where it would be exported (or from the Port of Geelong which remains an option). The Ultima Terminal can accommodate 80-100 wagons per train and has a hardstand area that would allow the placement of approximately 80 TEUs along the rail loading area. Overall, there is sufficient capacity to accommodate up to 630 containers. Two TEUs can be loaded on each 40-foot wagon, and the terminal has the capacity to accommodate the anticipated 126 weekly TEUs.

If the terminal became temporarily unavailable for vehicle or track maintenance, product could be transported to the Port of Melbourne using B-Double or A-Double vehicles.

(iii) Evidence and submissions

The Proponent submitted that the terminal and rail line have the capacity to service the project and no upgrades are required. Following further advice from the terminal operator (QUBE), the Proponent provided additional detail about the proposed freight arrangements and confirmed the capacity of the terminal and rail line.[36]

Mr Warfe advised that an investigation of contingency haulage options (via road) in exceptional circumstances (e.g. rail line closure) had not identified any significant impacts.

SHRCC appended a submission from the Rail Freight Alliance to its submission.[37] The Rail Freight Alliance is an advocacy group of Victorian councils (including SHRCC) that support rail freight. The submission included various recommendations related to rail freight infrastructure, some of which were not relevant to the Project, while others related to infrastructure upgrades that it believed were needed to support Project.

Other submissions raised general concerns about the capacity of the terminal and rail network, and potential implications of alternative road or rail routes being used.

[36] D264, pages 38 and 39
[37] S134

Issues such as radioactivity associated with the transport and storage of mine product within Ultima and in transit are discussed in chapter 14 of this report.

(iv) Discussion

The IAC accepts the Ultima Terminal has the physical capacity to accommodate container movements associated with the Project and that the haulage route to the terminal will be suitably upgraded through the TMP process. There will be mechanisms through the EMF and other approvals to address radioactivity and amenity impacts raised in submissions.

The IAC has not formed any definitive conclusions about the capacity of the rail line to accommodate additional train traffic in the absence of evidence about this or any advice from the relevant agencies. The IAC has proceeded on the basis that the rail line either has suitable capacity to accommodate additional movements or that any required infrastructure upgrades will be undertaken. In the event the rail line could not be used, the IAC notes Mr Warfe's evidence that the use of contingency haulage options would not raise any significant issues.

(v) Findings

The IAC finds:

- The Ultima Terminal has the capacity to safely provide for the shipment of mine product.
- There are no confirmed capacity constraints that would preclude the movement of product by rail to the Port of Melbourne or alternative port.

7.6 Overall conclusions on traffic and transport effects

Subject to the IAC's recommendations, there are no traffic or transport impacts that preclude the Project being approved or the draft evaluation objective being achieved.

8 Noise and vibration

8.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.

Noise and vibration are discussed in EES chapter 11 and technical report F.

The exhibited EMF includes the following mitigation measures:

- MM-NV01 Minimise noise emissions as much as practicable
- MM-NV02 Minimise noise emissions as much as practicable – Hours of Operation
- MM-NV03 Minimise noise emissions as much as practicable (management)
- MM-NV04 Minimise noise emissions as much as practicable (roads)
- MM-NV05 Minimise noise emissions as much as practicable – General Practice
- MM-NV06 Minimise noise emissions as much as practicable – Mine Planning
- MM-NV07 Minimise noise emissions as much as practicable – Power Plant
- MM-NV08 Minimise noise emissions as far as reasonably practicable – Pumpstation (Kangaroo Lake)

Additionally, the IAC had regard to:

- relevant submissions and evidence
- response to themes raised in submissions (D93)
- response to IAC RFIs (D248)
- joint statement of noise experts (D104).

Table 7 lists the noise and vibration evidence.

Table 7 Noise and vibration evidence

Party	Expert	Firm	Area of expertise
Proponent	Jim Antonopoulos	SLR Consulting Australia	Noise
MFMF	Les Huson	Les Hudson and Associates	Noise

8.2 Regulatory framework

(i) The issue

The issue is whether the EES evaluated noise impacts against the relevant noise policies and guidelines.

(ii) What did the EES say?

Construction noise impacts from the processing plant and the water supply pipeline were assessed against the unreasonable noise provisions of the EP Act and the *Civil construction, building and demolition guide,* EPA Publication 1834.1.

Noise sensitive receptors (refer to table 1 and figure 14) comprise a number of nearby rural residences. In accordance with the *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (EPA Publication 1826.4) (Noise Protocol), the potential impacts at these residences were determined in accordance with the specific provisions pertaining to earth resources premises.

The closest dwelling to the MLA is R14, situated to the east of Shepherd Road and opposite Area 1. The Proponent has entered into a contract with the owner of this property under which the dwelling will be vacated for the duration of mining, although the landowner may continue to farm the property. During Area 3 mining operations, the house denoted as R9 will be used as a Project operations office and therefore is not considered a sensitive receiver.

The ambient sound environmental values in the Environment Reference Standard (ERS) prepared by the EPA in March 2022 describe ambient sound quality that supports acceptable human health and amenity outcomes and enjoyment of natural areas. While the ERS is not a compliance standard, noise emissions during the stages of the Project were compared against the indicators designed to preserve the noise environment of natural areas such as wildlife reserves, nature reserves and flora and fauna reserves.

Low frequency noise emissions during the operation of the mine were assessed against *Noise guidelines: Assessing low frequency noise*, EPA publication 1996 (LFN Guidelines).

(iii) Evidence and submissions

Many submissions raised noise as a general concern. Three submitters, S47, S93 and S168 raised specific concerns about the general noise amenity of the area with Ms Carruthers (S168) submitting that "*any increase in decibels [dB] over normal night-time silence is a breach of the baseline noise levels*."

The MFMF noise expert, Mr Huson, said the processing plant and mine would be more than 20 dB above background sound levels for the Day, Evening and Night periods. His view was that this is a "…*significant change to the acoustic environment that neighbours to the Project will experience and this will be an adverse effect on their current acoustic amenity*".

The Proponent's noise expert, Mr Antonopoulos view was that noise impacts had been evaluated and assessed to the relevant noise requirements of the EP Act. His evidence was the noise limits account for the existing background noise levels and an increase in noise alone does not necessarily result in adverse effects on acoustic amenity.

Mr Antonopoulos explained that the Noise Protocol prescribes specific noise limits in rural areas for earth resources premises which account for low background noise areas. He also explained the noise limits applicable to the water pump station at Kangaroo Lake.

In regard to vibration, Mr Antonopoulos opinion was that vibration impacts are a lot more localised than airborne noise impacts. He considered that vibration from the mining activities and plant would be imperceptible at any sensitive receivers given the large distances involved.

(iv) Discussion

The IAC accepts the mining operation will increase noise levels in the area surrounding the mining site and processing plant. It is inevitable that almost any activity, industrial or farming, in the area

would contribute to increased noise levels. The issue is whether any increase is noise will result in an unreasonable noise impact.

The EPA Noise Protocol is incorporated into the Environment Protection Regulations which requires the assessment of noise from industrial premises to be performed in accordance with the Noise Protocol. The noise emitted from the premises is unreasonable if it exceeds the noise limit for the relevant time of day when measured in a noise sensitive area.

Specific noise limits are prescribed in the Noise Protocol for earth resource premises in rural areas. The IAC accepts that the appropriate noise limits are specified in the EES. Specific issues associated with construction and operational noise are discussed in the following sections.

(v) Finding

The IAC finds:

- The EES has appropriately identified the appropriate legislation and guidance against which noise impacts should be assessed.

8.3 Construction noise

(i) The issue

The issue is whether the construction noise impacts of the processing plant, water supply pipeline and water pump station are acceptable.

(ii) What did the EES say?

Construction activities would commence in Area 1 with the staged construction of the processing plant. The EES envisages construction activities in Area 3 would commence approximately 8 years after the commencement of operations in Area 1. Construction activities would be limited to the EPA normal working hours, (7 am – 6 pm Mon – Fri, 7 am – 1 pm Sat) except for unavoidable works and low noise impact works (where required).

Construction noise emissions were predicted to comply with the requirements of the *Civil construction, building and demolition guide*, (EPA Publication 1834). This publication does not prescribe construction noise limits for the EPA normal working hours. Noise levels were modelled for the construction phase and found to be below ambient background noise levels at most receivers, with only a single receiver anticipated to receive construction noise at an elevated level, but still below what would be the noise limit for the daytime operation of the processing plant.

Predicted noise from water pipeline construction (option A3) was found to be below ambient background noise levels at most receptors, with only a small number of receptors in Mystic Park and along the anticipated route to receive construction noise at an elevated level. Two receptors were predicted to be potentially exposed to noise levels exceeding 75 A-weighted decibels (dBA) and nine or ten receptors exposed to levels between 60 dBA and 75 dBA depending on the pipeline route. The work would be short in duration (anticipated to be only a few days in Mystic Park) and would occur during 'normal' daytime hours.

Construction works would be completed under a construction environmental management plan (CEMP) incorporating a noise management plan (NMP) required in the EMF under MM-NV02.

(iii) Evidence and submissions

Mr Antonopoulos considered that construction noise at the mine site posed a lower risk than the operational noise. He noted that the two most affected residences impacted by pipeline construction noise would experience "*transient*" noise with the nearest work occurring 20 to 30 metres from the two receptors in Mystic Park for approximately one to two days.

In relation to pipeline option A2, he said that one more receptor would be exposed to similar noise levels but slightly lower than the two most affected residents in Mystic Park. He observed that the work would be daytime only, short duration (1-2 days) and with a programme of community consultation it was unlikely there would be any impact.

At the noise expert's conclave, Mr Antonopoulos and Mr Huson agreed that vibration was not assessed as a pipeline construction impact as a vibratory roller was not proposed to be used.

Mr Antonopoulos also noted the works in this area would be conducted under a CEMP, incorporating an NMP, and would include community consultation to manage the works in the area.

SHRCC (S134) was "…*supportive of the need to complete construction within the EPA schedule hours of work as way of minimising noise impacts on the surrounding area*".

The EPA supported limiting construction activities to the times prescribed in its construction noise guidelines. It recommended a construction noise and vibration management plan (CNVMP) be prepared under the CEMP and require works outside of normal hours only occur if they do not impact the noise amenity of residents as verified by an independent environmental auditor.

The EPA's opening submission (D152) identified the GED under the EP Act which states:

> A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.[38]

Mr Antonopoulos gave evidence that a risk-based approach as outlined in the EPA's construction guidelines would be used to manage construction noise impacts to accord with GED obligations.

The Kangaroo Lake pump station is located 300 metres north of the closest noise sensitive receptor. No submissions identified concerns regarding construction noise from the pump station.

The Proponent proposed revisions to the EMF to include consultation with relevant bodies during the development of the NMP and incorporating a CNVMP into the CEMP.

(iv) Discussion

There was general agreement that construction activities should be limited to normal hours as specified within the *Civil construction, building and demolition guide* (EPA Publication 1834). This includes the construction of the pump station at Kangaroo Lake and the water pipeline from the Lake to the Project site.

The IAC considers that all practical measures should be taken to ameliorate construction noise impacts and this approach should be adopted in the EMF. As noise impacts are unlikely from the construction of the processing plant due to its separation from receptors, it is not considered there

[38] EP Act, section 25(1)

is any need to require an environmental auditor to review any proposed out of hours construction work. The Proponents wording within MM-NV02 is appropriate.

The pipeline option A2 would result in one additional receptor being impacted compared to option A3. As any impacts would be limited to daytime only and of short duration, the IAC considers from an acoustic view that the A3 route option offers a marginal, but not significant, benefit over option A2.

(v) Findings

The IAC finds:

- The EES has appropriately assessed construction noise impacts from the process plant, Kangaroo Lake pump station and the water supply pipeline.
- Construction noise impacts can be suitably managed through the EMF and CNVMP within the CEMP.
- There is little difference between the acoustic impacts from the pipeline route options A2 and A3, although A3 would provide a marginal benefit.

8.4 Operational noise

(i) The issue

The issue is whether the noise modelling is sufficiently robust to demonstrate that the Project will not cause unreasonable noise impacts.

(ii) What did the EES say?

Noise modelling was undertaken to predict noise from most aspects of the Project. A background noise monitoring programme was completed at four locations around the Project area over a period of approximately four weeks in October 2018. The existing noise environment in the area is typical of a rural farming area, with background noise levels generally being low.

Noise modelling of several key stages in the mine's operation was conducted using SoundPLAN 8.2 noise modelling software. The assessment methodology considered noise character such as tonal, impulsive and low frequency noise. Modelling was performed for four mine operating scenarios as shown in table 8 representing worst-case scenarios based on activity intensity in terms of material moved, the distance between the mining activities and the closest sensitive receivers.

Table 8 Noise modelling scenarios

Scenario	Area and timing	Activity
1	Area 1, Year 1 Quarter 1	Haulage to Area 1 MUP, topsoil, clay and overburden stockpiles. Mining cells 101 &102
2	Area 1, Year 6 Quarter 2	Haulage to Area 1 MUP. Topsoil, clay and overburden stockpiles. Mining cells 125, 126 &127
3	Area 3, Year 11 Quarter 3	Haulage to Area 3 MUP, topsoil, clay and overburden stockpiles. Mining cells 110, 111 & 112.
4	Area 3, Year 15 Quarter 2	Haulage to Area 3 MUP, topsoil, clay and overburden stockpiles. Mining cells 119 & 120.

The noise model predicts the A-weighted sound pressure levels under meteorological conditions favourable for propagation from sources of known sound power levels. The model used typical equipment and plant that may be used. The model also included attenuation due to air absorption, ground attenuation and shielding.

The mining fleet operating in the mine area was identified as the primary source for both overall noise levels and low frequency noise. The model assumed all the mine fleet was in use and was operating at surface level.

There was no exceedance of the day or evening noise limits predicted but the model showed a potential exceedance of the night-time noise limit during mining of the southern cells of Area 1 at receptors R12 and R13. Similarly, modelling indicated an exceedance of the night-time noise limit during mining of the northern cells of Area 3 at receptor R7. The EES proposed that mining operations would not occur at night if it resulted in an exceedance of the noise limits.

The power station plant was identified as potentially the most significant noise source of fixed plant in the processing area. It consists of twelve diesel powered generator sets housed within a building. To reduce noise breakout from the building, each engine would be placed inside 'drop over' acoustic enclosures. High performance exhaust silencers would be installed on the diesel engine exhausts.

The modelling of noise impact assessment for the pump station was based on one diesel generator and pump operating continuously and housed in an acoustic enclosure.

(iii) Evidence and submissions

SLIM submitted that as the EES specified mining operations would be limited to day times for specified mining blocks close to sensitive receptors, the public may not have raised concerns about potential night-time operations of the mine.

MFMF's acoustic expert, Mr Huson, was of view was that there should be a commitment that scenarios that are predicted to be non-compliant at night, should not take place unless it can be demonstrated that compliance will be achieved at that time. Mr Antonopoulos agreed.

Mr and Ms Cunning (S40) expressed concern that the noise assessment was based on "…*modelling and not facts as without using working machinery and a live working mine, it was just an estimation*".

Ms Carruthers raised concerns about the impacts of noise at night and felt that no night-time operations should be allowed in the mining blocks where modelling indicated that the night-time noise limit would be exceeded.

Mr Huson's evidence was that the noise impact assessment was "*more of a feasibility study*" than an accurate prediction of the actual noise impact. Mr Huson considered that the estimated accuracy of the model of +/- 3 dB should have 3 dB added to the model output to ensure a suitably conservative assessment. He also considered the ground absorbative factor used by the Proponent's expert of G=0.6 was not conservative and G=0 should have been adopted. When questioned by the IAC he provided an estimation that a G=0 would increase the predicted noise level by about 1.5 dB.

Mr Antonopoulos gave evidence the noise model is already conservative given it is for downwind propagation, and with all plant running at full capacity, at grade with no below grade operations. He did not consider it necessary to allow a further 3 dB additional safety margin. When

questioned on the extent of any additional attenuation when mining is below grade, he estimated a 5 dB reduction.

Regarding the ground effect used for mining site noise propagation, he referred to the guidance provided in the model that a G=0 is for hard "tamped" areas such as industrial sites and that a G=1 is listed for farmland with or capable of growing a crop. To be conservative he used a G of 0.6.

The EPA submitted that mining operations should be limited to the daytime period, as defined in the EP Regulations, for specified mining blocks close to sensitive receptors as identified by noise modelling.

Mr Antonopoulos position was that further modelling of the mine stages, with final selected plant and equipment, and with equipment in specific areas in pits, in combination with other potential operational restrictions (e.g. using fewer haul trucks at night) would allow for more accurate representation of the noise assessment and inform the content of noise management plans for the Project. His opinion was that such modelling would likely represent a lesser level of noise to sensitive areas than the initial assessment had identified, and that mining could occur at night subject to noise levels complying with the noise limits.

GSC submitted that the detailed modelling and assessment of the work undertaken to mitigate noise was appropriate and that a range of mitigation measures had been proposed.

The EPA submitted the NMP should be proactively developed in consultation with the relevant authorities and key stakeholders. It should be developed during the early planning and design stages to ensure all opportunities to minimise noise and vibration and the associated risks, so far as reasonably practicable, can be taken proactively. The EPA recommended the NMP specify key milestones at which the noise model would be updated, including significant variations in activities, such as changes in mining areas and other triggers such as, investigations in response to complaints or availability of noise monitoring or measurement data.

(iv) Discussion

The IAC considers the EES noise modelling was appropriate to gauge whether projected noise levels would be compliant with the prescribed noise limits. The IAC believes it would appropriate to re-assess predicted noise impacts once final plant selection is made and noise levels of actual plant used can be referenced against those used in the model to gauge the need for any further noise reductions that might be required at the source. MM-NV09 has been amended to require the NMP be updated based on the noise model and noise surveys.

It is appropriate to have an independent expert review the modelling as suggested by the EPA in its proposed MM-NV06. If more informed modelling shows operations would comply with the night-time noise limit, then mining should be permitted subject to adherence with the noise limits.

The IAC agrees with Mr Antonopoulos that the model is suitably conservative, and it is not necessary to add +3 dB to model outputs. A 3 dB increase is in effect the same as two plants operating rather than one, as a 3 dB increase represents a doubling of the sound power level.

(v) Findings

The IAC finds:

- The EES has used an appropriate noise model and has adopted suitably conservative assumptions for the basis of the noise impact modelling.

- Noise impacts from mining and processing can be suitably managed through the EMF and NMP within the work plan.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-NV06 to specify an independent environmental auditor review and confirm the noise modelling

b) revised MM-NV09 to require the Noise Management Plan be based on the updated modelling and the results of noise monitoring.

These changes are included at appendix E.

8.5 Residual noise impacts

(i) The issue

The issue is whether the residual noise impacts of low frequency noise, transportation and impacts on natural areas have been suitably assessed.

(ii) What did the EES say?

Low frequency noise

EPA publication 1996 Noise guideline: *Assessing low frequency noise* was used to determine whether the emission of low frequency noise from the MLA would cause an unreasonable noise based on an assessment of the low frequency bands ranging between 10 Hz to 160 Hz. The EES predicted exceedance at various receptors during the four modelled scenarios shown in table 9.

Table 9 Modelled low frequency noise guideline exceedances

Scenario	Receptors	Exceedance at 80 Hz 1/3 octave band
1	R3, R12, R13 and R15	2 – 6 dB
2	R3, R12, R13 and R15	4 – 11 dB
3	R7	4 dB
4	R7	1 dB

The NMP specified the frequency spectrum of plant be considered during the procurement of noise generating fixed plant to reduce the risk of tonal, impulsive or low frequency noise.

Traffic noise

The mining fleet operating in the mine area was the primary source of the low frequency noise. Modelling assumed the mine fleet was operating at surface level and at 100 per cent utilisation.

The EES predicted a moderate exceedance (4-5 dBA) of the night period limit at R12 and R13, but compliance could be achieved through:

- addition of engineered noise suppression kits to haul fleet vehicles

- higher levels of noise suppression on the processing plant building
- restricting mining activities to below ground level only.

The closest Receptor to the Kangaroo Lake pump station (P4) is located approximately 300 metres north of the site. Modelling indicated the LFN Guidelines threshold levels are predicted to be exceeded at P4 by 3 dB at 80 Hz. To mitigate this, noise from the diesel generator would be controlled via an acoustic enclosure and silencer and would be reviewed during detailed design.

In the absence of relevant traffic noise policies, the impact of traffic was evaluated within the EES against the framework of non-regulated noise emissions contained in the ERS. The EES found the projected traffic noise impact would be below the ERS targets. In particular, truck movement of ore product to the Ultima Terminal would not take place at night eliminating associated sleep disturbance impacts.

Natural areas

In relation to natural areas, the ERS defines natural areas as national parks, state parks, state forests, nature conservation reserves and wildlife reserves. The highest level of acoustic protection for the natural environment is for areas classified as Category V. The ERS gives a general description of Category V land as:

> Unique combinations of landscape, biodiversity and geodiversity. These natural areas typically provide undisturbed species habitat and enable people to see and interact with native vegetation and wildlife.

The ERS sets the following acoustic objective for Category V land:

> A sound quality that is conducive to human tranquillity and enjoyment having regard to the ambient natural soundscape.

The EES considered the following areas did not meet the ERS definitions for Category V and noted they are not identified in the planning scheme as environmentally significant areas and landscapes:

- Talgitcha Bushland Reserve
- Lalbert Recreation Reserve
- Mystic Park Bushland Reserve
- Forest Plantation East Road
- adjacent to Kangaroo Lake and Murray Valley Highway.

Given the location of these sites, and their zoning, the EES assessed these as ERS Land Use Category IV. While no specific noise levels are specified for Category V land, Category IV has the noise objectives of 40 dBA during the day (6am to 10pm) and 35 dBA at night (10pm to 6am).

(iii) Evidence and submissions

Low frequency noise

Concerns about low frequency noise were raised by submitters, including Ms Bennett in her initial submission (S65) and presentation to the IAC (D245).

In his expert witness statement (D20), Mr Antonopoulos identified a range of measures to control noise, including low frequency noise, which in his view was "*…appropriate and align with the intent of the GED so as to minimise the risk of harm.*"

In the noise expert conclave (D104), there was agreement that "*with appropriate silencing it will be possible to manage low frequency noise.*" Both agreed the sound power of the power plant should be specified below 63 Hertz to ensure the final installed plant would comply.

Traffic noise

Mr Antonopoulos stated the facility will not generate truck transport traffic at night so sleep will be protected, and he expected traffic noise during the day to still be below the ERS targets.

Natural areas

In its closing submission, the EPA submitted that Mystic Park Bushland Reserve, Talgitcha Bushland Reserve and adjacent to Kangaroo and Murray Valley Highway should be classed as category V. Lalbert Recreation Reserve and Forest Plantation East Road should be category IV.

Mr Antonopoulos gave evidence that DEECA, Parks Victoria or another authority should be consulted for the purpose of categorising natural areas. Mr Antonopoulos had however visited the five sites and made the following observations:

- Talgitcha Bushland Reserve measures approximately 100 x 200 metres, is exposed to nearby farming activity and would experience the greatest predicted impact during scenario 2 with noise levels up to 37 dBA.
- Lalbert Recreation Reserve is a sports ground used as football oval, is proximate to a railway and main highway and would experience the greatest predicted impact during scenario 2 of 26 dBA.
- Mystic Park Bushland Reserve is a large bushland area, experiences minimal noise from traffic and farming and would experience predicted noise impacts less than 20 dBA.
- Forest Planation East Road is a small reserve adjacent to Kangaroo Lake, is in close proximity to dwellings and a camping ground, the Lake is used for recreational boating and would experience predicted noise impacts from the pump station of 20-24 dBA.
- Adjacent to Kangaroo Lake and Murray Valley Highway is a small reserve, noise from the Highway would be audible, and would experience predicted noise impacts from pump station of 20-24 dBA.

In his view, apart from the Mystic Park Bushland Reserve, the other reserves were not pristine natural areas because of their size and exposure to existing recreational, transport or agricultural noise sources.

(iv) Discussion

Low frequency noise

The IAC accepts the evidence of the noise experts that with appropriate silencing it will be possible to manage low frequency noise.

Traffic noise

The EMF requires that ore products not be transported at night to the Ultima Terminal. This is an effective and sensible way to minimise the impact of traffic noise on local roads.

Natural areas

The IAC considers it does not have adequate information to determine the category to ascribe the five natural areas. In regard to construction noise impacts, the IAC notes this primarily relates to the installation of the water pipeline. The impact would be limited to daytime hours and be for a period of 1 to 2 days. The IAC does not consider this level of impact would be unacceptable but notes MM-NV02 requires noise emissions to be minimised so far as reasonably practicable.

Operational mining noise could be a potential concern at Talgitcha Bushland Reserve. The IAC does not have sufficient evidence to be able to ascribe a land use category to this or other reserves. This matter can be dealt with in the NMP required under MMNV09 by requiring an assessment of the appropriate categories to be assigned. This would be the basis for assessing the significance of any exceedances. Further modelling would be done once the equipment and plant to be used is known and factors such as the duration and magnitude of any potential noise impact as mining proceeds below grade would inform whether additional noise mitigation measures are warranted. The IAC recommended EMF includes an amended MM-NV09 to include this requirement.

(v) Findings

The IAC finds:

- The EES has appropriately assessed the level of low frequency noise, traffic impacts and impacts on natural areas.
- Residual noise impacts can be suitably managed through the EMF and NMP.
- Traffic noise impacts can be suitably managed through the EMF and TMP.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-NV09 to require consideration of land use categories specified in the Environment Reference Standard.

These changes are included at appendix E.

8.6 Overall conclusions on noise and vibration effects

Subject to the IAC's recommendations, there are no noise or vibration impacts that preclude the Project being approved or the draft evaluation objectives being achieved.

9 Air quality

9.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.

Air quality is discussed in EES chapter 12 and technical report G.

The exhibited EMF includes the following mitigation measures:

- MM-AQ01 Minimise air emissions as far as reasonably practicable – General practice (dust environmental management plan)
- MM-AQ02 Minimise air emissions as far as reasonably practicable – Mine planning
- MM-AQ03 Minimise air emissions as far as reasonably practicable – Process plant
- MM-AQ04 Minimise air emissions as far as reasonably practicable – Public roads
- MM-AQ05 Minimise air emissions as far as reasonably practicable – General Practice (best practice)
- MM-AQ06 Minimise air emissions as far as reasonably practicable - Equipment and Plant Exhaust Emissions.

Additionally, the IAC had regard to:

- relevant submissions and evidence
- response to themes raised in submissions (D93)
- information in relation to the hydromet plant (D98)
- response to IAC RFIs (D248)
- joint statement of air quality experts (D105).

Table 10 lists the air quality evidence.

Table 10 Air quality evidence

Party	Expert	Firm	Area of expertise
Proponent	Dr Jason Shepherd	SLR Consulting Australia	Air quality
MFMF	Peter Ramsey	Peter J Ramsey and Associates	Air quality

Emissions to air may arise during the construction and operational phases of the Project. Dust may become airborne from mining haul trucks travelling on dirt roads, excavation, transfer and storage of soil, overburden and ore as well as from the surface of the mine. Emissions will also arise from the power plant and the processing plant.

9.2 Dust

(i) The issues

The issues are whether the impacts of dust emissions have been appropriately identified and the proposed controls are appropriate to achieve acceptable environmental outcomes.

(ii) What did the EES say?

The main air impact associated with this Project is dust and particulate matter. Particulate matter is classified by its size, the smallest is $PM_{2.5}$ (a diameter of 2.5 micrometres (0.0025 mm) or smaller), the next is PM_{10} (a diameter of 10 micrometres (0.01 mm) or smaller). Total Suspended Particulates (TSP) and nuisance dust are the larger particle sizes capable of becoming airborne with nuisance dust settling earlier than TSP.

Pipeline construction would progress linearly along the pipeline route with the corresponding potential for dust emissions also moving along the route as work progresses. Sensitive receptors would only be exposed to these emissions for one to two days and only during daylight hours. The EES assessed dust impacts from the pipeline construction as low to negligible.

A qualitative risk assessment was used to assess the risk of dust impacts from the construction of the processing plant. As the nearest receptor is 900 metres from the construction site boundary, dust and health impacts were assessed as low.

The main background sources of particulate matter in the area include agricultural activities, wind erosion, grass/brush/bush fires, controlled burns and dust storms. A baseline ambient air quality monitoring program was undertaken between January 2019 and September 2020, including:

- continuous monitoring of PM_{10} and $PM_{2.5}$ at one location
- batch monitoring of respirable crystalline silica (RCS) (as $PM_{2.5}$) and heavy metals (as PM_{10}) at one location
- dust deposition monitoring at five locations.

The assessment of dust impacts was based on criteria specified in the *Guideline for Assessing and Minimising Air Pollution in Victoria*, EPA 2022 (Publication 1961) which lists air pollution assessment criteria (APACs).

Table 11 Air Pollution Assessment Criteria

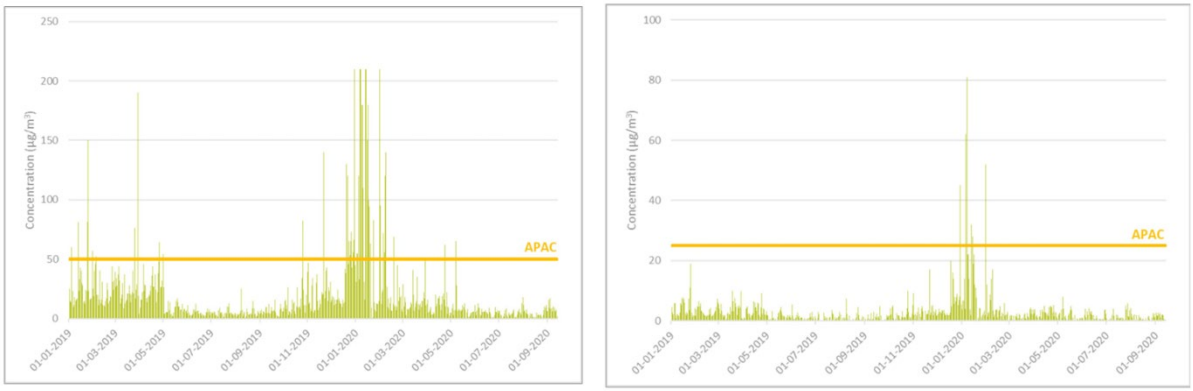
Indicators	Objectives	Averaging period
Particles as PM_{10} (maximum concentration)	50 µg/m^3	1 day
	20 µg/m^3	1 year
Particles as $PM_{2.5}$ (maximum concentration)	25 µg/m^3	1 day
	8 µg/m^3	1 year
Visibility reducing particles (minimum visual distance)	20 km	1 hour

Note: µg/m^3 = Microgram per cubic metre

A dust deposition rate of 4 g/m^2/month (no more than 2 g/m^2/month above background), as a monthly average, taken at the boundary of an industrial premise, has commonly been used to assess mining impacts. Under the EP Act, the GED requires the ongoing review of operational controls and management practices to prevent and minimise dust nuisance as far as reasonably practicable, even if the guideline threshold of dust deposition is met.

Time varying background concentrations (24-hour averages) of PM_{10} and $PM_{2.5}$ recorded at the Project area between January 2019 and September 2020 were included in the models so that the cumulative 24-hour and annual average concentrations (Project impact plus background) could be assessed against the criteria. By utilising both datasets, the potential cumulative impacts during a bush-fire impacted year (2020) and a normal year (2019) were assessed.

Figure 17 Site background PM_{10} and $PM_{2.5}$ concentrations



Source: EES technical report G figures 16 and 17

Emission estimations

Fugitive emissions of TSP, PM_{10} and $PM_{2.5}$ were estimated using published emission factors from the National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Mining.

Based on the typical evaporation rates for the area and a worst-case traffic frequency of up to 25 trips per hour, a control of greater than 95 per cent was calculated for the Project on-site haul roads.

The primary contributor to the predicted dust impacts was wheel generated dust associated with haulage of topsoil, overburden and ore. While the determined control efficiency was based only on watering roads, the EES found that other measures such as the maintenance of haul road surfaces and use of chemical stabilisers would provide additional mitigation.

Emissions from stockpiles and exposed areas were estimated using the default values in the NPI Mining Manual and assumed a dust control efficiency of 50 per cent. Dust arising from trucks unloading to the topsoil, overburden and clay stockpiles plus unloading ore at the MUP and loading ore into the MUP was also calculated using NPI estimation methods and assumed a dust control factor of 70 per cent based on the proposed management practices.

Control measures

Dust controls proposed included water sprays, misting systems and water trucks. To minimise wheel generated dust, haul roads would preferably be prepared and maintained with low silt content material. Additional mitigation measures included reducing the speed of vehicles on the haul roads and increasing the water application rate on roads during periods of hot and dry weather.

To control dust from stockpiles, the EES relied on the following measures:

- compaction of stockpile batters to reduce the amount of loose material that can be eroded by wind
- periodic application of emulsions and polymers to the surface of stockpiles
- product stockpiles located within roofed and three-sided shelters.

A real-time monitoring program would be implemented with monitoring results being reviewed and used to gauge the effectiveness of mitigation measures and whether additional measures are required.

Impact modelling

Dust emissions from the Project were estimated on the basis of emission factors for all the relevant activities, volumes to be handled, equipment proposed to be used and locations of activities under the four worst-case mine operational scenarios described in table 8.

Modelling was undertaken using AERMOD and used meteorological data from Swan Hill for five years (2017 to 2021) with the maximum or worst-case impacts identified and assessed.

AERMOD was also used to predict maximum cumulative pollutant ground level concentrations resulting from emissions to air and existing background concentrations.

Elevated background concentrations of PM_{10} and $PM_{2.5}$ exceeded the 24-hour criterion at all receptors before the Project contribution is considered. No exceedances of the PM_{10} 24-hour APAC were predicted as a result of the Project alone.

The EES concluded that maximum Project contributions would be relatively minor and would be unlikely to result in any measurable increase in the annual average concentration to PM_{10} and $PM_{2.5}$.

Heavy metals and respirable crystalline silica

The proposed mining operations involve the handling of mineralised ore. The dust produced would include metals and silica. Heavy metals were considered as a fraction of PM_{10} and deposited dust.

Particulate samples collected during 2019 were analysed on 17 occasions for heavy metals. Similarly, during January to August 2019, multi-day samples of particulates were analysed on 14 occasions for RCS.

The maximum predicted cumulative annual average metal concentrations are summarised in table 12, with the EPA APACs and background concentrations used in the modelling. Table 13 shows the predicted impact at Receptor R12 under Scenario 1 with the highest results of any Receptor.

The EES also provided an estimation of the potential deposition of metals into rainwater tanks at sensitive receptors due to the Project. The assessment was based on an average rainfall of 300 millimetres per year and all metals dissolving in the water.

Table 12 Maximum predicted annual average metals air concentration

Most Impacted Receptor R12 – Scenario 1							
		Annual Average Concentration µg/m³				Project Contribution	
Metal	Fraction of PM_{10}	Project	Background	Cumulative	APEC µg/m³	Relative to APEC	Relative to Background
Arsenic	0.011%	0.00011	0.0020	0.0021	0.007	1.6%	5.6%
Cadmium	0.021%	0.00022	0.0040	0.0042	0.005	4.5%	5.6%
Chromium	0.13%	0.0014[b]	0.025	0.026	0.005[a]	28%	5.6%
Copper	0.079%	0.00084	0.015	0.016	-	-	5.6%
Lead	0.15%	0.0016	0.028	0.030	0.5	0.3%	5.6%
Manganese	0.28%	0.0030	0.053	0.056	0.15	2.0%	5.6%
Mercury	0.016%	0.00017	0.0030	0.0032	1	0.02%	5.6%

Nickel	0.15%	0.0016	0.028	0.030	0.09	1.7%	5.6%
Vanadium	0.042%	O.00045	0.0080	0.0084	-	-	5.6%
Zinc	0.31%	0.00326	0.056	0.061	2	0.2%	5.6%

Source: EES technical report G, table 43

[a] APAC is for hexavalent chromium (Cr^{6+})

[b] Chromium found in natural environment would be trivalent chromium (less toxic than Cr^{6+})

Table 13 Maximum predicted annual average metals deposition in rainwater tanks for most affected receptor

Metal	Maximum Annual Average Deposition Rate (mg/m²/year)	Maximum Project Contribution to Rainwater Tank Concentration (mg/L)	Drinking Water Guideline (mg/L)
Arsenic	0.18	0.00060	0.010
Cadmium	0.36	0.0012	0.002
Chromium	2.3	0.0075	0.05
Copper	1.4	0.0045	2
Lead	2.5	0.0084	0.01
Manganese	4.8	0.016	0.5
Mercury	0.27	0.00090	0.001
Nickel	2.5	0.0084	0.02
Vanadium	0.72	0.0024	-
Zinc	5.3	0.017	3.0

Source: Derived from EES technical report G, table 69. Note: mg/L = milligram per litre

Background or ambient levels of RCS (as $PM_{2.5}$), air monitoring was conducted between January 2019 and September 2020 at one location. Background RCS was estimated to range from 0.046 to 0.21 µg/m^3 as an annual average. The EES modelled potential impacts from the Project, assuming RCS emissions for all activities make up 100 per cent of $PM_{2.5}$ emissions. The highest result at any Receptor for the Project alone contributed 7 per cent of the APAC or less than half of the background level.

(iii) Evidence and submissions

Many submissions raised concerns about the impact of dust on health and amenity, including RCS and dust toxicity due to heavy metals.

Emission estimations

MFMF's air expert, Mr Ramsay, considered the Proponent had failed to take into account nuisance dust and therefore underestimated the total amount of dust emitted from the MLA. He noted that while the Proponent had modelled for TSP with an upper size limit of 30 to 50 µm, larger particles had not been included. He referred to a paper, *Particle Size Distribution of Settled Dust*[39] which assessed that the bulk of the dust with a particle size greater than 40 µm size settled within 120 metres of the source.

[39] Fairweather, et. al., 1965

Dr Shepherd agreed larger particles were not included in the estimations or the model, as larger particles would fall to ground within or close to the Project boundaries and with the closest receptor over 600 metres distant, omitting particles greater than 30 µm would not make any material difference to the assessment outcomes.

Impact modelling

Mr Ramsay reviewed the regional meteorology and found it to be comparable to that used in the AERMOD model. He also characterised the topography as consisting of flat to slightly sloping with less than 50 metres of elevation change over 50 kilometres from the Project site.

Control measures

The EPA submitted the dust impact assessment associated with haul roads is based on an optimistic assumption that dust control of 95 per cent efficiency will be achieved.

Dr Shepherd's evidence was that a combination of measures would be required to achieve this level of dust control including:

- preparing and maintaining level and well finished haul road surfaces
- regular grading, gravelling and resurfacing of heavy traffic areas, such as intersections, to reduce silt build-up
- attentive monitoring and application of suppressants as surfaces dry out
- maintaining a spray water regime to the surface of high traffic routes using a water and environmentally friendly organic based resins
- regardless of posted speed limits, road trucks travelling to and from the Project on unsealed public roads should be advised to travel at reduced speed to reduce wheel generated dust - speed reductions on-site may be necessary during hot and dry conditions where excessive wheel generated dust is observed.

At the air quality expert conclave (D105), Dr Shepherd clarified that fugitive emissions from product storage were not assessed as the product would be in the form of a 'damp cake' within enclosable sheds prior to placement in sealed containers.

GSC identified that it operates a limestone quarry and has had good results using magnesium chloride to manage dust from roads within its quarry.

The EPA's view was that on public roads vehicle speeds should reduce to 20 km/hr within 500 metres of sensitive receptors on sealed and unsealed roads, otherwise 50 km/hr with appropriate signage to minimise dust generation.

Dr Shepherd's view was that these speeds may not be reasonably practicable from an operational perspective, nor would it be necessary in all conditions (e.g. wind blowing from sensitive receptor to haul road).

When questioned by the IAC on constructing roads with low silt content soils on the final surface of haul roads, Dr Shepherd supported the inclusion of such a mitigation measure but could not specify a value for silt content.

Dr Shepherd's evidence statement (D18) included a technical memorandum discussing whether sealed roads on the Project site would reduce dust emissions. The memorandum concluded that paving haul roads is unlikely to be a reasonably practicable control, primarily due to the cost of construction of temporary sealed roads capable of handling 240 tonne laden haul trucks, the

similar levels of active management (sweeping, vacuum sweeping and washing) required, and the modest/minimal dust emissions improvement compared to controlled unsealed roads.

In regard to product storage within sheds, Dr Shepherd's oral evidence was that the sheds would be enclosed on three sides and have doors on the fourth to allow for the movement of people and product in and out. He explained the product would be in a 'cake' like state and would dry in the shed.

Heavy metals and respirable crystalline silica

Mr Ramsay expressed the view that the ratio of heavy metals in the dust emitted from the Project may change as different soils are disturbed and the mineral sands are mined. He identified lead as a particular concern as the predicted maximum annual average lead concentration in tank water from dust deposition was predicted to be 0.0084mg/L which is 84 per cent of the drinking water guideline criterion for lead.

Dr Shepherd acknowledged in his evidence statement that he now held the view, as distinct from that expressed in the EES, that metals deposition indicate dust from the Project at the most impacted receptor may lead to concentrations of lead and mercury in rainwater tanks that approach the Australian Drinking Water Guidelines (ADWG) for these metals. He believed, however, that the ADWG levels for these metals are unlikely to be exceeded. He explained this was due to averaging analytical results with some results reported as being less than the limit of reporting (LOR), but the value used in the calculations was the higher LOR. He noted that several of the LOR concentrations were an order of magnitude greater than actual detected concentrations reported for other months. His view was that including these elevated LOR results artificially increased the annual average concentration.

Regarding the ratios used to proportion metals in the dust, Dr Shepherd's evidence was that as most of the dust produced is from soils and overburden (primarily from dirt roads on-site) rather than from the ore, the metals would be similar to that measured in the ambient PM_{10} monitoring. Monitoring for metals (as PM_{10}) at a location(s) representative of sensitive receptor(s) to demonstrate that emissions are being controlled adequately to meet relevant APACs is proposed in the EMF.

Submissions identified concerns about the health impacts of RCS but did not comment on how it was assessed in the EES.

(iv) Discussion

Emission estimations

The IAC notes the evidence of Mr Ramsay that larger dust sizes do not travel far from where they are produced and is satisfied the EES did not need to include larger particle sizes in the dust impact modelling. It is also noted there was no disagreement at the air expert conclave that the EPA does not recommend the use of AERMOD to predict particle deposition of nuisance dust.

In regard to the estimations, the IAC is satisfied the major sources of dust from the Project have been identified and modelled according to the procedures described in the appropriate NPI, Emission Estimation Technique Manual.

The IAC is satisfied the dust impact risk assessment of constructing pipeline option A3 would not change if option A2 was adopted. Dust impacts can be mitigated, are of short duration and the alternative route has only one additional receptor.

Control measures

The GED is the cornerstone of the EP Act and requires anyone conducting an activity that poses risks of harm to human health and the environment to minimise those risks, so far as reasonably practicable. Doing what is 'reasonably practicable', means putting in controls to eliminate the risk of harm to human health and the environment so far as is reasonably practicable. If eliminating the risk of harm is not reasonably practicable, then the risk of harm must be reduced so far as reasonably practicable.

Mr Ramsay noted that a mining separation distance for dust of 250 metres is specified in *Recommended separation distances for industrial residual air emissions* (EPA Publication 1518). He also noted it recommends a separation distance of 500 metres for non-ferrous metal production, such as the proposed processing plant. There are no sensitive receptors within these separation distances. The closest receptor is R13 at a distance of approximately 900 metres from the processing plant and 600 metres from a topsoil stockpile.

In regard to the specified control efficiency of 95 per cent for haul roads assumed in the estimation modelling, the IAC notes the NPI reference manual for mines specifies for haul roads:

- 50 per cent for level 1 watering (2 litres/m^2/hr)
- 75 per cent for level 2 watering (>2 litres/m^2)
- 100 per cent for sealed or salt crusted roads.

EES technical report M and Land Resources Assessment identified the silt content within the top metre of the Project site which ranged from about 1 to 27 per cent. The estimations of dust emissions from haul roads was based on a silt content of 4.8 per cent.

The approach to dust management of assessing the sources of dust, the application of water and other agents combined with real time monitoring to guide any additional measures accord with the 'all practicable measures approach'. The IAC considers however, it is appropriate (and agreed by Dr Shepherd in response to questioning from the IAC) that limiting the silt content of roads would be a good mitigation measure. The NPI estimation manual for mines refers to a default value for surface material silt content of 10 per cent. The IAC therefore considers it appropriate to restrict the silt content of the surface of roads to 10 per cent with the ability to review this subject to ERR agreeing to a higher silt loading based on still achieving a satisfactory outcome. This is addressed in the recommended MM-AQ02.

The IAC is unable to determine whether sealing internal haul roads is practicable or if it would result in a significant reduction in dust emissions from vehicles. This is a matter that ERR should review in conjunction with the EPA.

To mitigate any release from product storage shelters, the IAC considers doors must remain closed unless plant or people are entering or exiting the buildings. This has been incorporated in the recommended MM-AQ03.

Impact modelling

The Proponent used the air pollution model AERMOD to model emissions from the mine, power station and pump station. This program is the regulatory model prescribed by the EPA to be used unless it approved the use of a different model.

The IAC is satisfied that the Proponent has appropriately modelled the dust impacts.

Heavy metals and respirable crystalline silica

The IAC generally accepts the evidence of Dr Shepherd regarding the estimations of heavy metals. However, it considers it appropriate that a continuous air monitoring program be developed to provide real time information so that corrective actions can be taken to minimise any impacts.

The most critical potential impact is heavy metals contamination of rainwater tanks used for domestic water supply. The IAC considers it appropriate to test the quality of the water in rainwater tanks within one kilometre of the Project site and supports the proposed mitigation measure. The suggestion of Ms Carruthers (D280) to extend the range of testing based on results of the testing is sensible and is included in the IAC's revised MM-AQ07.

(v) Findings

The IAC finds:

- The EES has appropriately assessed the dust impacts of the Project.
- Dust impacts can be suitably managed through the recommended EMF.
- There is little difference between the dust impacts of the pipeline route option A3 to the alternative option A2, with A3 providing a marginal benefit.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-AQ02 to specify a maximum silt content for road surface construction

b) revised MM-AQ03 to require doors of product storage sheds to be closed unless plant or people are entering or leaving the building

c) revised MM-AQ07 to extend the range that rainwater tank testing is offered if warranted by the results of testing.

These changes are included at appendix E.

9.3 Power station and pump station

(i) The issue

The issue is whether the emissions from the power station and pump station have been appropriately assessed.

(ii) What did the EES say?

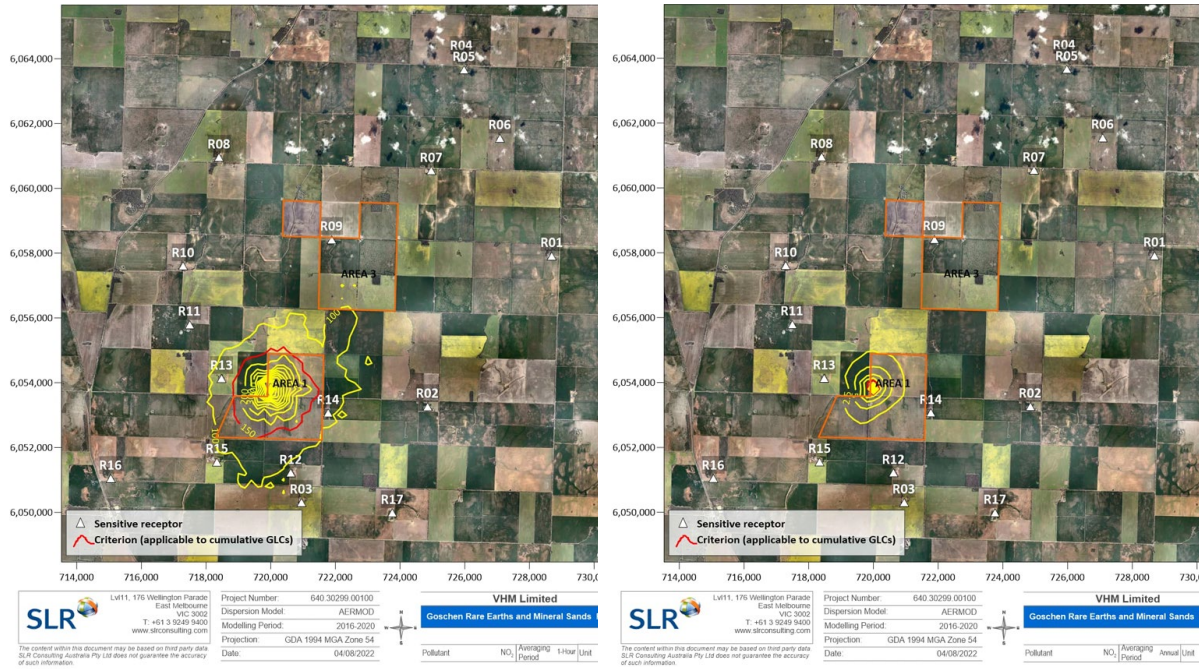
Estimated emissions from the 12 megawatt (MW) power station were based on 12 duty and 2 standby 1.0 MW diesel reciprocating generators. The generators would be housed in a single building, each serviced by an individual exhaust stack. The Project proposes to use dual fuel diesel/LNG fired generators with the EES assessing the generators as running solely on diesel.

AERMOD was used to model the worst-case power station and pump station emissions. Inputs to the model were the manufacturer reported emission rates for the engines, local meteorological data, the local terrain, discharge points elevations and dimensions of the power station itself.

Nitrogen dioxide (NO_2) levels were predicted to result in exceedances of the 1-hour average NO_2 concentration APAC to about 700 metres beyond the Project boundaries. It was also predicted to exceed the annual average APAC relating to terrestrial vegetation beyond the Project boundary, covering an area of approximately 2.5 hectares.

For the water pump station, modelling showed that NO_2 levels would exceed the 1-hour average NO_2 concentration APAC to about 15 metres from the shed.

Figure 18 Maximum predicted 1-Hour and Annual average NO_2 concentrations



Source: EES technical report G, figures 53 and 54

(iii) Evidence and submissions

In response to the IAC's RFI, the Proponent clarified the height of the highest part of the power station[40]. The height was revised from 6 metres as stated in the EES to 6.5 metres with the exhaust stack height of 8.4 metres. When questioned by the IAC, Dr Shepherd agreed that dispersion of the emissions would be enhanced if the exhaust was at least 3 metres above the roof height.

Dr Shepherd was asked by the IAC if the emissions from the power station and pump station were based on an uncontrolled source. He confirmed that the modelled NO_2 emissions assumed no specific emission controls such as selective catalyst reduction using AdBlue which would reduce actual emissions of NO_2 from the generators.

(iv) Discussion

MM-AQ06 specifies that the diesel generators will have emission reduction technology such as selective catalytic reduction (e.g. use AdBlue) or use LNG/LPG. The modelled NO_2 emissions from the power station were based on no emission controls. The actual exceedance, if any, of the NO_2 APAC predicted off-site would be less than that shown in the EES. Dr Shepherd was not able to say what improvement he would expect. The development licence application states that "… *selective*

40 D248 item 43

catalytic reduction is an advanced emissions control technology that reduces NO_2 emissions by approximately 90%."

Dr Shepherd agreed with the IAC's proposition that raising the height of the discharge points for the generators to at least three metres above the roof line of the power station would also reduce the levels of NO_2 near the boundary of the site.

The IAC considers that selective catalytic reduction and revised stack height would readily address the extent and magnitude of any exceedance of the NO_2 APAC.

(v) Findings

The IAC finds:

- The EES has assessed the impacts of the power station and water pump station without considering the benefit of the proposed emission controls.
- The modelled impact of the power station and the pump station would be significantly reduced with the application of reasonable available emission control devices and changes to the exhaust height of the generators.
- To demonstrate the reduced range of any impacts of emissions from the power station and pump station, the EPA should require remodelling after the Proponent demonstrates an all-practicable measures approach to reducing emissions and improving dispersion.
- Air quality impacts of the power station can be suitably managed through the recommended EMF.

(vi) Recommendations

The IAC recommends:

K01 (Power generation) development licence

The Proponent should address the following in support of the development licence application:

a) Confirm the dimensions of the power station and pump station and the dimensions of any nearby structures.

b) Confirm stack heights are adequate to ensure good dispersion.

c) Confirm the intention expressed in section 8.1.2 of the exhibited development licence application that emissions from the power station and pump station have been minimised as far as reasonably practicable by using selective catalytic reduction such as AdBlue or equivalent technology.

9.4 Other potential sources of air emissions

(i) The issue

The issue is whether other sources of potential air emissions have been omitted from the EES assessment that would significantly affect the findings of the EES.

(ii) What did the EES say?

In regard to particulate modelling, the EES identified the following sources of air emissions:

- excavator loading topsoils, clay and overburden to truck

- excavator loading ore to truck
- truck hauling to and from topsoil/clay/overburden stockpiles
- truck hauling to and from ore pad at MUPS
- truck unloading to topsoil/clay/overburden stockpiles
- truck unloading to ore pad at MUPS
- loader loading ore to MUPS
- bulldozer movement of topsoil/clay/overburden
- clay stockpile/overburden bulldozer
- wind erosion of Blocks/stockpiles and ore pad.

For other gaseous emission sources:

- powerhouse
- pump station.

EES chapter 3 describes the three stages of treating or processing the ore (see section 2.1 of this report). The REMC flotation plant (Phase 1) would be constructed first. Within a year of the Phase 1 plant being constructed, the REMC would be further processed (Phase 1A) at the hydromet and a zircon titania concentrate produced which would be dewatered and processed at a mineral separation plant as part of Phase 2 mining operations.

The hydromet plant (Phase 1A) produces a rare earth carbonate. The feedstock to the circuit is REMC, which would be dewatered in an indirectly heated electric dryer and then discharged to a paddle mixer where concentrated sulphuric acid is added to make a paste in preparation for baking in a gas fired kiln.

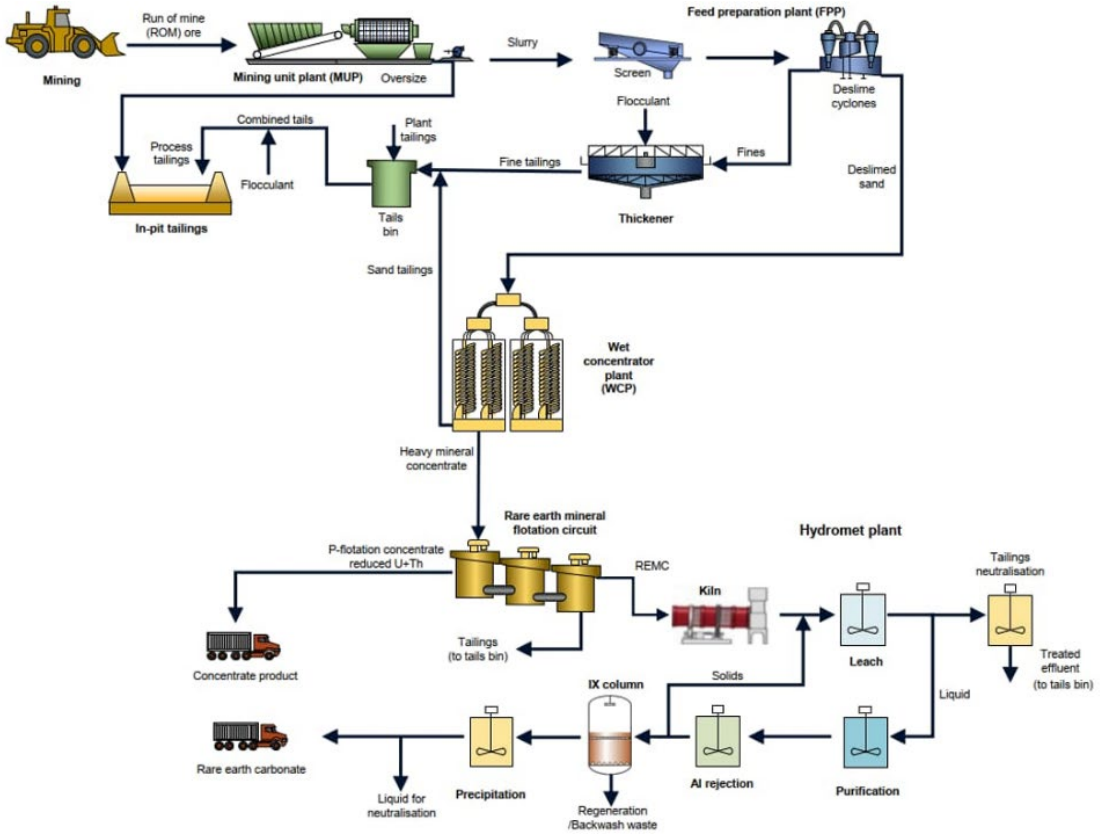
(iii) Evidence and submissions

Mr Ramsay's evidence was that the activities relating to the processing plant and MUP will generate particulate emissions. In particular, the emissions from crushing and grinding, the sulfation furnace, and drying of refined product can generate particulate emissions.

On day one of the Hearing, the Proponent provided additional information on the processing plant, and Mr Beers, a consulting metallurgist, provided an explanation of the hydromet plant (D98). He described the following features of the proposed plant depicted in figure 19:

- The REMC feed is received from the wet concentrator plant and is first filtered to form a wet cake.
- The filter cake is fed to a gas fired rotary drier approximately 0.8 x 6 metres long. Off-gas is passed through a bag house filter to remove dust.
- The dried REMC (approximately 1.6 tonnes per hour) is mixed with sulfuric acid using a twin paddle 'pug mixer' to form a paste.
- The paste is then fed to a rotary kiln that is also heated by natural gas to 275 degrees celsius. The kiln is 1.8 x 12 metres long.
- The solids discharge from the kiln discharges directly to the water leach quench tank.
- The off-gasses from the kiln are treated via a venturi scrubber followed by a lime scrubber with an electrostatic precipitator (ESP) to remove any particulates.

Figure 19 Phase 1A mining process circuit



Source: EES chapter 3, figure 3-12

In response to the IAC's RFI, Dr Shepherd's evidence statement explained the kiln and dryer are expected to use approximately 3 gigajoules per hour (or 22,500 gigajoules per annum) of natural gas. To gauge the relative significance of emissions from the kiln and dryer, he compared the NO_2 emissions of the power station of 24 g/s to that from the kiln and dryer of 0.1 g/s. A Scope 1 greenhouse gas calculation was provided in his statement.

(iv) Discussion

The IAC accepts that emissions from the processing plant such as from the kiln and dryer, but not including the power station, are not of a magnitude that would require their inclusion in an EPA licence. Exemptions apply to sources other than an afterburner and incinerator discharging less than 100 kilogram per day of oxides of nitrogen.

The IAC acknowledges that detailed design was not done at the time the EES was prepared and hence drawings of processes were simplified as shown in figure 19. While more detail was provided at the Hearing, the air quality management plan needs to be informed of all emissions to air, even those that may not merit inclusion within the EPA licence. The inclusion of this information is required under the IAC's recommended MM-AQ08 that also specifies mitigation measures supported in evidence. The air quality management plan would need to be updated to include this information in an amended MM-AQ01.

(v) Findings

The IAC finds:

- The EES has appropriately assessed emissions from the processing plant.
- Air emissions from the processing plant can be suitably managed through the recommended EMF.
- Further modelling and assessment of air impacts downstream of the processing plant need to be undertaken to inform the air quality management plan.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) new MM-AQ08 to require the assessment of all air emissions from the processing plant

b) revised MM-AQ01 to require the air quality management plan have regard to MM-AQ08.

These changes are included at appendix E.

K01 (Power generation) development licence

The Environment Protection Authority Victoria should review emissions from the processing plant to establish whether the prescribed exemptions for general discharges or emissions to the atmosphere apply.

9.5 Overall conclusions on air quality impacts

Subject to the IAC's recommendations, there are no air quality impacts that preclude the Project being approved or the draft evaluation objective being achieved.

10 Surface water

10.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Kerang Wetlands Ramsar site) over the short and long -term.

Surface water is discussed in EES chapter 13 and technical reports H1 and H2.

The exhibited EMF includes the following mitigation measures:

- MM-SW01 Development of a Surface Water Management Plan (SWMP) for construction, operation and closure activities
- MM-SW02 Final design of mine site water storages and drainage infrastructure to ensure they can accommodate nominated storm events
- MM-SW03 (in relation to revegetation)
- MM-SW04 (in relation to spill control)
- MM-SW05 (in relation to culverts)
- MM-SW06 (in relation to diversions)
- MM-SW07 (in relation to design).

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248).

Table 14 lists the surface water evidence.

Table 14 Surface water evidence

Party	Expert	Firm	Area of expertise
Proponent	Adrian Moon	Pitt and Sherry	Surface water
MFMF	Dr Phillip Macumber[41]	Phillip Macumber Consulting Services	Hydrology

10.2 Site water management

(i) The issues

The issues are whether the site is subject to flooding and if contaminated stormwater would leave the site.

(ii) What did the EES say?

The Project intends to contain all water from disturbed catchments on-site and not permit offsite release until the MLA is rehabilitated. Surface water from disturbed areas within the site will be

[41] Dr Macumber was also referenced as a co-submitter for submission S79.

captured in water management basins. Captured water may be used on-site for dust suppression and irrigation.

The MLA comprises various stockpiles and mine operation facilities which would drain to detention ponds within each stormwater basin. Each of these basins is sized to contain the run-off generated in a 5% Annual Exceedance Probability (AEP) rainfall event for all durations. Runoff generated from more extreme events would be directed to the mine pits.

The Project is located at the top of the catchment, in an area with flat topography, low rainfall, high evaporation, deep water table and very low erosion risk. The site has an inherently low risk for sediment transport in surface water.

The Cannie Ridge acts as a surface water divide which distributes surface water flows to the northeast and west portions of the site down to the Lalbert Creek floodplain and towards Lake Boga.

Based on the local topography and catchments, there are no flow paths connecting the Project mining areas to the Murray or Avoca River floodplains, or to the Kerang Wetlands Ramsar site. Water from the MLA flows to the west down to the Lalbert Creek floodplain and to the northeast towards a channel draining to Lake Boga.

The assessment considered:

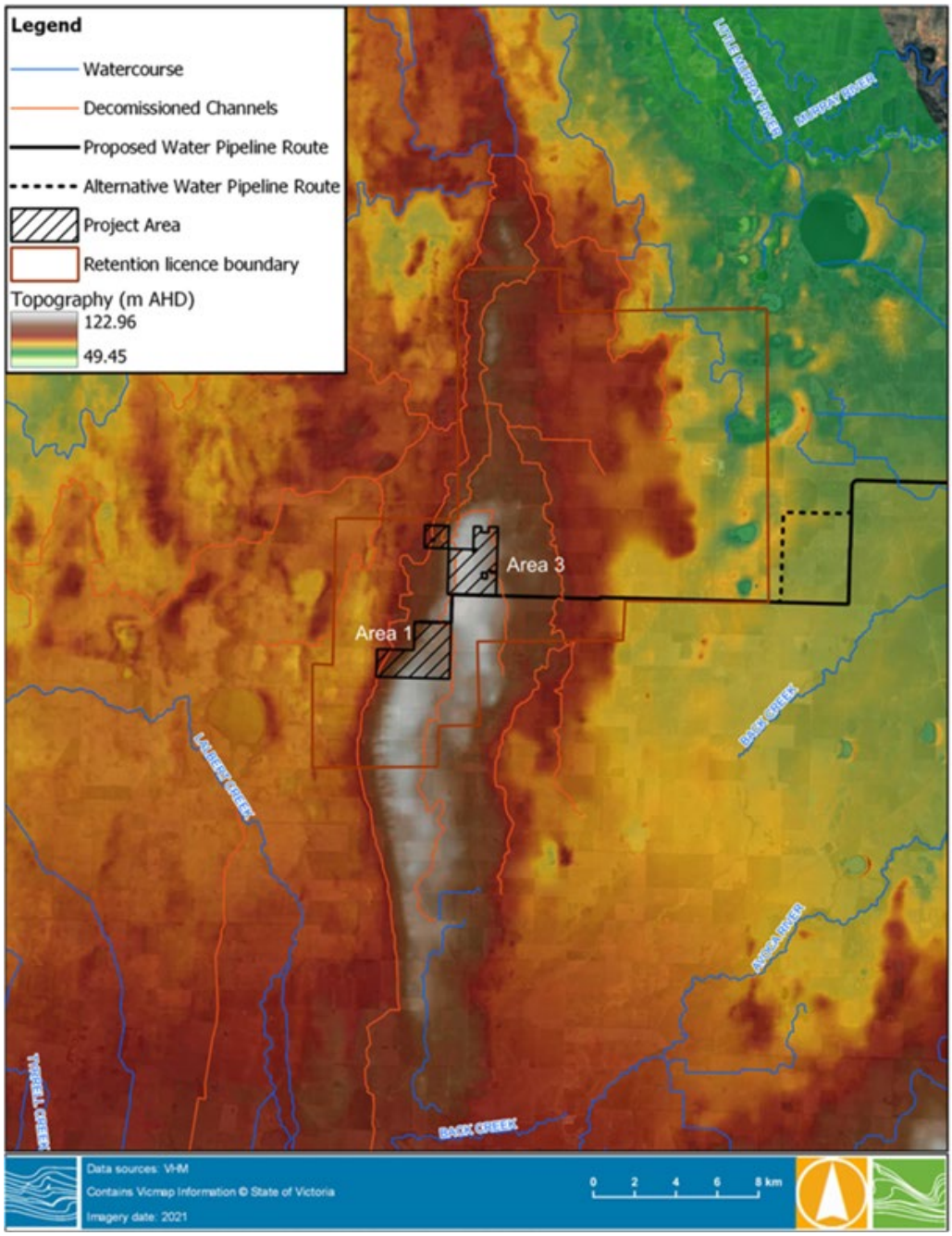
- riverine flooding
- direct/localised catchment inundation
- regional surface water contributions to downstream environments and the size of the required mine infrastructure to retain all surface water runoff from disturbed areas
- existing water quality
- the potential impact of climate change.

Modelling the 1% AEP flood showed the MLA is generally not affected by riverine flooding. The extent of flooding just touching the south-west and south-east extractive licence boundaries from Lalbert Creek and Back Creek.[42]

A water quality monitoring program within the MLA would be established throughout the mine's progressive development. Water sampling specified in the SWMP would be dependent on sufficient rainfall to produce water flows. The EES outlines sediment and erosion control measures that would be implemented through the SWMP prior to any ground disturbance works and throughout constructions.

[42] See EES chapter 13, figure 13-7: Modelled 1 % AEP riverine flooding

Figure 20 Topographic data



Source: EES chapter 13, figure 13-4

(iii) Evidence and submissions

Many submitters who presented at the Hearing, including the Pola and Bennett families, provided photographs showing sheets of water laying in paddocks or along roads.

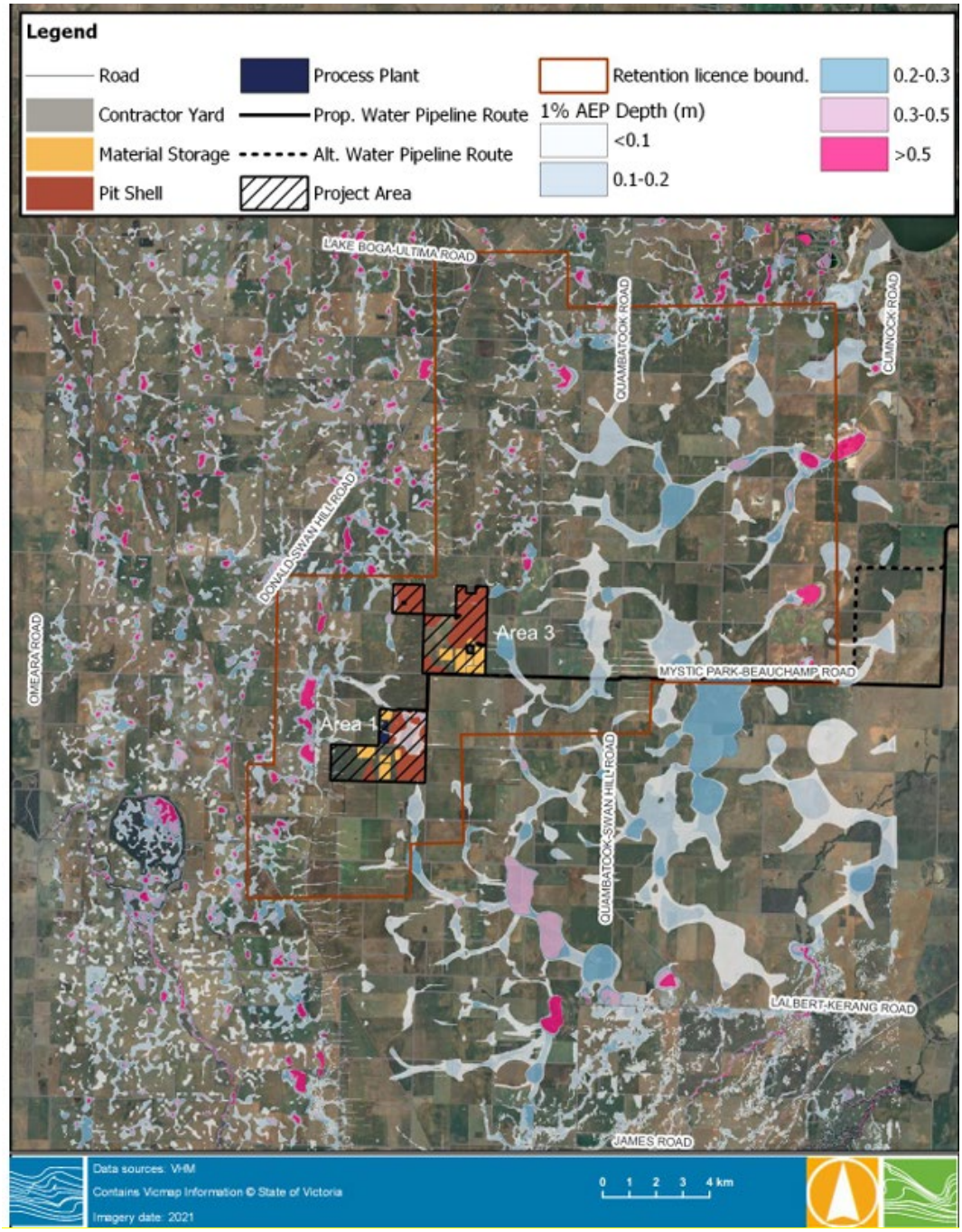
Mr Moon provided surface water evidence on behalf of the Proponent and explained the difference between flooding and stormwater inundation:

> Flooding is defined as the covering of normally dry land by water that has escaped or been released from the normal confines of a natural watercourse, reservoir, canal or dam.[43]

[43] D16, paragraph 5.3, page 10

He noted the MLA is not impacted by riverine flooding, but localised stormwater inundation is observed as shown in figure 21.

Figure 21 Modelling 1% AEP stormwater inundation



Source: EES chapter 13, figure 13-8

Mr Moon's evidence was that containment of additional surface water from storm events greater than the 5% AEP design storm can be achieved by directing the excess surface water to the mine pit or other appropriately sized containment structures via channels and bunds or through pumps and pipes. He considered the proposed drainage strategy is consistent with the GED and implements the recommendations in the ERR codes of practice and the best practice erosion and sediment control guidelines for management and treatment of surface water. The proposed drainage strategy is considered achievable and practicable.

(iv) Discussion

Many of the submitters due to their long connections with the land provided their understanding of how water flows in the area around the MLA. The areas that submitters identified following the episodes of locally significant rainfall aligned with the stormwater inundation modelling in the EES.

The IAC is satisfied that the strategy of constructing drains and bunds to prevent off-site discharges from processing areas, stockpile areas and the mine are readily achievable making good use of the topography to capture and channel water flows.

To verify the performance of surface water infrastructure, a monitoring program must be capable of providing sufficient confidence the SWMP systems are functioning properly, and the quality of any discharge is acceptable. The SWMP must also be flexible so it can adapt to statutory requirements and monitoring results, particularly if testing results and observations indicate a potential concern. This can be achieved through the recommended revisions to MM-SW01.

(v) Findings

The IAC finds:

- The EES has appropriately assessed flooding and inundation risks associated with the Project.
- The Project does not pose a risk to surface waters or the Kerang Ramsar Wetlands site.
- Surface water impacts can be suitably managed through the recommended EMF.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-SW01 to require the surface water management plan reflect statutory requirements and the results of monitoring.

This change is included at appendix E.

10.3 Chemical management

(i) The issue

The issue is whether there is an unacceptable risk of chemical contamination from stormwater exiting the MLA.

(ii) What did the EES say?

The EES assessed the risk of stormwater runoff containing sediment and other contaminants from development activities as well as chemical contamination from re-fuelling stations and chemical storage facilities.

To reduce risk of contamination from fuels and chemicals, the amounts stored on-site would be minimised and placed in facilities designed in accordance with the EPA Victoria Publication 1698 – *Liquid storage and handling guidelines* and AS 1940:2004 – *The storage and handling of flammable*

and combustible liquids. Contingency plans for clean-up and management of spills would be implemented.

These guidelines require internal storages and drainage infrastructure to be designed to accommodate a sufficient volume to prevent spills.

Hydrocarbon spills that may occur, such as from vehicles and machinery operating on the site, would be managed through a spill management plan, to prevent hydrocarbons interacting with surface water.

A first flush system would divert stormwater within the process plant area to the storage ponds.

(iii) Evidence and submissions

Many submitters raised concerns about surface water contamination.

In response to the IAC's RFI, the Proponent provided a list of the chemicals proposed to be used on-site, maximum storage volumes and means of storage (D107).

Powder reagents storage silos and make-up tanks would have dust collectors, and there would be separate bunds and sumps around each storage and make-up area to contain spillages. The liquid reagents area would include perimeter bunding and sumps to contain spills and washdown water. MM-SW01 specifies procedures and equipment (spill kits).

The reagents used during processing would be stored in an enclosed building with segregated storage areas for individual reagents. All liquid reagents would be stored on self-bunded platforms and in compliance with the EPA guidelines.

(iv) Discussion

The IAC is satisfied that adherence with the relevant regulations and guidelines, and implementation of the EMF, including the SWMP, will adequately safeguard against chemical contamination associated with stormwater flooding. The SWMP includes specific requirements relating to run-off, chemical spills and storage.

(v) Findings

The IAC finds:

- The EES has appropriately assessed potential contamination impacts associated with surface water.
- Surface water impacts can be appropriately managed through the recommended EMF and relevant regulations and guidelines.

10.4 Overall conclusions on surface water effects

Subject to the IAC's recommendations, there are no surface water impacts that preclude the Project being approved or the draft evaluation objective being achieved.

11 Groundwater

11.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Kerang Wetlands Ramsar site) over the short and long-term.

Groundwater is discussed in EES chapter 14 and technical report I.

The exhibited EMF includes the following mitigation measures:

- MM-GW01 (in relation to tailings water recovery)
- MM-GW02 (in relation to permits and licences)
- MM-GW03 (in relation to risk minimisation)
- MM-GW04 (in relation to groundwater management plan).

In response to the IAC's RFI and other issues raised at the Hearing, the Proponent provided the following technical notes:

- TN01: Fate of flocculant in groundwater (D95)
- TN02: Tailings Leachate Analysis Comparison (D145).

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248)
- the Proponent's presentation on the hydromet plant (D98)
- joint statements of the groundwater experts (D130 and D132).

Table 15 lists the groundwater evidence.

Table 15 Groundwater evidence

Party	Expert	Firm	Area of expertise
Proponent	Dr Jon Fawcett	CDM Smith	Groundwater
MFMF	Dr Phillip Macumber	Phillip Macumber Consulting Services	Hydrology

The Loxton Parilla Sands containing the targeted mineralisation zone, has an average thickness of 50 metres across the Murray basin. Beneath it lies the Geera Clay layer which separates the Loxton Parilla Sands from the deeper Renmark Group. The Loxton Parilla Sands forms the main aquifer in the area and contains the unconfined water table aquifer.

Eight dedicated groundwater monitoring bores were installed in July 2021 and were screened across the Loxton Parilla Sands aquifer or the Renmark Group. Groundwater was measured and sampled in 7 of the 8 bores (Bore MW007 did not intercept groundwater). Using the results from the seven monitoring bores and from information on other registered bores in the area, a contour map of the top of the groundwater table was prepared.

The groundwater elevation contours indicate that groundwater in the aquifer flows to the northwest. The inferred groundwater elevation at the proposed mining locations is approximately

64 metres Australian Height Datum (AHD). With the average surface elevation within the MLA of approximately 112 metres AHD, the inferred depth to groundwater at the proposed mining locations is approximately 48 metres below ground level.

11.2 Groundwater mound and model

(i) The issue

The issue is whether the EES adequately evaluated the potential mounding effect of seepage from the tailings into groundwater.

(ii) What did the EES say?

During operation and rehabilitation of the Project, tailings will be progressively returned to the mined void. The tailings would be approximately 50 per cent saturated and even though some water will be recovered, the combination of increased rainwater infiltration through the mined area and the water seepage from tailings will cause a localised increase in groundwater levels, known as a groundwater mound. The key input assumptions used to model the quantity of seepage into groundwater were:

- 350 millimetres per year rain into the open pit with no evaporative loss or soil retention
- 175 millimetres per year rain infiltration for 3 years after mining
- tailings infiltration modelled over whole area 1 and area 3 not just mined area.

The mounding sensitivity analysis is shown in figure 22.

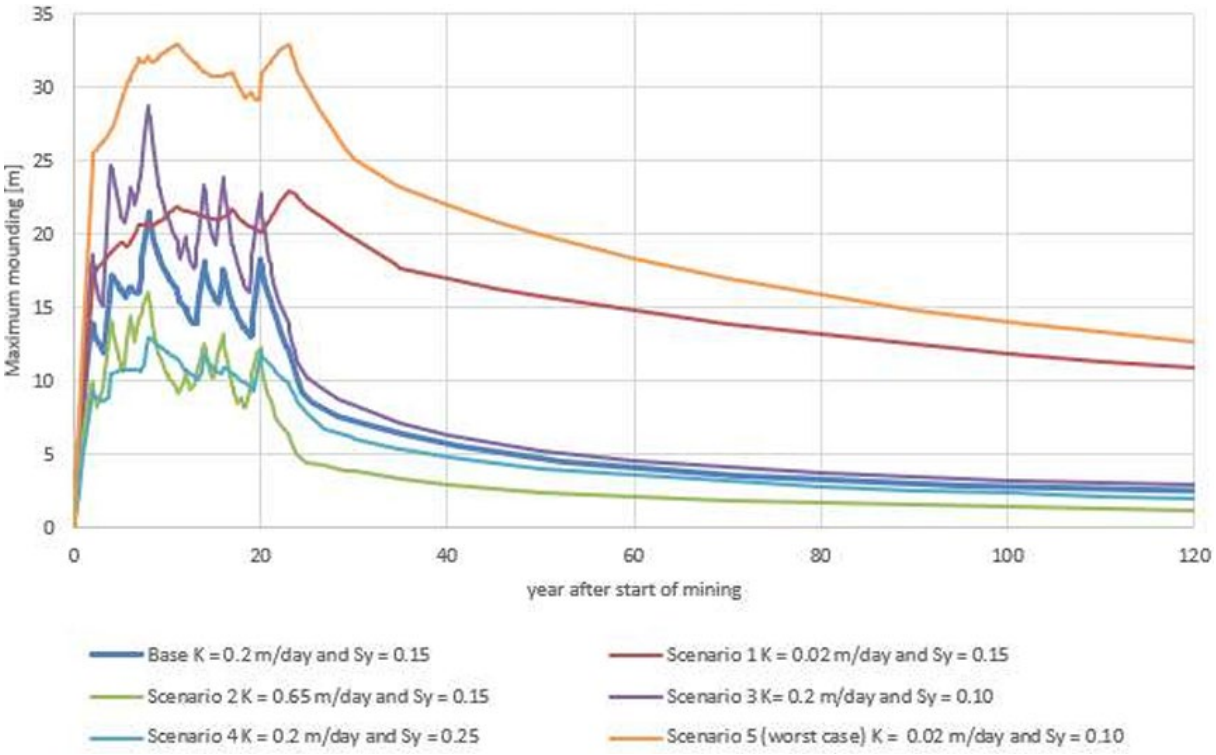
The baseline model assumed the aquifer had hydraulic conductivity of 0.2 metres per day and a tailings yield of 0.15 or 15 per cent of the water held in the tailings.

The model indicated that groundwater mounding from tailings seepage would reach a theoretical maximum of over 20 metres above the existing groundwater level at year eight of mining and would remain high until the end of mining at year 20. From year 20, modelled seepage and groundwater mounding declines, but the mounding continues to spread laterally and dissipate within the aquifer.

Particle tracking modelling based on only advective transport with no dispersion, diffusion or potential chemical attenuation processes showed that they would travel approximately two kilometres up to 10,000 years post mining.

The EES found that geochemical processes in the Loxton Parilla Sands aquifer would potentially attenuate and dissipate any plume from the tailings such that there is unlikely to be any long-term measurable change to groundwater quality surrounding the MLA from the deposition of tailings.

Figure 22 Mounding sensitivity analysis



Source: EES technical report I, figure 9-8

(iii) Evidence and submissions

Dr Macumber gave evidence on behalf of MFMF that hydraulic conductivities reported for the seven monitoring bores from slug tests were 1.5 to 2.5 orders of magnitude less than he would expect across the Loxton Parilla Sands aquifer. His opinion was a hydraulic conductivity of 15 metres per day for the aquifer would be more appropriate rather than the 0.2 metres per day used as the base line for modelling the extent of the predicted groundwater mound.

When questioned by the Proponent on the consequences of a higher conductivity, he agreed that it would result in faster movement of groundwater off-site and a corresponding reduction in the height of the groundwater mound.

Dr Fawcett agreed at the groundwater conclave that higher regional hydraulic conductivity is possible which would lead to a lower mound and faster transport of the groundwater plume off-site. Dr Fawcett's view was that the estimation of recharge or mounding was based on conservative assumptions and overestimated the actual volumes of expected recharge.

In regard to the hydrochemistry of the aquifer, Dr Macumber's evidence was that rather than the anaerobic reducing environment which attenuates the base metal contaminants nearer the mine as expressed in the EES, the aquifer is an aerobic oxidising regime which readily transports base metals. At the expert conclave, Dr Macumber did not accept the field test data provided by Dr Shepherd showing low oxygen levels in the monitoring bores.

The EPA submitted that continuous groundwater monitoring is required with results reviewed at least quarterly and the modelling updated where the data indicates a requirement to update the modelling. Its view was that continuous modelling was not required.

(iv) Discussion

The IAC largely accepts the evidence of Dr Macumber regarding the likely higher hydraulic conductivity of the Loxton Parilla sand aquifer than that assumed by Dr Fawcett. It accepts Dr Fawcett's advice the intent was to provide a conservative, or an overestimation of the impact.

The effect of this is that any groundwater mound will be lower than that modelled with the mound extending further and faster than indicated by the model. The IAC considers the "*conservative*" assumptions upon which the estimation of annual seepage rate to groundwater was based may have overestimated the seepage rate contributing to a perception of a large groundwater mound.

In regard to the hydrochemistry, the IAC accepts that Dr Macumber has extensive knowledge of this aquifer system and that further testing of the groundwater is required to have greater confidence about the chemical processes occurring within the Loxton Parilla Sands aquifer at and near the MLA.

The IAC notes that based on the testing of bore MW002, which is screened to the top of the watertable, the salinity levels detected in this bore do not show any indication of a freshwater layer on top of the aquifer.

The IAC agrees with the EPA there should be increased monitoring to improve the baseline knowledge of the local groundwater environment and this information should be used to refine the hydrogeological conceptualisation model. This is included in an amended MP-GW01.

Monitoring will continue beyond the life of the mine. Only when there is sufficient confidence the groundwater trigger values will not be breached, then monitoring may cease. This is addressed in MP-GW03 and CP-GW02.

The IAC agrees with the EPA's position that it is difficult to remediate groundwater. However, the risk to groundwater users is low given the poor quality of the groundwater and there are no known users within 10 kilometres of the MLA. The IAC considers that MM-GW04 should be amended to include trigger levels for when groundwater mitigation measures such as interception, extraction or containment of impacted groundwater as well as examining tailings management and disposal.

Additionally, the IAC has recommended some additional requirements and detail be included in MM-GW04A in relation to groundwater modelling to inform the A18 permit process.

(v) Findings

The IAC finds:

- The EES has provided a conservative assessment of the potential for a groundwater mound.
- Additional monitoring, as suggested by the EPA, would enable an improved groundwater model to be developed.
- Groundwater impacts can be acceptably managed through the recommended EMF.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MP-GW01 to require increased monitoring of groundwater

b) revised MM-GW04 to develop trigger levels for requiring actions to intercept, extract or contain impacted groundwater, and/or modify tailings management

c) revised MM-GW04A to require a revised hydrogeological assessment in accordance with relevant EPA guidelines based on the findings from the increased monitoring program

d) revised MP-GW03 and CP-GW02 to ensure the monitoring network is fit for purpose after the closure of the mine and to review monitoring results post closure to determine whether monitoring may cease or to determine the reason for any groundwater impact.

These changes are included at appendix E.

11.3 Tailings chemistry

(i) The issue

The issue is whether there is sufficient information to determine the likely contaminants of potential concern in tailings seepage.

(ii) What did the EES say?

The vast majority (more than 97 per cent) of mined material is considered non-economic and is physically separated on-site before being returned to the mine void as backfill. When separating out the various product minerals from the ore, several tailings streams would be generated. The tailings streams originating from the process are shown in figure 23 with the mass of tailings produced from each step in described in the EES.

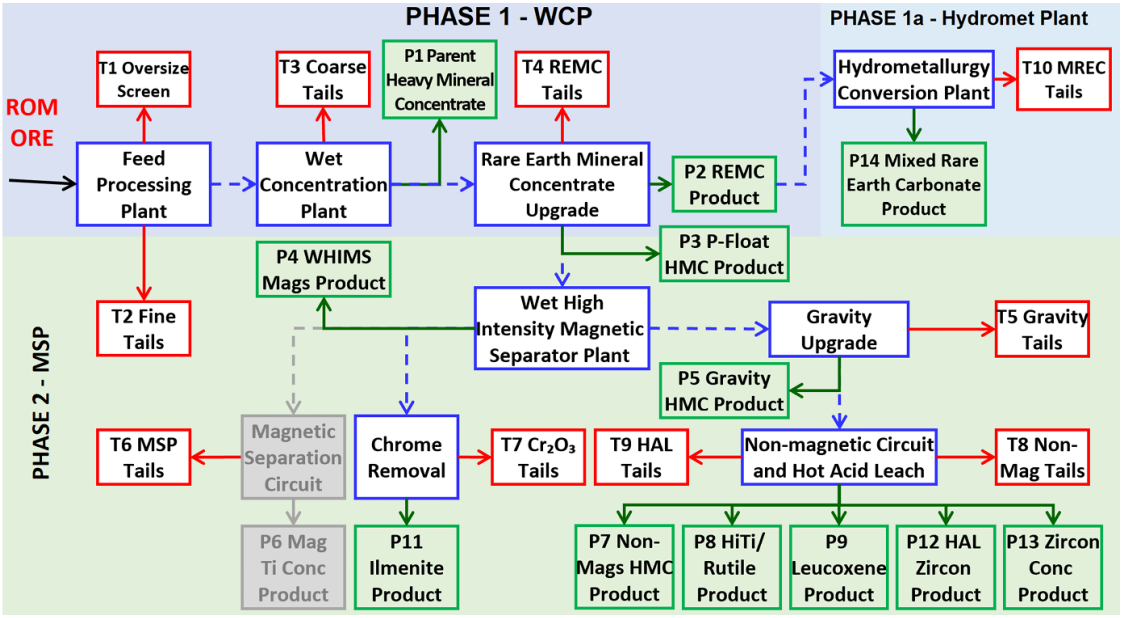
All tailings material except the greater than 2 millimetre oversize would be mixed into one stream and pumped as a slurry back to the mine to fill the pit to the level where the overburden was removed.

Tailings were subject to the following tests:

- water leach at 1:5 and 1:20 dilutions (to stimulate rainfall percolating through the material in periods of low and high rainfall respectively)
- leachate from the Net Acid Generation Test (used to assess metal loadings under acidic conditions) analysis of decant water from tailings
- the Australian Standard Leaching Protocol test (to test what may leach from the tailings)
- The EES compared the testing results to the baseline trigger values specified in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZ Guidelines) at the 95 per cent of Species Limit of Protection for a Slightly to Moderately Disturbed System. Table 16 identifies those elements found to exceed the ANZ

Guidelines values in the various tests of Tailings T1, T2, T3, T4 and T5 which collectively comprise 99 per cent of the tailings.

Figure 23 Mineral sands process circuit



Source: Technical report I, appendix C, figure 2

Table 16 Elements exceeding ANZ Guideline Values in leach tests

Chemical	Water Leach 1:5	Water Leach 1:20	Net Acid Generating Liquor	Decant water	Australian Standard Leaching Protocol
Aluminium	✓	✓	✓		✓
Beryllium					✓
Boron					
Cadmium					✓
Cobalt					✓
Chromium^{3+}	✓				✓
Chromium $^{6+}$	✓	✓	✓		✓
Copper				✓	✓
Iron	✓	✓			✓
Lanthanum	✓	✓	✓		✓
Nickel					✓
Thallium	✓		✓	✓	✓
Titanium					
Uranium					
Vanadium	✓	✓	✓		
Zinc	✓	✓	✓		✓

(iii) Evidence and submissions

Attached to Dr Fawcett's evidence statement was a report by ATC Williams providing more test results on the water quality of tailings leachate. It was Dr Fawcett's evidence this work "…*provides a better representation of the tailings leachate chemistry that will seep to the underlying groundwater as compared to the information and data available from Right Solutions*."

The EPA did not accept the results reported in the draft ATC Williams report provide a better representation of the tailings leachate chemistry or that the initial preliminary work reported by Right Solutions over predicted the number and concentration of contaminants of concern. It submitted that further work is required to develop an adequate and reliable understanding of tailings seepage arising from rainfall passing through the tailings waste and from the dewatering of the in-pit tailings.

During cross examination by MFMF, Dr Fawcett admitted a lack of expertise in geochemistry. MFMF submitted that Dr Fawcett lacked the expertise to compare the Right Solutions report to the ATC Williams report.

The ATC Williams Report contained chemical testing of the tailings for element concentrations and bench marked them against average crustal concentrations of that element (a comparison against the average level of that substance within the earth's crust). Only two elements exceeded the average crustal concentration being arsenic with a moderate exceedance and iron with a slight exceedance.

The Proponent provided a comparison between the Right Solutions report and the ATC Williams report in TN02 (D145). TN02 found that both reports present valid data with the Right Solutions report based on static one-off tests of the individual tailing streams, and the ATC Williams report using the homogenised tailings from the three phases of production and a kinetic leach test over 12 weeks.

(iv) Discussion

The IAC accepts that both the Right Solutions and ATC Williams reports provide useful information for determining the characteristics of seepage from the tailings. Between the two reports, a range of parameters were tested from tailings from Areas 1 and 3. A comparison of the data in the two reports show that it is not dissimilar. The IAC notes Dr Macumber's observation in his review of the ATC Williams report "…*the data is real* ".[44]

The IAC notes that for the purposes of the EES, only tailings from a pilot plant have been tested. These tests used water at various application rates and times to leach out chemicals and mirrored the acidic environment of the groundwater.

The IAC considers that testing of homogenised tailings from the actual processing plant should be conducted during operation to monitor the stability of the tailings using water from Kangaroo Lake and also testing the effect of rainwater seepage through the deposited tailings. These requirements are addressed in a revised MM-GW01 recommended by the IAC.

[44] D135 An Understanding of the ATC Williams and Right Solutions reports with respect to the extent of occurrence and mobilization of contaminants of concern in the Goschen tailings fill, Dr Phillip G. Macumber

(v) Findings

The IAC finds:

- The combined reports of Right Solutions and ATC Williams EES provide adequate information to gauge the chemical properties of the tailings.
- Further periodic review of tailings stability and leachate should be undertaken to inform the Tailings Management Plan.
- Issues relating to the properties of the tailings and stability of the tailings can be appropriately managed through the recommended EMF.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) revised MM-GW01 to require periodic review of tailings stability and leachate quality.

This change is included at appendix E.

11.4 Effect of seepage on groundwater quality

(i) The issue

The issue is whether seepage from tailings will adversely affect the environmental values of the groundwater.

(ii) What did the EES say?

Groundwater data collected during field assessments indicated that groundwater salinity, as total dissolved solids ranged from 13,394 to 29,565 mg/L across the Project area.

With the average total dissolved solids exceeding 10,000 mg/L, the groundwater was classified as Segment F in accordance with the EPA's ERS and assigned the following environmental values:

- water dependent ecosystems and species
- water based recreation - primary contact recreation
- Traditional Owner cultural values
- buildings and structures
- geothermal properties.

The EES concluded, based on the extent of impact, the risk of harm to these environmental values is not realised.

To aid in water recovery from tailings, and hence to reduce the quantity of seepage to groundwater, flocculants would be used. The type of flocculants proposed to be used include those commonly used in the sand mining industry such as polyacrylamide. Polyacrylamide flocculant products can contain impurities that result from the manufacturing process, including acrylamide.

(iii) Evidence and submissions

The EPA's opening submission called for a revised groundwater risk assessment to address the assumptions in the EES about the geochemical processes and contaminants of potential concern in tailings seepage. The EPA's closing submission highlighted the consideration of groundwater as a resource that requires protection regardless of whether it is currently used or not. It stated that "*the nearest receptor is as little as 5 metres below the mine pit*".

MFMF submitted that as the authors of the Right Solutions report and the ATC Williams report were not called to give evidence, then the contaminants of concern likely to seep into groundwater is unresolved.

Dr Fawcett's evidence report acknowledged the Right Solutions report over-predicted the contaminants of concern. Based on the ATC Williams report, he found that:

- tailings are unlikely to generate acidity
- under non-acid forming conditions the likely contaminants of concern are iron and potentially arsenic if acidic conditions developed.

Annexure E to his report contained a risk assessment which assessed the risk of tailings seepage impacting on future recreational use of groundwater in the form of primary contact recreation i.e. groundwater used in swimming pools. Iron was identified as the only risk but he noted it was already elevated above recreational guidelines in the natural groundwater.

He advised the Project poses the least environmental risk out of all groundwater related mining impact assessments he has completed within the last 10 years.

TN02 provided a comparison of the test results between the Right Solutions and ATC Williams reports and comparison of the total chromium and arsenic in groundwater and tailings. Levels of chromium reported in both reports for seepage from tailings was less than the Drinking Water Guidelines level of 50 mg/l. For arsenic, the drinking water standard was exceeded for seepage from the tailings but the levels were lower than those contained naturally in the groundwater.

The IAC requested the Proponent provide further information showing the relevant ERS indicator levels for the chemical indicators that were potentially contaminants of concern. Those levels were to be compared to levels seeping from the tailings and in the background groundwater. The Proponent provided table 17 attached to D248.

Table 17 Relevant indicator reference levels

Parameter	ERS for Water-based recreation		Right Solutions Australia (2022) Static Leach Test – 1:5 solution					ATC Williams (2024) Week 12 kinetic leach sample (pH 7)			Groundwater (CDMSmith, 2023)
	Health[1]	Aesthetics[2]	T2 (16%)	T3 (80%)	T5 (<1%)	T6 (<1%)	T8 (<0.5%)	Phase 1	Phase 1A	Phase 2	Loxton Parilla bores
Uranium (U)	20	-	<0.1	0.1	0.2	0.5	0.3	0.052	0.089	0.164	All results <10
Thorium (Th)	-	-	<0.1	0.4	0.6	5	1.6	0.36	0.079	0.209	All results <10
Vanadium (V)	-	-	3.6	15	6.2	11	4.8	<10	<10	10	All results <10
Selenium (Se)	10	-	<1	<1	<1	<1	<1	<0.5	<0.5	0.5	All results <10
Aluminum (Al)	-	200	720	1,900	32	240	260	460	180	170	All results <50
Copper (Cu)	2,000	1,000	0.8	0.9	0.9	24	26	<10	<10	<10	<10 to 18
Lead (Pb)	10	-	0.5	0.4	0.7	1.1	0.4	<0.5	<0.5	<0.5	<2 to 150
Cadmium (Cd)	2	-	<0.1	0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	All results <10
Arsenic (As)	10	-	1.0	1.4	8.0	51	4.0	5.4	9.5	20	5.3 to 120
Chromium (total)	50[3]	-	1.2	14	4.9	39	30	<10	<10	<10	All results <5
Iron (total Fe)	-	300	700	280	50	510	370	240	70	100	470 to 14,000

Note: all values in µg/L
(T3 - 80%) - approximate proportion of tailings stream relative to total homogenized tailings
< – below laboratory detection limit
ERS – Environment Reference Standard

[1] – ERS values listed for health are applicable to drinking water quality (Australian Drinking Water Guidelines (ADWG), 2022) and are based on the daily consumption of 2 L. Recreation Water Guidelines state: *that these values should only be used as a guide to deriving chemical values applicable to recreational water bodies. Using a consumption factor of 2 L will result in very conservative health guideline values in recreational water. When applying these values to recreational water exposure, consumption of 100–200 mL per day should be taken into consideration.*
[2] – ADWG guideline values for aesthetics
[3] – As Cr(VI) – ADWG guidelines states: *If guideline value exceeded, analyse for hexavalent chromium*

Source: Attachment H: Proponents response to Requests for Information (RFI) v2 (D248)

Dr Macumber identified chromium as the metal exceeding the ANZ Guidelines for Fresh and Marine Water Quality at the 95 per cent of Species Limit of Protection for a Slightly to Moderately Disturbed System, with the trigger value of 0.001mg/L based on the information in the Right Solutions report. His oral evidence was that metals such as chromium, scandium, titanium, lanthanum, yttrium, zirconium, strontium, barium, phosphorus and manganese and radionuclides sourced from the heavy mineral suite in the Parilla Sand as at Goschen are carried by the acidic, high chlorinity Parilla Sand groundwater to be precipitated and concentrated in the anaerobic reducing regime at Lake Tyrrell.

Ms Hildebrant submitted that the use of flocculants and their impact had not been adequately assessed in the EES. In particular, she was concerned the use of flocculants may lead to the presence of acrylamide in groundwater.

TN01 stated that with the rapid degradation of acrylamide in soil and groundwater environments, the very low concentrations at which acrylamide is present in commercial flocculants, and the low potential for acrylamide to be formed by the degradation of flocculant, acrylamide is unlikely to be detected in groundwater in the vicinity of in-pit tailings storage.

(iv) Discussion

The listing of potential contaminants of concern in the Right Solutions report was based on referring to guideline values applicable for higher quality i.e. less saline groundwater. In particular, the trigger level used for chromium referenced in the EES was 0.001 mg/L for the more toxic form of chromium as hexavalent chromium. An appropriate figure for recreational water use - primary contact recreation is 0.5[45] mg/L. The tested levels of total chromium in tailings leachate were less than this value in both the Right Solutions and ATC Williams reports.

It was a failing of the EES to not properly identify the correct standards specified in the ERS against which to benchmark impacts on environmental values and relevant indicators. This has led to some confusion as to what are the actual contaminants of concern in seepage from the tailings.

The IAC notes that in regard to the metals in table 17, the information in Attachment H of the Proponent's D248, indicates that only aluminium potentially exceeds the indicator level. The IAC notes the aluminium level is based on aesthetics (turns water milky colour) not directly related to actual health impacts. The IAC understands the existing groundwater is not suitable for consumption due to salinity levels alone and hence the aesthetics criteria for aluminium should not be a concern. In any case the homogenised tailings tested by ATC Williams for Phase 1A and Phase 2 operations satisfy the aesthetics criteria.

The IAC considers that testing of tailings, including its stability associated with different leaching media and the quality of seepage, is required to provide certainty on the behaviour of the tailings given that the tailings change when the different production phases commence. This issue is addressed in the revised MM-GW01.

It was clear to the IAC that Dr Macumber had a detailed knowledge of the Loxton Parilla Sands aquifer and of the geochemistry at Lake Tyrell but had limited understanding of the regulatory framework for assessing groundwater impacts. Other than his evidence of the hydraulic conductivity of the aquifer, the IAC did not find his evidence particularly helpful in quantifying the

[45] An allowance of at least 10 to allow for incidental consumption of 200 ml of groundwater per day.

impact on the aquifer at the site. A large focus of his evidence was the geochemistry within the aquifer, but he concluded he had "*no concerns about Lake Tyrrell*".

The Proponent proposed a testing program to check for the presence of acrylamide. The IAC supports the inclusion of flocculants and their decomposition products in MM-GW04 as well as setting trigger levels based on the ERS.

The groundwater chemical composition was determined from one round of groundwater sampling. The IAC accepts the EPA's advice that risk assessments are an iterative process and as more data becomes available during the life of the Project, groundwater chemistry, aquifer properties and tailings chemistry, then the groundwater risk assessment may need to be reviewed. This has been addressed in the recommended MM-GW05.

(v) Findings

The IAC finds:

- The EES has appropriately assessed the potential impacts on environmental values of the underlying aquifer and found the impacts to be acceptable.
- Groundwater water impacts can be appropriately managed through the recommended EMF.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-GW01 to require the periodic review of water seepage from tailings

b) revised MM-GW04 to specify testing for flocculants and decomposition products

c) revised MM-GW05 to require a groundwater risk reassessment if groundwater monitoring or testing reveals a change has occurred.

These changes are included at appendix E.

11.5 Overall conclusions on groundwater effects

Subject to the IAC's recommendations, there are no groundwater impacts that preclude the Project being approved or the draft evaluation objective being achieved.

12 Land use planning

12.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.

Land use planning is discussed in EES chapter 15 and technical report K.

The exhibited EMF includes the following mitigation measure:

- MM-LU01 Bushfire Management Plan.

Additionally, the IAC had regard to:

- relevant submissions
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248).

12.2 Consistency with planning policy

(i) The issue

The issue is the extent to which the Project is consistent with planning policy that seeks to protect agricultural land.

(ii) What did the EES say?

Technical report K described the relevant elements of the Planning Policy Framework (PPF), the Gannawarra and Swan Hill Municipal Planning Strategies, other strategic and land use plans, together with zone, overlay and particular provisions. It concluded that there is broad policy support for the Project given that it would:

- not result in a permanent loss of agricultural land or adversely affect the use of surrounding land for broadacre farming
- diversify the region's economy, delivering new employment and training opportunities that would support the retention of the region's population.

Technical report L (Agriculture) noted the Project site comprises a relatively small proportion of the farming land in the regional and state contexts, and the potential loss of revenue represented 0.12 per cent of the annual agricultural production in Gannawarra. This impact would be mitigated by the rehabilitation of the land and subsequent return to agricultural production.

(iii) Submissions

In response to a query from the IAC (D131) about the applicability of planning policy given that a planning permit is not required for the mining and processing elements of the Project, the Proponent submitted:

> …in the context of the proposed mine itself and having regard to the IAC's Terms of Reference, planning policy is relevant to the consideration of:
>
> - land use effects, including having regard to the support of policy at State, regional and local levels for mining in this area, and how that is appropriately balanced against policy seeking to protect agricultural land; and

- the acceptability of effects on other land uses in the area, in the sense that (cl 52.08- 1 aside) mining, and industry, is a permissible use in the Farming Zone, and land in the Farming Zone is not included as a receptor relevant to the threshold distances of cl 53.10…[46]

Many submissions raised concerns about the loss of agricultural land and argued this would be inconsistent with planning policies that supported its retention and protection. Some submissions assumed that the land would either be permanently lost to agriculture, or its productive capacity would be significantly diminished following mining and rehabilitation. Concerns were also expressed about the impacts the Project would have on the operation and productivity of adjoining farmland and land within the broader area.

The Victorian Farmers Federation submitted the IAC should have regard to clauses 14.01-1S (Protection of agricultural land) and 35.07 (Farming Zone) in the Gannawarra Planning Scheme. It submitted these provisions provided necessary context for considering submissions about agricultural impacts.

MFMF and others opposed the loss of 'prime' agricultural land and submitted that ongoing food security was a higher priority than temporary mining activity.

BDEC submitted that the loss of agricultural land associated with the Project would be compounded by the loss of agricultural land from other proposed mining projects in the region and needed to be considered.

Ms Hildebrandt noted various references in support of agriculture in the Gannawarra Planning Scheme and submitted it did not provide for 'unfettered' mining. Ms Eastman expressed similar concerns, submitting that it was hard to see how the Project met any of the planning scheme objectives that encourage agriculture.

The Proponent relied on the EES assessment of the land use policy context and submitted that the temporary use of the Project land for mining was consistent with relevant planning, State and national policy. It concluded there is no policy support for prioritising agriculture over mining in this area as argued in many submissions.

It acknowledged the connection that landowners and others have to the agricultural use of the land and the broader area, but submitted the land in the area has not been attributed any particular significance for its agricultural value in relevant policy.

(iv) Discussion

There is clear support at all policy levels for protecting agricultural land as well as facilitating natural resource development, including mineral sands mining. This is evidenced in the Gannawarra Planning Scheme PPF that includes 'Agriculture' objectives in support of preserving productive farmland and encouraging sustainable agricultural land use, but also includes 'Earth and Energy Resources' objectives that encourage exploration and extraction of natural resources. Regional policy supports growth in primary production and emerging growth sectors, including mining, while local policies acknowledge the important role of agriculture while encouraging employment growth, including industry, in support of population retention.

[46] D264, pages 17-18

In considering how these policies might be reconciled, the IAC does not agree with those submitters who argued that the agricultural productivity of the Project site would either be permanently lost or significantly diminished following mining and rehabilitation.

As discussed in chapter 13 of this report, the IAC is satisfied that site rehabilitation in accordance with the recommended EMF will enable it to be rehabilitated to a suitable 'equivalent' level of agricultural productivity within 5 to 7 years. In this context, the loss of agricultural production will be temporary and there will not be any significant loss of local or regional productive capacity over the longer term. In addition, it is not expected the Project will have any significant impacts on the productive capacity of other farming land in the area during the life of the Project.

For these reasons, the Project will achieve an acceptable balance between planning policies that support agriculture and those that support resource development and mining.

The Proponent noted many submitters described the land in the area as 'prime' or 'high quality' agricultural land but submitted it had not been identified in policy as having 'any particular significance' for agriculture. While this might be true, the PPF objective to protect agricultural land refers to 'productive' agricultural land and is not confined to 'prime' or 'high quality' land. The Project area is clearly productive agricultural land.

In relation to the BDEC's concerns about cumulative impacts on agricultural productivity from other potential mineral sands mines in the area, the IAC notes that no approvals for new mines have been issued and any proposals would need to go through their own approval process.

(v) Findings

The IAC finds:

- The Project achieves an acceptable balance between planning policies that support agriculture and those that support resource development and mining.
- Impacts on agriculture will be acceptable given the temporary loss of the land from production and its progressive rehabilitation.

12.3 Land use effects

(i) The issue

The issue is whether land use effects have been appropriately assessed and are acceptable.

(ii) What did the EES say?

Technical report K assessed potential land use effects associated with:

- loss of agricultural land
- loss of native vegetation
- fire risks
- landscape and visual impacts
- traffic disruptions
- environmental conditions and amenity, such as dust, noise, vibration.

It concluded the Project would not result in any unacceptable impacts because of the design solutions that had been adopted and the mitigation measures intended to avoid, minimise or manage potential impacts. The mitigation measures include the requirements of the EMF and Incorporated Document that would be implemented through various approvals.

In addition, the assessment noted that various amenity issues would be avoided by two dwellings (Receptors R9 and R14) not being occupied during stages of the Project.

(iii) Submissions

The key land use issues raised in submissions related to the loss of agricultural land and various amenity and access impacts. These are described more fully in the relevant chapters of this report.

The Proponent relied on the relevant EES technical reports and submitted that land use impacts had been adequately addressed through Project design and the proposed mitigation measures.

(iv) Discussion

As noted above and discussed in chapter 13 of this report, impacts on agricultural production will be temporary and not significant given the land's progressive rehabilitation and expected post rehabilitation productivity. In addition, it is not expected the Project will have any significant impacts on the agricultural productivity of other farming land in the area.

Traffic impacts, including increased traffic and constraints on local accessibility are discussed in chapter 7 (Traffic and transport). The IAC is satisfied the impacts can be addressed through the recommended mitigation measures and the further investigations, consultation and approvals that will be required.

The extent of potential amenity impacts will be limited by the low number of sensitive receptors in the area (including the limits on occupying R9 and R14) and the mitigation measures intended to address impacts.

The IAC's findings about specific amenity issues and recommended mitigation measures are included in chapters 3 (Flora), 4 (Fauna), 6 (Landscape and visual), 8 (Noise and vibration) and 9 (Air quality). The proposed neighbour agreements and compensation payments that in part respond to diminished amenity expectations are discussed in chapter 15 (Social and economics).

The IAC is satisfied potential adverse land use impacts will be minimised and any residual effects will not be significant.

(v) Findings

The IAC finds:

- The EES has appropriately assessed land use effects.
- Land use effects can be appropriately managed through the recommended mitigation measures.

12.4 Overall conclusions on land use planning effects

Subject to the IAC's recommendations, there are no land use planning impacts that preclude the Project being approved or the draft evaluation objective being achieved.

13 Agriculture, soils and geotechnical

13.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.

Agriculture and soils are discussed in EES chapter 16 and technical reports L and M. Geotechnical impacts are discussed in technical report J. Rehabilitation is discussed in chapter 19 and technical report P.

The exhibited EMF includes the following mitigation measures:

- MM-SLR01 Minimise effects on native soils – Mine Site
- MM-SLR02 Minimise effects on native soils – Pipeline
- MM-SLR03 Minimise effects on land resource
- MM-SLR04 Minimise effects on native soils (rehabilitation)
- MM-SLR05 Minimise effects on native soils (weeds)
- MM-SLR06 Spills and Leaks
- MM-AG01 Minimise potential adverse land rehabilitation effects
- MM-AG02 Minimise potential adverse land use effects
- MM-AG03 Minimise potential adverse biosecurity effects
- MM-GS01 (ground control management plan).

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248)
- joint statement of experts (110).

Table 18 lists the agriculture and soils evidence.

Table 18 Agriculture and soil evidence

Party	Expert	Firm	Area of expertise
Proponent	Jim Shovelton	Meridian Agriculture	Agriculture
Proponent	Rod Masters	SLR Consulting Australia	Soil management and rehabilitation
MFMF	Robert Sonogan	-	Soil rehabilitation

13.2 Agricultural production impacts

(i) The issues

The issues are whether the impacts on agriculture have been appropriately assessed and are acceptable, including:

- the temporary loss of agricultural production for the MLA
- the potential impacts on agricultural production of farmlands in the area.

(ii) What did the EES say?

The EES described the predominant use of the Project area as dryland winter cereal cropping, with wheat, barley, oats and canola the most common crops. To protect topsoils from wind and water erosion, crops are sown with stubble retention and minimal ground disturbance.

The EES noted that because land would be returned to its current agricultural use at the end of the Project, no land would be permanently removed from agriculture. The Project would temporarily remove land in the MLA from agricultural production, resulting in a loss of agricultural revenue for the local community.

The EES assessed the temporary impact on agricultural productivity on a worst-case basis assuming the entire MLA would be unavailable for production for the 20-year life of the mine. The intention is the mine would be progressively rehabilitated, with no more than three to four open mining cells at any one time. Estimates of the potential agricultural production value to be lost were made based on the MLA, assumed yields of common crops and average potential gross margins for winter cereal crops in the study area with an assumed 25 per cent yield increase for the higher productivity in the Cannie Ridge area. A reduction in the local employment pool for seasonal agricultural operations was also expected. The EES concluded these losses would be more than offset by additional income streams and employment provided by the Project.

Expected indirect effects included:

- land access restrictions for adjacent landholders
- local road network impacts (including delays and diversions from road closures)
- spread of weeds and pests
- increase in dust on crops.

Through the implementation of mitigation measures, residual effects were expected to be minimal to non-existent.

(iii) Evidence and submissions

Submitters claimed the productivity estimates used for the impact assessment had underestimated the productivity of the Cannie Ridge which was considered prime agricultural land in the local context. Mr Shovelton agreed, yields in the Cannie Ridge were better than estimated and likely to be consistent with submissions. He provided updated lost yield amounts for the entire mine site based on these revised yields. The resulting annual economic impact on the State's production and local businesses was still minor.

Mr Shovelton gave evidence these calculations were conservative as they assumed the entire MLA would be devoid of farming for the duration of the Project, when in fact the land would be progressively mined and rehabilitated.

The Proponent relied upon Mr Shovelton's improved yield estimates and submitted lost yield would amount to 0.15 per cent of wheat and 0.26 per cent of canola, produced in Victoria or 0.03 per cent of Victoria's winter crop production. The Proponent concluded:

> In this context, even if the entirety of the Project area was now used for agriculture and post-mining could never be so used again, the impact can be properly described as minimal.[47]

[47] D264, paragraph 97

There was a general view from submitters the approval of mining on agricultural land diminished the importance of agriculture to the economy and the State's food productivity. Many submitters were concerned the Project would impact on the productivity of the adjacent farmland. These submissions were related to potential off-site pollution, radiation, traffic and amenity impacts. Some submitters were concerned the Project would result in reputational risks for adjacent farm products, limiting access to organic or 'green' markets. Some were also concerned mining would not *"stop at the gate"* and felt the Project was a direct threat to their own farms, homes and livelihoods.

In closing, the Proponent submitted consideration of potential effects on agricultural land had to have regard to the following factors:

- The area of land actually proposed to be mined, as a proportion of agricultural land in the region and the State;
- The value of the area proposed to be mined in that broader context;
- The rehabilitation regime which seeks to restore the land for agricultural purposes;
- The staged timing and progressive nature of the mine and rehabilitation; and
- The fact that the land will be privately owned by VHM and not subject to compulsory/non-consensual acquisition/activities under the MRSD Act.[48]

(iv) Discussion

The EES underestimated agricultural yields of the local area. More realistic yields are provided in submissions and were analysed by Mr Shovelton. The IAC accepts the evidence and submissions, that accounting for the revised production yields, the Project area itself contributes a minimal portion to State or regional agricultural production.

Many submissions noted the agricultural value of the Cannie Ridge and anticipated effects of the Project on food security and argued the use of the land for agriculture was more beneficial and to be preferred over mining. As noted in chapter 12 of this report, there is clear policy support for protecting agricultural land, but also for facilitating natural resource development, including mineral sands mining. While the productivity of the Cannie Ridge is acknowledged, it is not identified for any specific protection or subject to any policies that might elevate its status above that of resource development. The IAC is satisfied the Project will achieve an acceptable balance between planning policies that support agriculture and those that support resource development and mining. This balance does not diminish the important contribution agriculture makes to the area, and more broadly to the nation.

Submitters raised concerns about the Project's impacts on agricultural production in the local area during construction and operation. Many were concerned that farmland in the area will be affected by contaminants of concern transported by surface water runoff, mounding groundwater, or dust resulting in impacts to crops grown. These concerns relied upon the establishment of credible risk pathways from groundwater, surface water and air. As discussed in chapters 9, 10, 11 and 14 of this report, the IAC has concluded that such impacts can, subject to recommendations, be suitably managed through the EMF and associated EMPs. The IAC does not agree the Project will have any significant or unacceptable impacts on the agricultural productivity of surrounding farms.

[48] D264, paragraph 91

Submitters raised general concerns that surrounding agricultural productivity will decrease due to increased travel times between paddocks due to road closures and detours. Traffic effects and mitigation are discussed in chapter 7 of this report. In summary, the IAC concludes there is sufficient capacity in the road network to safely accommodate Project traffic. While further work is required to understand the full implications of proposed road closures, this will be undertaken in preparing the TMP with direct landowner input, ensuring potential impacts can be suitably managed. Submissions that significant effects on surrounding agricultural productivity would occur due to traffic impacts were not substantiated.

The IAC recognises the genuine concerns submitters have about possible expansion of the Project or additional mines in the future. As discussed in chapter 1 of this report, the IAC can only consider the Project that is before it. Any expansion of mining in the area would require its own approval, including an assessment of impacts on agriculture.

(v) Findings

The IAC finds:

- The temporary loss of agricultural production within the MLA will not be a significant effect.
- The Project will not significantly impact agricultural productivity of surrounding farmland.

13.3 Soil management

(i) The issue

The issue is whether soils can be suitably managed to avoid impacts on soil productivity post-rehabilitation.

(ii) What did the EES say?

The EES assessed existing conditions through desktop searches and 14 targeted soil surveys. The MLA soils were described as calcarosols and chromosols. Soil profiles were assessed for 14 sites up to a maximum depth of 1.2 metres, with 11 of these sites subject to laboratory testing. One soil map unit, a calcic red-brown calcarosol was identified across the MLA. Three soil types were identified from the surface being calcarosols, chromosols and sodosols. These soil types are not strongly acidic, and the potential presence of acid sulfate soils was considered negligible.

No soil testing of the water pipeline route was undertaken for the EES, though similar sodic and dispersive subsoils were expected.

Investigations identified potential impacts during the construction and operation phases that might have implications for rehabilitation, including:

- mixing of soil types during stripping impacting successful rehabilitation and reducing agricultural production post rehabilitation
- degradation of soil structure during stripping and stockpiling increasing erosion potential and reducing post-rehabilitation agricultural production
- exposure of dispersive subsoil during pipeline construction, stockpiling and mining resulting in erosion and soil loss
- weed infestation of stockpiles increasing weeds introduced in agricultural areas.

Key mitigation measures that were proposed included:

- applying gypsum to control dispersive subsoils
- sowing stockpiles with pasture species
- periodic weed treatment
- stripping soils in two profiles (topsoil 0 to 20 centimetres and sub-soil of 20 to 100 centimetres in depth).

Although actual topsoil was generally only in the first 10 centimetres, blending this with the sub-soil was expected to benefit soil health through increasing the clay content, cation exchange capacity (nutrient retention potential) and water holding capacity. Any resulting increase in sodicity would be mitigated with gypsum.

Residual impacts were not expected.

(iii) Evidence and submissions

The Proponent relied on the EES and evidence of Mr Masters and Mr Shovelton. In response to evidence and submissions during the Hearing, the Proponent proposed changes to MM-SLR01, MM-SLR02, MM-SLR04 and MM-SLR05:

- including specified strategies in the soil management plan requirements (MM-SLR01)
- investigating soil conditions through a combination of soil sampling, EM38 (electromagnetic soil mapping) and normalised difference vegetation index (NDVI) images (MM-SLR01)
- basing the number and depths of subsoil stripping horizons on the outcomes of those soil condition investigations and any soil reinstatement trails that are undertaken (MM-SLR01)
- using soil condition investigations to determine appropriate depths for stockpile locations to be stripped (MM-SLR01)
- training and induction of all staff engaged in stripping and stockpiling activities (MM-SLR01)
- investigating soil conditions of vegetated land along the pipeline and determining stripping ratios following those investigations (MM-SLR02)
- continual monitoring of stockpiles for weeds and controlling weeds as required (MM-SLR05).

The conclave agreed (D110):

- subject to further analysis, soils should be stripped to the following depths: 0 to 10 centimetres, 10 to 20 centimetres, 20 to 40 centimetres and 40 to 100 centimetres rather than the two depths proposed in the EES
- soil samples from zones exhibiting no obvious restrictions to rooting depths beyond a metre should be sampled to two metres at 20-centimetre intervals
- to the list of analytes recommended in Mr Shovelton's evidence report being investigated for future soil sampling.

Mr Shovelton clarified NDVI and EM38 sampling methods would not be useful where soils were to be returned to non-agricultural purposes such as the pipeline route.

Mr Shovelton explained boron was a critical issue due to its toxicity to crops and because there are no agronomic solutions to remove it from the soil profile. He emphasised the importance of appropriate soil stripping to minimise the potential adverse effects on successful rehabilitation. This was addressed in the Proponent's changes to the EMF.

Mr Bennett (S113) submitted baseline soil testing in the EES was limited and was supportive of the proposed approach to update this with NDVI and EM28. He submitted the EMF (at section 21-7) should not refer to the EES for baseline soil conditions, but instead account for updated baseline conditions identified by further investigations. Mr Bennett agreed soil sampling should extend beyond a metre's depth.

Many farmers, including the Polas and Bennetts, related their experience of back filling previous channels and dams and the land still not recovering in terms of yield or structure.

(iv) Discussion

The IAC acknowledges submissions from landowners about past rehabilitation experience in the area related to dams and channels. However, the proposed mitigation measures would ensure a more controlled approach from the outset, ensuring soils can be returned to as close as possible to their existing profiles. The IAC is confident this will result in better outcomes post-rehabilitation.

The proposed mitigation measures benefited from input from submitters and a collaborative approach among experts. The Proponent was responsive to submissions and evidence and proposed extensive changes to the EMF.

The IAC accepts the changes proposed by the Proponent subject to some minor revisions.

The day 3 version of MM-SLR01 proposed soil stripping horizons be based on soil condition investigations and the outcomes of any soil reinstatement trials. It did not specify the default stripping horizons adopted in the conclave. The IAC supports the wording proposed by the Proponent and considers it reasonable.

The EMF did not specify the depth to which soil sampling should occur. The IAC agrees with evidence and submissions that the EMF should enable sampling and stripping beyond a metre where warranted based on rooting depth conditions. This is recommended by the IAC in revised MM-SLR01.

The EMF did not specify the analytes for which the soil should be tested. The IAC recommends MM-SLR01 specify analytes as detailed in Mr Shovelton's expert witness statement.[49] A cross - reference to this document has been added to the recommended MM-SLR01.

The IAC accepts the evidence that NDVI and EM38 mapping techniques are less relevant to non-vegetated land along the pipeline. The key risk for such land identified in the EES is dispersive soils and the potential to create ongoing issues with the road surface from erosion. Therefore, the existing conditions of all soils along the pipeline route should be investigated (whether vegetated or not) to determine baseline conditions and any areas requiring dispersive soil management. The sampling method should be determined based on the end land use and the results should inform the stripping depths. A minor change to MM-SLR02 is recommended to address this.

The IAC agrees the further investigations required to be undertaken will provide more detailed baseline information than in the exhibited EES and will better inform the EMF. The IAC recommends section 21.7 of the EMF be amended to ensure that where more detailed information is obtained, baseline environmental conditions will be updated accordingly.

[49] D26

(v) Findings

The IAC finds:

- The EES process including submissions, evidence and cross examination have adequately identified key soil constraints.
- Soil can be suitably managed through the recommended EMF to avoid significant effects on soil productivity post rehabilitation.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-SLR01 to require soil samples from zones currently exhibiting no restrictions to rooting depths to be sampled to 2 metres

b) revised MM-SLR01 to require soils to be sampled for the analytes provided in Mr Shovelton's expert witness statement

c) revised MM-SLR02 to ensure soil condition investigations are not limited to vegetated land

d) revised section 21.7 to allow for baseline conditions to be updated by future investigations.

These changes are included at appendix E.

13.4 Agricultural land rehabilitation

(i) The issues

The issues are whether the land can be rehabilitated to achieve suitable agricultural productivity and what measures are required to ensure this productivity is achieved.

The related issue of whether the site can be rehabilitated to a suitable landform to achieve this is discussed in chapter 16 of this report.

(ii) What did the EES say?

The EES relied on the proposition the site would be rehabilitated for agricultural use post-mining and the objective that it would be restored to an *"…equivalent (or better) agricultural land capability to enable a broad range of future agricultural uses"*.

The EES identified community concern during stakeholder engagement *"…that rehabilitation of the Project area will be unsuccessful and previous land uses of agriculture will not be possible".*

As discussed earlier, the EES described how soil stripping and handling during construction and operations would be managed from the outset with a focus on preserving the quality of the clay subsoil and topsoil material for future rehabilitation. To maximise soil fertility and address sodicity it was proposed to ameliorate the soils with gypsum and Granulock. Once replaced, soils would be tested and treated as necessary to address any deficiencies. Existing very low rainfall conditions, flat site gradients and amelioration of dispersive soils with gypsum were expected to suitably

address potential water erosion during rehabilitation. Early establishment of ground cover vegetation would further stabilise the soils. Revegetation prior to *"…hand-back would be aimed at achieving a desirable surface cover of annual and perennial grasses to protect the soil surface and restore the land to productive agriculture".* The EES proposed revegetation methods be developed *"…based on first-hand knowledge of local landholders and agronomists"* and would include revegetation trials undertaken within the earliest mining rehabilitation areas. It stated:

> The trials would test different revegetation species, seeding times and rates, and application methods. Success and failure factors would be investigated and fed into an adaptive management program to develop preferred revegetation methodologies.[50]

Once rehabilitated, the Proponent would seek to progressively restore active agriculture over former mining areas and ensure the revegetation program was targeted to achieving this.

The EES outlined weed management measures, a rehabilitation monitoring program and a quality assurance process to ensure rehabilitation risks are identified and addressed at each phase of rehabilitation. Relevant quality assurance elements related to soil preparation and vegetation establishment.

(iii) Evidence and submissions

Agricultural productivity post rehabilitation

The Proponent relied on the EES and the evidence of Mr Masters and Mr Shovelton that the site could be returned to its pre-mining status.

The conclave concluded:

> The site can be returned to its pre-mining status within 2 to 3 years but may take 5 to 7 years.[51]

Mr Masters and Mr Shovelton clarified their support for this conclusion was contingent on their respective recommendations being implemented. Mr Sonogan withdrew his support for this statement but raised no specific issues with the proposed mitigation measures.

Mr Master's peer review of the draft rehabilitation plan (technical report P) noted section 6.2.6 *"…refers to conduct of revegetation trials, however I believe that this should be extended to the establishment of a soil trial plot…simulating the proposed reconstructed soil profile for rehabilitated areas".*[52]

There was consensus within the conclave that the proposed soil reinstatement trial be established as soon as possible.

Mr Shovelton supported the trial including sites encompassing different soil conditions and constraints. He believed a soil reinstatement trial was important to fine tune management measures and to fulfill an educative role for good practices for staff. He considered it necessary for trials to be monitored over the expected timeframe for rehabilitation being 5 to 7 years. He agreed with Mr Bennett, it was important to observe performance in years of low rainfall as yields from higher rainfall seasons could mask the true effect of constraints. Mr Sonogan agreed a multi-year trial was needed to understand the best approach to rehabilitation.

[50] EES chapter 19, pages 19-17
[51] D110
[52] D22, Appendix B, page 9

Mr Masters acknowledged concerns about the potential for unsuccessful rehabilitation and provided two examples of success from the Hunter Valley, New South Wales. While he acknowledged the environmental conditions were different to the Cannie Ridge, he attributed the success of these sites to appropriate *"rigour and regulation"* including a detailed quality assurance system consistent with the recommended approach for the Goschen project.

Submitters remained concerned the MLA could not be rehabilitated to suitable agricultural productivity post rehabilitation. Most of these submissions were general in nature and some related to broader concerns that there was limited assurance the site would be rehabilitated at all. Some submitters queried why a soil reinstatement trial had not commenced as part of the EES to demonstrate the claims made by the Proponent that land would be reinstated to its pre-mining state *"or better"*.

Mr Bennett submitted quality assurance could not fix the critical issues of shallow topsoil and subsoil constraints. While Mr Bennett conceded the proposed management approach had somewhat *"moved on"* from the exhibited EES he remained concerned key characteristics of the soils remained unaddressed. These included soil structure, limestone soils and Gilgai country.

Mr Masters was satisfied his recommended management measures would be able to address soil structure and Gilgai country. Mr Shovelton recommended free lime should be tested in the soil profile[53] and plant tissue tests be undertaken during rehabilitation to monitor nutritional uptake of plants.[54]

Measures required to achieve suitable agricultural productivity

Mr Masters undertook a peer review of the draft rehabilitation plan and made specific recommendations which the Proponent addressed through an amended MM-SLR01 and new MM-RH04 and RH05.

The conclave agreed on additional mitigation measures which were generally agreed by the Proponent in changes to MM-SLR01 and MM-AG01.

The EPA submitted in closing, its relevant submissions had been addressed, except for the following two matters. Firstly, *"appropriate erosion and sediment control measures"* to be applied in MM-SLR01 and MM-SLR04 had not been articulated in the EMF.[55] Secondly, a detailed risk assessment for the rehabilitation plan including post-closure risks had not been provided.

The EPA submitted previous iterations of the draft rehabilitation plan that it had reviewed had included a "*post-rehabilitation risk identification and assessment*" which was not included in the exhibited EES. Its submission included:

> This assessment identified what likely risks the rehabilitated land may pose to the environment, to any member of the public or to land, property or infrastructure in the vicinity of the rehabilitated land.[56]

The EPA explained the risk assessment identified what *"…appeared to be residual risks in the post-closure phase"* including soil quality. The submission stated:

[53] D26, page 14
[54] D110, page 12
[55] Recommendations 10 and 11 in S147
[56] EPA original submission S147, page 60

> EPA considers this to be a key ongoing risk for the remediated land, as degraded soil can reduce agricultural capability or result in ongoing environmental risks such as erosion and sedimentation from surface water run-off.[57]

The EPA supported the revised MM-RH01 (which required the rehabilitation plan to be informed by a detailed risk assessment) and noted under the existing memorandum of understanding (MoU) between ERR and the EPA, the rehabilitation plan would likely be sent to the EPA for review and comment providing an opportunity for the EPA to *"…fully resolve this issue at that later stage".*[58]

In closing, the Proponent submitted the general principles of the rehabilitation strategy were sound and had improved with the benefit of expert evidence and submissions from local farmers and agronomists.

(iv) Discussion

Agricultural productivity post rehabilitation

The IAC accepts the expert evidence of Mr Masters and Mr Shovelton that, subject to their recommendations, the site can be rehabilitated to achieve pre-mining (i.e. equivalent) productivity within a timeframe of 5 to 7 years. The key recommendations made by these experts are included in the day 3 EMF and the further changes are recommended by the IAC.

The IAC notes Mr Sonogan's uncertainty about rehabilitation outcomes but did not find his evidence on this point compelling.

The IAC agrees it is a desirable aspiration to return the land to a 'higher' agricultural productivity than currently exists, but it has not been conclusively established this would occur in the 5 to 7 year timeframe. In any event, the IAC does not believe it is necessary that the site achieve a higher level of productivity in order the meet the Scoping Requirements draft evaluation objective. Achieving an equivalent productivity would be sufficient for this purpose.

The IAC accepts the evidence the soil reinstatement trial is required for fine tuning only and not to demonstrate the land can be restored to its pre-mining capacity. The IAC supports the early establishment of these trials as reflected in MM-RH05. The EES and submitters might have benefitted from a trial being conducted as part of the preliminary investigations, but the IAC does not believe this was necessary in order to establish the site can be effectively rehabilitated.

Measures required to achieve suitable agricultural productivity

As with soils, the proposed mitigation measures benefited from the collaborative approach among experts, the consideration of well-made, informed submissions and peer review of the EES documents.

Mr Master's recommendations for the draft rehabilitation plan were mostly included in the Proponent's changes to the EMF which the IAC supports. One exception was the recommendation for a detailed soil management plan to be included in the rehabilitation plan. The IAC has recommended this be specified in MM-RH04. For clarity, the IAC has recommended this include details of appropriate erosion and sediment control measures to be implemented consistent with MM-SLR01 and MM-SLR04. It is noted that the EPA will likely have an opportunity to review this via the MoU with ERR.

[57] EPA original submission S147, pages 60-1

[58] D270, paragraph 108

The conclave recommended productivity benchmarking to be determined *"by a committee"* with local landholders and agronomists. The Proponent proposed in its day 3 MM-AG01 that yield targets be determined *"in consultation with stakeholders"* including local landholders and agronomists. For practicality reasons, the IAC prefers the Proponent's approach and therefore no change is required.

The IAC notes Mr Master's soil reinstatement trials were recommended in addition to the revegetation trials referred to in the draft rehabilitation plan. It is possible that one trial site could help test both soil reinstatement and revegetation – the IAC does not have a view on this. However, for clarity it has used and recommended the term 'soil reinstatement trials' to distinguish this from the proposed revegetation trials.

The soil reinstatement trails should be representative of the range of current soil conditions and constraints (such as Gilgai, boron, sodicity, free lime etc) on-site, and be monitored for 5 to 7 years and include at least one season of below average rainfall. The IAC has recommended this be included in MM-RH05.

The Proponent's recommended MM-RH04 included Mr Master's recommendation for an adaptive management strategy and trigger action response plan (TARP). To ensure foreseeable constraints (such as Gilgai, boron, sodicity, free lime etc) can be appropriately dealt with in a timely fashion, the IAC recommends the TARP address all foreseeable soil constraints. As part of the adaptive management this should be a live document which may be updated from time to time with data from soil reinstatement trails and site rehabilitation. This has been recommended in MM-RH04. Outcomes of the TARP will help inform the post-closure risk assessment required by the MRSDMI Regulations and referenced in MM-RH01.

Some of Mr Shovelton's recommendations from his evidence report were not included in the EMF. These recommendations related to:

- The identification and control of herbicide resistant species.
- Monitoring of agricultural rehabilitation including:
  - NDVI imaging of the MLA to compare any productivity variation with reference sites
  - plant tissue tests to determine crop nutritional status
  - crop monitoring to ensure issues such as weeds, diseases and pests are not compromising crop production.

The IAC has reviewed these and recommended they be included in the monitoring program outlined in Table 21-7 of the EMF.

MM-SLR04 includes soil management measures to minimise impacts of soil exposure if rehabilitation is delayed. The IAC has recommended this be implemented by the rehabilitation plan as well as the risk management plan under the work plan.

(v) Findings

The IAC finds:

- The objective of returning the site to a higher level of agricultural productivity is supported.
- The site can be rehabilitated to a suitable 'equivalent' level of agricultural productivity within 5 to 7 years.
- Subject to recommended changes, potential risks to achieving successful rehabilitation of the site can be appropriately managed through the recommended EMF.

(vi) Recommendations

Environmental Management Framework

Include the following changes:

- **a) revised MM-AG01 to improve clarity**
- **b) revised MM-AG03 to be consistent with the revised MM-SLR05**
- **c) revised MM-SLR01 to require the soil management plan to be prepared with input from an agronomist with local experience**
- **d) revised MM-RH05 to require soil reinstatement trial sites to be monitored for 5 to 7 years and include at least one season of below average rainfall**
- **e) revised MM-AG03 to ensure herbicide resistant species are considered in the management of potential adverse biosecurity effects**
- **f) revised Table 21-7 Agriculture monitoring to include crop and productivity monitoring in rehabilitated areas and adjacent baseline paddocks and to include plant tissue tests to identify any nutrient issues**
- **g) revised MM-RH04 to include a detailed trigger action response plan addressing all foreseeable soil constraints which may be encountered and a detailed soil management plan including details of appropriate erosion and sediment control**
- **h) revised MM-SLR04 to be implemented by the rehabilitation plan under the work plan.**

These changes are included at appendix E.

13.5 Geotechnical

(i) The issues

The issues are whether potential geotechnical effects have been appropriately assessed and are acceptable.

(ii) What did the EES say?

The EES assessed impacts of the Project's construction and operation for potential geotechnical risks and ground movement impacts.

Technical report J included an assessment of ground movement risks including from earthquakes, slope collapse, deformation or heave of material and dispersive/sodic soils. It concluded key outcomes of the MRSD Act for a safe, stable and sustainable project had been met.

Overall, the EES found the Project would not have significant ground movement impacts because mine design:

- used space in the MLA to contain potential hazards
- includes comprehensive geotechnical investigations, conservative material properties and detailed design focused on key risk pathways
- maintains the pit floor above the water table
- allows for all tailings to be deposited sub-surface.

Technical report J identified information gaps and risks outside the MLA requiring further investigation, including:

- location of existing public services and proximity to buffer zones

- information on the current road infrastructure and its ability to support the Project
- the extent and nature of dispersive soils in the proposed pipeline alignment.

Potential geotechnical risks included:

- bank stability, erosion potential and subsidence of pump station facilities at the Kangaroo Lake pump station site
- constructability and ground settlement risks above trenchless crossings of the pipeline alignment with associated impacts on above-ground infrastructure such as water channels or railways
- unstable trench walls, weak bearing resistance and low soil resistivity along the pipeline alignment
- erosion risks associated with surface water
- ground movement impacts on the current road network.

(iii) Submissions

The IAC's RFI queried what measures or investigations were proposed to address information gaps identified in technical report J. The Proponent submitted these matters would typically be addressed in the front-end engineering and design. If they warranted further analysis and investigations subject of a statutory control, they would be better suited to the Incorporated Document rather than the EMF.

The IAC (through the RFI) requested the Proponent identify the recommendations in technical report J that had not been included in the EMF. In response, the Proponent amended MM-GS01 to outline that the ground control management plan would:

- incorporate comprehensive geotechnical design methodology and review using conservative elastic parameters and incorporate sensitivity assessments
- implement pit and stockpile buffer zones from sensitive receptors
- require mine operation planning to be integrated with ground and surface water monitoring to ensure the mine pit floor is above the groundwater table.

(iv) Discussion

The IAC notes the further investigations and geotechnical risks identified in technical report J will be addressed as follows:

- Geotechnical risks for existing public services in the buffer zone will be addressed through detailed design in the work plan.
- Detailed information on current road infrastructure will be covered in the TMP and dilapidation surveys.
- Information on dispersive soils in the proposed pipeline alignment and potential for associated risks affecting design and constructability will be addressed by recommended changes to MM-SLR02.
- Geotechnical risks at the Kangaroo Lake pump station site, including bank stability, will be addressed during detailed design and in the works on waterways application.
- Pipeline alignment and infrastructure crossing issues will be addressed in detailed design and the works on waterway application and railway and road crossing consents.
- Soil condition investigations along the pipeline route will identify any potential dispersive soils as by the recommended MM-SLR02.

Based on this assessment, the IAC is satisfied no further changes are necessary to the Incorporated Document.

The IAC supports the Proponent's day 3 changes to the EMF to implement the recommendations in technical report J.

No evidence or submissions were made with respect to geotechnical impacts of the Project. The IAC notes the ground control movement plan will be assessed by ERR as part of the work plan application.

(v) Findings

The IAC finds:

- The EES has appropriately assessed geotechnical effects.
- Geotechnical effects can be appropriately managed through the recommended EMF.

13.6 Overall conclusions on agriculture, soil and geotechnical effects

Subject to the IAC's recommendations, there are no agriculture, soil or geotechnical impacts that preclude the Project being approved or the draft evaluation objective being achieved.

14 Radiation

14.1 Introduction

The relevant Scoping Requirements draft evaluation objective is:

> To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.

Radiation is discussed in EES chapter 17 and technical report N. Technical report N provides the Radiation Impact Assessment (RIA).

The exhibited EMF includes the following mitigation measures:

- R-ENG01 (in relation to approvals)
- R-ENG02 Minimise radiation effects: Engineering design
- R-ENG03 Minimise radiation effects: Product packing
- R-ADM01 Minimise radiation effects: Administrative
- R-ADM02 Minimise radiation effects: Rehabilitation.

In response to the IAC's RFI and other issues raised at the Hearing, the Proponent provided the following technical note:

- TN04: Crop Radionuclide Uptake Impact Assessment (D188).

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248)
- joint statement of radiation experts (D103).

Table 19 lists the radiation evidence.

Table 19 Radiation evidence

Party	Expert	Firm	Area of expertise
Proponent	Jim Hondros and Rose Secen-Hondros	JHRC	Radiation
MFMF	Dr Harry Watts	Watts and Fisher Pty Ltd	Radiation
MFMF	Assoc Professor Tilman Ruff	University of Melbourne	Radiation and health

Radiation naturally exists at varying levels everywhere within the environment. Radioactivity represents the rate of radioactive decay. One becquerel (Bq) is equal to one radioactive decay per second. Radiation exposure is measured in a unit called the gray (Gy). The radiation exposure is equivalent to the energy 'deposited' in a kilogram of a substance by the radiation. Exposure is also referred to as absorbed dose. Effective dose takes the absorbed dose and adjusts it for radiation type and relative organ sensitivity. The units for effective dose are sievert (Sv).

Mineral sands contain naturally occurring radioactive materials. The EES assessed background conditions, the content of the mineral sands and other materials to be mined and modelled

potential radiation exposures for various aspects of the mine processes, including within and outside the MLA.

14.2 Roles and responsibilities

(i) The issue

The issue is whether the EES identified the necessary management plans requiring approvals under the *Radiation Act* 2005.

(ii) What did the EES say?

The *Radiation Act*, administered by the Victorian Minister for Health, provides the legislative framework for radiation protection and radioactive waste management. The overall purpose of the *Radiation Act* is to protect the health and safety of persons and the environment from the harmful effects of radiation.

The *Radiation Regulations* 2017, contain provisions relating to the limits on occupational and public exposure arising from mining and processing operations. The regulations set out the requirements for licensing, registration, emergency response, safety precautions, monitoring, disposal of radioactive materials, and other requirements for facilities handling radioactive substances.

The EES identified the following licences are required from the Department of Health:

- a radiation management licence
- density gauge licence.

The regulatory system requires the following plans be approved by Department of Health in order to obtain the relevant licences:

- Radiation management plan (RMP)
- Radioactive waste management plan (RWMP)
- Radiation environment plan.

Radiation Management Plan

The RMP must address among other things:

- a radiation risk assessment
- an outline of the radiation control mechanisms
- nominated dose constraints for workers and the public
- information regarding worker induction, instruction and training
- details of the occupational and environmental radiation monitoring program
- pre-defined action levels for monitored results, with defined actions
- procedures and measures to protect the security of radioactive sources and materials including storage, transport and disposal
- plans for management of accidents, incidents, emergencies and near misses related to radiation.

Radioactive Waste Management Plan

While tailings do not trigger the need for a RWMP, there may be other wastes such as contaminated bags from the dust filtration collection systems on the product storage sheds that

trigger the need for a RWMP because of their radioactivity levels or contamination. The key additional content beyond that already contained in the RMP include:

- a description of the waste that may be generated and the processes that may generating the waste
- a description of the disposal options or disposal facility
- a prediction of any environmental radiological impact of the waste disposal, including impacts to flora and fauna and members of the public.

Radiation Environment Plan

The radiation environment plan would have similar components as the RMP and RWMP, with the key additional aspects being as follows:

- a description of the potential radiological impacts on the environment
- radiation impact assessment of flora and fauna using measurement data
- detail of environmental radiation monitoring program
- management measures to control any potential impacts.

The transportation of radioactive material is regulated, with transporters of radioactive materials required to have a radioactive materials transport licence and a Department of Health approved transport radiation management plan.

The concentrations of some radioactive materials in some of the products, which are to be temporarily stored on-site, will exceed the levels prescribed for a nuclear action under the EPBC Act.[59] These materials will be subject to control under the operational RMP.

The transportation of radioactive material is regulated, with transporters of radioactive materials required to have a radioactive materials transport licence and a Department of Health approved transport radiation management plan.

(iii) Evidence and submissions

Submitters identified that worker or occupational exposure to radiation was not addressed in the EES. The conclave of radiation experts agreed this needs to be considered but it was not within the scope of the EES to undertake this assessment with the focus of the EES on environmental impacts not occupational impacts.

Submitters expressed concerns about truck and train accidents with the potential for spillage of radioactive rare earth concentrates.

There were no submissions or evidence that challenged the regulatory framework described in the EES, but some submitters raised general concerns about radiation impacts.

(iv) Discussion

The expert evidence of Mr Hondros and Ms Secen-Hondros outlined the relevant legislation, approval and management plans that are required.

The IAC notes that the various plans under the *Radiation Act* will address matters such as:

- occupational exposure to radioactivity
- emergency contingency measures in the case of accidents and spill

[59] 'nuclear actions' under the EPBC Act are discussed in chapter 17 of this report

- waste disposal.

The IAC is satisfied the regulatory framework is in place to address many of the concerns raised by submitters. Broader issues associated with radiation levels on the site are discussed below.

(v) Findings

The IAC finds:

- The EES has appropriately identified the relevant radiation management legislation that applies to the Project.
- Approvals of key plans and licences under the *Radiation Act* will be required before the processing of mineral sands can commence.
- Approvals under the *Radiation Act* will address many of the concerns raised by submitters about radiation impacts.

14.3 Background radiation

(i) The issue

The issue is whether the described background radiation levels have been appropriately assessed.

(ii) What did the EES say?

The RIA was conducted within a five-kilometre radius of the Project.

Various monitoring was conducted at five Environmental Radiation Monitoring Locations (ERMLs). Monitoring commenced in February 2019 and some monitoring is still ongoing.

Gamma Dose Rate

Background gamma radiation depends on the natural levels of radionuclides in soil and from cosmic radiation. Monitoring was conducted at the five ERMLs and with spot measurements at the EMRLs as well as over 100 locations within or near the study area. The survey found that the background gamma dose rate averaged about 0.04 µSv/h which is typical for Australia.

Radionuclides in dust

By collecting and analysing deposited dust samples, the dust deposition rate, concentration of radionuclides in airborne dusts and radionuclide deposition rates were determined. Using lead as the benchmark, radionuclide deposition rates were found to be similar to global deposition rates.

Radon

Radon is a naturally occurring inert radioactive gas produced by the radioactive decay of radium, an element found naturally in soil and rocks. Hourly baseline radon concentrations were measured at ERML-R9 between August 2019 and January 2021. The survey showed that Radon concentrations in the study area (maximum of 28 Bq/m^3) were consistent with naturally occurring Australian Radon concentrations.

Radionuclides in soil

Soils contain naturally occurring radionuclides, which are present due to a combination of locational geology, land use practices (past and present), climatic events and dust deposition. Surface soil samples were collected at each of the ERMLs and the measured baseline activity concentrations of Uranium (U-234 & U238), Thorium (Th-230 & Th232), Radium (Ra-226 & Ra-

228), Lead and Polonium. Baseline soil radionuclide concentrations in the study area were found to be consistent with worldwide soil radionuclide concentrations.

Radionuclides in groundwater

Groundwater contains naturally occurring radionuclides, which are present due to a combination of locational geology, hydrogeology and land use practices (past and present). Groundwater samples were collected from the seven monitoring wells installed to establish baseline groundwater quality for the Project.

The natural groundwater in the study area is radiologically elevated. The gross alpha and gross beta activity concentrations exceed ADWG, and isotopic radium concentration are elevated.

Crop Radionuclide Uptake Impact Assessment

To assess the potential impact on crops, it was assumed that there had been 20 years of dust deposition during the operation of the mine. The change in soil concentrations of radionuclides was used to gauge the effect of any additional uptake by crops. The data showed that the predicted change in soil concentration of radionuclides is less that the error estimates in the pre-existing natural concentrations, and as such would be undetectable.

(iii) Evidence and submissions

The Proponent relied on technical report N and the evidence of Mr Hondros and Ms Secen-Hondros.

No submissions questioned the extent or the findings of background radiation studies in the EES.

(iv) Discussion

The IAC is satisfied the EES has appropriately assessed the background radiation levels.

However, it notes the discussion in the conclave report in relation to natural soil variability and the importance of taking sufficient samples to capture that variability and establish accurate baseline samples.[60] For that reason, the IAC has included a requirement to undertake additional baseline sampling in a new EMF mitigation measure R-ADM03.

(v) Findings

The IAC finds:

- The EES has appropriately assessed background radiation levels.
- Further baseline sampling is required to better understand natural variability.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) new R-ADM03 that requires additional baseline sampling.

This change is included at appendix E.

[60] D103, table in section 4 (IAC reference number 4.11)

14.4 Exposure scenarios

(i) The issue

The issue is whether the Project will cause unacceptable radionuclide exposure to people and the environment.

(ii) What did the EES say?

Public exposure

The potential radiological impacts to the public were assessed by calculating the potential total effective dose from all exposure pathways. As public receptors are not in close proximity to the site, gamma radiation exposure was assessed due to its capacity to travel further.

Based on the worse-case scenario of material stockpiles at the MLA boundary, all year exposure and no shielding of source or receptor, the highest gamma dose exposure of 0.034 mSv/y from the Project was at Receptor R14. The ionising radiation dose limit for public exposure as specified in the Radiation Regulations is 1 mSv/y.

Doses due to the inhalation of Project originated dust were calculated for the highest modelled dust scenarios for mining in Area 1 and in Area 3. For modelling purposes, it was assumed all dust was ore and exposure was for one year spent outside. The calculated radiation inhalation exposure of dust containing radionuclides was determined at each of the receptors and found to be less than 0.0002 mSv/y.

An assessment of the exposure of receptors to food grown was conducted (with half of all food assumed produced at the receptor) after 20 years of dust deposited during the life of the Project. Food ingestion dose calculations accounted for different dietary uptakes of age groups and found the worst case for the most affected receptor was 1/50 of the maximum annual dose allowance.

The exposure to radiation due to drinking rainwater from tanks at the receptors was calculated based on all dust being considered as ore and using the maximum dust deposition rates modelled for each receptor and that half the radionuclides dissolve in water. Accounting for age groups, the highest modelled exposure was 1/100 of the maximum annual dose allowance.

The dose from the inhalation of Radon gas was calculated for receptors for Area 1 and Area 3. The highest dose calculated was 1/500 of the maximum annual dose allowance.

The cumulative exposure from all the pathways of exposure was determined. The EES found that the total doses to humans at the receptors, due to the Project, were low with a range of 0.035 – 0.192 mSv/y and a median of 0.039 mSv/y, all below the public dose limit of 1 mSv/y.

Agriculture impacts

The radiological impact to flora and fauna due to the Project was assessed based on the soil radionuclide increment at the conclusion of the Project. The ERICA project (environmental risks from ionising contaminants) as endorsed by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) was used to assess the radiological risk to biota at Receptor 14.

The screening level (absorbed dose rate above which additional assessment is required, due to possible impact to species) for additional or more detailed assessment is 10µGy/h (ARPANSA 2015). The assessed potential impact to all reference species was deemed very low with the highest result for lichen and bryophytes (mosses) of 0.466µGy/h.

The radiological impact to grain crops was assessed to be minimal. The modelled Project originated soil radionuclide increments were within the analysis error bands for existing soil radionuclide levels and would be undetectable. For crop radionuclide activity concentrations, the calculated Project increment was one to two orders of magnitude less than that calculated to currently be in the crops, based on the existing soil radionuclide activity concentrations.

Groundwater

The radiological impact to groundwater was assessed to be low because of the inert nature of the tailings, the high levels of natural radiation already in the groundwater and the activity concentration of the tailings being less than that of the activity concentration of the ore removed from above the groundwater.

Transport

The radiological impacts to the public were assessed by calculating the potential effective dose from gamma exposure, as the other exposure pathways are negated due to the product being encapsulated in shipping containers.

The exposure scenario modelled for the Ultima Terminal was all containers stored at the boundary, no shielding and exposure was for a continuous period of 1 year. Even in an extreme event where containers are stored for 10 days, the maximum exposure for a receptor was 0.2mSv/y. Results for the Phase 1A and Phase 2 ore products produced lower results due to lower levels of radionuclides in the ore.

(iii) Evidence and submissions

MFMF expert witness, Associate Professor Ruff gave evidence that radiation risks to health are greater than previously thought and are not adequately reflected in current regulatory limits. He expressed the view that annual dose limit for members of the public (1 mSv/y) should be regarded as high and outdated and should be revised to 0.25 mSv. He held a similar view about the non-human biota dose rate where he felt the current trigger level of 10 µGy/h should be revised to 3-4 µGy/h.

Mr Hondros and Ms Secen-Hondros gave evidence that the prescribed radiation dose limits and trigger levels for biota radiation are appropriate and consistent with international standards. Mr Hondros explained the International Commission on Radiological Protection makes recommendations regarding what is an acceptable level of exposure. The recommendations are then turned into internationally agreed standards by the International Atomic Energy Agency and adopted in national regulation. In Australia, the standards are endorsed by ARPANSA and then adopted under State and Territory regulations.

Airborne

MFMF submitted that the findings of the RIA are contingent on the accuracy of the dust modelling.

The Proponent submitted that there was high level of conservatism in the RIA due to the assumption that 100 per cent of the dust generated by the Project is ore. Its view was that the dust assessment would need to be off by an order of magnitude before it would have any material consequences for the RIA.

Agriculture

During MFMF cross examination of Mr Hondros and Ms Secen-Hondros, MFMF asserted that lentils may be more sensitive to the uptake of radionuclides than the grain crops assessed in the EES. The EPA also questioned Mr Hondros and Ms Secen-Hondros on whether the direct impact of dust falling on crops had been assessed.

Mr Hondros and Ms Secen-Hondros provided a written response, in TN04 (D188). TN04 referenced information from the International Atomic Energy Agency that the uptake factor for cereal grains is greater than for lentils except for Polonium which is marginally higher. TN04 confirmed that conclusions applicable to grain would also apply to lentils.

TN04 also responded to the request for an assessment of radioactive dust falling and settling on crops. It confirmed that it was not assessed in the EES as a valid risk because:

- dust will deposit on the pods of lentils and husks of cereal grains
- natural wind and rain has the potential to remove the dust from crops seed heads
- the mechanical action of harvesting will loosen dust from crop seed heads
- during the harvesting process lentils are removed from pods, and wheat grains are removed from heads.

TN04 contained an assessment of the potential increase of radionuclides in grain crops based on dust deposition at Receptor R14 which is the closest to the MLA boundary. The assessment assumed all dust was ore and 100 per cent absorption of the radionuclides into the grain. The impact was assessed and found to be significantly lower than that modelled to be already in the crop due to uptake from the soil. The risk was assessed as "*minima*l".

Groundwater

MFMF expert Dr Watt was concerned that radionuclides in the tailings would not be in chemically stable or inert forms. He considered this was important for the impact assessment of radiological impacts on groundwater. His view was in the absence of testing elemental concentrations of thorium and uranium in the tailings, interpreting the low leachate rates of those elements is impossible.

It was Dr Watt's evidence that leachability testing should also account for the composition of natural waters. He cited an academic article suggesting that the solubility of radionuclides will be increased in natural waters in the presence of sulfates and organic acids.

Dr Watt accepted that the tailings would be homogenised at the point of discharge into the pit but considered they may not remain perfectly mixed and dispersed after the slurry is discharged. His opinion was that similar size particles may settle in the same area with a subsequent loss of overall tailings homogeneity and therefore may lead to a concentration of radionuclides exceeding the activity level of 1 Bq/g.

The RIA had assessed the tailings on the basis that it was homogenous and therefore would not exceed the 1 Bq/g prescribed level.

The opinion of Mr Hondros and Ms Secen-Hondros was if tailings are not homogenous, the radiological impacts need reassessment with consideration of the International Atomic Energy Agency GSG-17 2023.[61]

[61] Internal Atomic Energy Agency – General Safety Guide GSG-17, Application of the concept of exemption.

Transport

Associate Professor Ruff gave evidence that the modelled gamma dose of 0.80 mSv/year at the Ultima Terminal during phase 1 for a member of the public is concerning, and in his opinion unacceptably close to the maximum permissible dose limit.

Ms Eastman (S37) identified that drivers transporting the heavy mineral concentrate would be exposed to radiation.

Mr Hondros and Ms Secen-Hondros noted that all products leaving the Project will be double encapsulated, either in lined shipping containers, or in sealed bulka bags inside shipping containers. Prior to leaving the MLA, the external surface of each shipping container would be checked to ensure there is no radiological surface contamination. Annexure D to their evidence report reassessed exposure calculations to the public for the transport of the product as they had been informed that the containers would hold 27 tonnes rather than 25 tonnes of mixed heavy mineral concentrate as assessed in the EES. They concluded that the risk to members of the public for the transport of the ore remained low.

(iv) Discussion

In regard to exposure limits and standards, the IAC accepts the evidence of Mr Hondros and Ms Secen-Hondros and understands that the limits and trigger levels are specified in legislation. The IAC notes that the trigger levels specified in the RIA are comparable to those suggested by Associate Professor Ruff.

Airborne

Due to the nature of emission estimations and modelling, the IAC accepts that actual dust emissions may vary from that predicted by modelling. The issue is whether the dust modelling so significantly underestimated emissions that the findings of the RIA are no longer valid. The IAC accepts that with the high level of controls on dust emissions sources combined with a proactive management system providing real time information on dust levels, that dust emissions can be appropriately mitigated.

Most of dust in the model was wheel generated dust from internal dirt haul roads. The roads will be constructed from low silt overburden and not from the mineral sands ore which contains the radionuclides. As the RIA treated all dust as ore, the IAC is satisfied that the radiological assessment has not underestimated airborne impacts from radionuclides.

Ore from Area 1 has higher levels of uranium and thorium compared to Area 3. The IAC considers there is merit in baseline monitoring of radionuclides in dust which may change as mining disturbs the ore body. The RIA should also be revised if subsequent observations of the in-pit tailings show it is not homogeneous or the tailings are not chemically stable or radionuclides are leached above ambient levels. If measured dust deposition rates are higher than those predicted by the modelling in the Air Impact Assessment, the engineering controls fail to fully contain the ore or there is a significant variation between actual data and that used in the RIA, then it should be revised. This is addressed in new mitigation measure R-ADM03.

Agriculture

The IAC is satisfied the evidence and additional information related to assessing the sensitivity of a different grain type establishes that any impact from the Project on radionuclide levels in soils and in crops will not be appreciably different from those currently found.

Groundwater

The evidence before the IAC is that the solubility of Uranium and Thorium is important to determining the potential impacts on groundwater. Although Dr Watt acknowledged the low solubility of the radionuclides reported in the ATC Williams Report, his evidence was that the concentration of these elements is important in determining their solubility.

While it is generally true that increasing the concentration of a substance may lead to more of it being potentially dissolved, this is not the case here. There was no evidence that the tailings tested are not representative of tailings that would be returned to the mine pit. The IAC therefore considers the metal solubility test results for tailings from the three phases of processing provides useful information for gauging the potential impact on groundwater. This is discussed further in the chapter 11 of this report.

The groundwater monitoring program includes testing for radionuclides.

In regard to the evidence of Mr Watt of the increasing solubility of radionuclides in "*natural waters in the presence of sulphates and organic acids*" he referred to a 1980 study by Langmuir and Herman. The abstract of this paper states that data is incomplete and only draws a tentative conclusion that:

> …it seems likely that organic complexes predominate over inorganic complexes of thorium in organic-rich stream waters, swamp waters, soil horizons, and waterlogged recent sediments.[62]

There was no evidence that groundwater or process water would be organically rich.

On the matter of potential aggregation of similar materials following the discharge of tailings into the pit, the IAC has no specific evidence that this aggregation will occur to a degree that potentially causes a localised exceedance of the 1 Bq/g activity level. As noted by Mr Hondros and Ms Secen-Hondros, if appreciable differential settlement occurs, the radiation risk assessment could be recalculated. The IAC is cognisant of the International Atomic Energy Agency (of which Australia is a member state) GSG-17 publication referred by Mr Hondros and Ms Secen-Hondros that an exemption may be possible if:

> Regulatory control of the practice or the source would yield no net benefit, in that no reasonable measures for regulatory control would achieve a worthwhile return in terms of reduction of individual doses or of health risks.

With the quantity of overburden to be placed over the tailings, any radiological impact from a small concentration of radionuclides would be expected to be attenuated.

Transport

The IAC is satisfied the radiological risk from the transport of the heavy mineral concentrate is low. The highest level identified for a receptor identified at the Ultima Terminal is actually a silo and not a residential premises. Rather than 0.80 mSv/year exposure, the nearest actual sensitive receptor would be exposed to 0.20 mSv/year in the scenario of longer term storage of products in shipping containers stored on the boundary of the terminal.

The IAC notes the RMPs will address occupational exposure issues such as drivers transporting the containers.

[62] Donald Langmuir, Janet S. Herman, The mobility of thorium in natural waters at low temperatures, Geochimica et Cosmochimica Acta, Volume 44, Issue 11, 1980, Pages 1753-1766, ISSN 0016-7037.

(v) Findings

The IAC finds:

- The EES has appropriately assessed environment and public exposures to radiation impacts from the Project.
- Radiation impacts can be appropriately managed through the recommended EMF and other approvals.
- For the Project to proceed, a radiation management licence from the Department of Health as well as approvals for management plans describing its engineering controls, management and monitoring of radioactive sources will be required.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) new R-ADM03 that requires a reassessment of the Radiation Impact Assessment under certain circumstances.

This change is included at appendix E.

14.5 Controls

(i) The issue

The issue is whether design controls and mitigation measures are appropriate to protect the public and the environment.

(ii) What did the EES say?

Design controls for preventing any releases of radioactive material to the environment include:

- restricted access to the Project, to prevent intentional or inadvertent removal of contamination
- dust suppression at the source of emissions, and minimisation through capture mechanisms (such as dust extraction) or covers
- contained material transfers and storage of products within enclosed sheds
- pressure detection systems on pipelines to identify failures and stop pumps
- wash-down facilities for vehicles and equipment exiting site, to minimise any spread of contamination off-site
- final rehabilitation to radiation levels that are consistent with pre-Project levels.

In addition to design controls, administrative controls, such as management systems and work instructions would be used to ensure that emissions are controlled during operations, and would include:

- detailed procedures for the clean-up of spills
- incident reporting and investigation procedures to minimise recurrences
- monitoring and reporting on the performance of design controls.

(iii) Evidence and submissions

Dr Watt gave evidence that engineering controls are needed for total containment of radioactive materials in all areas of the plant where they will be handled. Associate Professor Ruff also questioned the feasibility of containing dust from the final product within the storage building.

All experts agreed at the conclave that engineering controls are needed for total containment of radioactive materials in all areas of the plant where radioactive materials will be handled. Mr Hondros and Ms Secen-Hondros stated in their evidence report that baghouses would be part of the engineering controls to manage the release of radioactive dust.

(iv) Discussion

The IAC notes that EES chapter 3 indicates the various mixed rare earth mineral concentrates would be stored in covered sheds before transport off-site. The evidence of Mr Hondros and Ms Secen-Hondros was that dust control measures would be needed in all areas of the plant where radioactive materials will be handled. The IAC notes that if these engineering controls fail, then the RIA should be reassessed. This issue is addressed in the new recommended R-ADM03.

The IAC is satisfied that appropriate design controls and mitigation management procedures are described in the EES and the EMF.

(v) Findings

The IAC finds:

- The EES has identified appropriate controls to mitigate the risk of radiation exposure.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) new R-ADM03 requiring the Radiation Impact Assessment be reviewed if engineering controls fail to contain radioactive material.

14.6 Overall conclusions on radiation effects

Subject to the IAC's recommendations, there are no radiation impacts that preclude the Project being approved or the draft evaluation objective being achieved.

15 Social and economics

15.1 Introduction

The relevant Scoping Requirements draft evaluation objectives are:

> To achieve the best use of available mineral sands resources, in an economic and environmentally sustainable way, including while maintaining viability of local industries.
>
> To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.
>
> To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.

Socio-economics are discussed in EES chapter 18. The social impact assessment (SIA) is provided in technical report O. An economic impact assessment (EIA) is provided at Attachment IV.

The exhibited EMF includes the following mitigation measures:

- MM-SC01 Workforce Accommodation Strategy
- MM-SC02 Neighbour Agreement.

Additionally, the IAC had regard to:

- relevant submissions and evidence
- responses to themes raised in submissions (D93)
- responses to the IAC's RFI (D248)
- joint statement of economic experts (D190).

Table 20 lists the social and economic evidence.

Table 20 Socio-economic evidence

Party	Expert	Firm	Area of expertise
Proponent	Glenn Weston	Public Place	Social
Proponent	Dr Jackie Wright	Environmental Risk Sciences Pty Ltd	Human health
Proponent	Noel Richards	Deloitte Access Economics	Economics
MFMF	Chris Lightfoot and Professor Bill Malcolm	Consultant economist and University of Melbourne	Economics

15.2 Social impacts

(i) The issues

The issues are the Project's impacts on the local housing and labour markets, local services and community infrastructure, and amenity.

(ii) What did the EES say?

The expected Project workforce includes a peak construction workforce of up to 275 workers, with the operational workforce peaking at up to 400 workers in year 5. The workforce will be

accommodated in local towns, predominantly Swan Hill and Kerang, and not on the mine site. The SIA assessed the impacts of the workforce increase based on various accommodation scenarios and demand for housing and community services and infrastructure. It also assessed the potential social effects in the vicinity of the Project associated with access and amenity.

The SIA identified three potential social impact pathways shown in figure 24.

Figure 24 Potential social impact pathways

Category	Social Effect	Receptors	Phase
Workforce and Social Profile	▪ Influx of workers creates additional demand for community facilities and services in settlements within commuting range of the project	▪ Users of community facilities and services	▪ Construction, Operation and Decommissioning
	▪ Influx of workers creates additional demand for housing within commuting range of the project	▪ Housing market participants.	
	▪ Influx of workers influences the social profile of communities within commuting range of the project	▪ Residents of established communities	
Displacement	▪ Occupation of land disrupts current land use	▪ Owners and occupiers of directly affected land. ▪ Members of the broader rural community	
Access and Amenity	▪ Alterations to the amenity and character of rural areas in proximity to the MIN (within approximately 3.5 kilometres) and Water Pipe.	▪ Occupants of nearby dwellings ▪ Members of the broader rural community	
	▪ Alterations to the amenity and character of Kangaroo Lake	▪ Residents living adjacent the lake ▪ Recreational users	
	▪ Altered access and amenity due project induced traffic interferes with the enjoyment of valued community resources	▪ Residents of dwellings and settlements along the transport route.	

Source: EES technical report O, table 5.1

The SIA found the increased demand for community facilities and services would be relatively small and would not place an unmanageable burden on existing facilities and services. The Project would contribute to the ongoing viability of services in the region, although, in the case of general practitioner services, the current supply network is operating at or near capacity.

The SIA identified various economic and social benefits associated with increased employment and local expenditure, including the increased viability of towns and community services and facilities.

The SIA noted the Proponent would apply its 'local employment policy' and 'code of conduct' for staff and was in the process of developing MoUs with GSC and SHRCC that have since been agreed and signed.

It recommended two mitigation measures in relation to:

- developing a workforce accommodation strategy (the draft strategy is appended to technical report O)

- implementing neighbour agreements (the agreement template is appended to D248).

The Workforce Accommodation Strategy would provide a framework for managing workforce accommodation needs during the Project's construction and early operational phases.

The neighbour agreement model is intended to share some of the financial benefits of the Project with neighbours who are not receiving payment for land acquisition/access, in recognition the Project will result in a change to their amenity. It provides a sliding scale annual payment which is based on the distance of the dwelling from the mining licence boundary as follows:

- $25,000 if the dwelling is within 1 kilometre
- $10,000 if the dwelling is between 1 to 2 kilometres
- $5,000 if the dwelling is between 2 to 3.5 kilometres.

The payment commences once construction commences and will be paid annually during the life of the mining operation. Each annual payment will be adjusted in accordance with the Consumer Price Index.

(iii) Evidence and submissions

The Proponent relied on EES chapter 18, the SIA and the evidence of Mr Weston. It acknowledged the concerns of the local community about various social impacts, but submitted many concerns would dissipate over time. It noted Mr Weston's observation that a "*…residual perception of unwanted intrusion*" was an unavoidable consequence of the Project.

The Proponent concluded the influx of new residents to the region, would contribute to social and cultural life, the viability of community services, and economic activity. The Workforce Accommodation Strategy would enhance the capacity of towns to accommodate workers and their families and encourage its workforce to integrate into local communities.

The Proponent explained the neighbour agreement model seeks to mitigate the perceived intrusion of the Project into the existing agricultural setting, and its potential to change to amenity. It is not intended to 'fix' concerns. Neighbour agreements have been signed by four landowners. The Proponent and Mr Weston acknowledged the Project would impact on rural character and amenity, and noted the neighbour agreements and associated compensation were designed to partly address this.

The Proponent advised it signed MoUs with GSC[63] and SHRCC in 2023. The MoUs provide a framework for the Proponent and Councils to consult and collaborate.

The Proponent outlined various other initiatives to assist in mitigating the Project's effects, including:

- Employee code of conduct (MM-SC03)
- Employment policy (MM-SC04).

Mr Weston provided an overview of the SIA and responded to issues raised in submissions, including social cohesion, housing, community services, rural character and amenity, workforce and the EMF.

Mr Weston described the proposed arrangements to accommodate the construction workforce, including negotiations with the accommodation providers to develop new rooms, and concluded

[63] D54

there would be sufficient capacity. In relation to the expected housing requirements for the operational workforce, he noted the influx of permanent workers would be significant in the context of the existing housing market and this process needed to be managed to avoid rent-seeking and associated price spikes. In this context he supported the Workforce Accommodation Strategy.

Mr Weston outlined the employment benefits that would accrue from the Project, including the reversal of young people leaving the region to secure employment. He acknowledged the demand for workers would create some stresses for other businesses in attracting and retaining staff but did not believe the impacts would be significant and was satisfied they would be offset by the broader employment benefits for the region.

He supported the Proponent's development of an employment policy and code of conduct and agreed they should be referenced in the EMF as new mitigation measures.

GSC highlighted the social and economic benefits associated with increased employment and local population growth, and the opportunity to address rural area sustainability. The Project would provide leverage to upgrade infrastructure and reinforce the role and capacity of Lalbert.

SHRCC noted various social and economic benefits associated with the Project but raised concerns about housing capacity and how population growth associated with the Project might be accommodated. It sought additional 'social and land use' requirements in the EMF, including:

- the preparation of annual surveys over a five-year period in relation to workforce accommodation, community services and procurement outcomes (revised MM-SC01)
- the establishment of a community benefit fund by the Proponent (new MM-SC06).

MFMF submitted the IAC should find that the SIA is "*derisory and irresponsible*". It raised concerns about the extent to which the SIA 'uncritically' relied on material provided by the Proponent and the lack of direct consultation with those who would be affected by the Project. It was critical of Mr Weston's assessment of the Project's impacts on the local housing market and his conclusions about the amenity impacts on residents in the rural area. It noted the Workforce Accommodation Strategy and neighbour agreements had been prepared by the Proponent, not as part of the SIA.

Submitters raised a broad range of concerns including impacts on housing availability and cost, competition for workers, demand for education, health, sporting, community and other social infrastructure and the lack of a 'social licence' for the Project.

Some submitters raised concerns about the neighbour agreement model, including limitations it might place on signatories and the basis for determining the financial compensation. Ms Hildebrandt, for example, submitted the compensation amounts should be significantly increased. Some submitters, including the Pola family, noted that not all eligible landowners had agreed to participate.

Some were critical of various aspects of the SIA and shared concerns raised by MFMF about the lack of direct consultation with the community and the reliance on what were described as flawed technical studies in the EES.

Some submitters argued the Project would have broader social and economic benefits associated with increased employment and local expenditure. These included the Murray River Group of Councils (S25), various businesses and others.

(iv) Discussion

Housing

The IAC acknowledges concerns about the local capacity to accommodate the influx of construction and operational workers, and the housing supply and cost impacts this might have on the local community.

The IAC notes Mr Weston's evidence about the capacity to house the workforce drawn from outside the region but expects there will be challenges in accommodating the influx of workers, particularly the operational workforce that will be encouraged to live locally, rather than operate as Fly in Fly Out or Drive in Drive out.

This reinforces the importance of the Workforce Accommodation Strategy (MM-SC01) and the MoUs with the Councils.

The Proponent has proposed changes to the Workforce Accommodation Strategy to include a process for agreeing and if necessary, adjusting, the maximum number of workers who could take up accommodation in the local housing market. This will need to be agreed with GSC and SHRCC in accordance with a revised mitigation measure MM-SC01. This was supported by Mr Weston.

The IAC agrees this is a worthwhile strategy and believes housing affordability and availability will require ongoing monitoring to identify and minimise impacts on the local community. This could also be done under the framework of the MoU. The IAC has recommended MM-SC01 be extended to include housing requirements associated with the 'construction' phase of the Project. Although construction accommodation is likely to be less problematic than operational accommodation, it should be monitored so that any impacts on the local housing market can be identified and addressed. It has also recommended that the reporting of housing outcomes under MM-SC01 occur over a minimum five-year period as sought by SHRCC.

While the Project's potential impact on the local housing market is an issue of concern, the IAC is satisfied appropriate mitigation measures have been recommended and any residual impact is not a reason for the Project to not proceed.

Employment

The IAC is satisfied the increase in workforce and resident population will have a range of economic and social benefits, consistent with the focus of both Councils on supporting the viability of existing towns, attracting new residents and reversing population decline and ageing.

There will be increased competition for attracting and retaining staff, including within the agricultural sector, however this is an unavoidable consequence of the Project and does not outweigh the positive economic and social benefits. Employment impacts can be monitored and partly managed through the employment policy required under MM-SC04 and other consultation processes such as the MoUs with GRSC and SHRCC.

Community services and infrastructure

The IAC accepts the SIA findings that existing community services and infrastructure have the capacity to service the increased population, although it notes that general practitioner services are currently operating at or near capacity and the Project would generate the need for an additional position. Mr Weston noted the uplift in demand for services would be relatively small and would offset the current decline in demand from the existing communities.

The IAC is satisfied there is sufficient capacity in community services and infrastructure to service population growth associated with the Project and the growth will provide the impetus for enhanced social and cultural outcomes in the region.

The IAC does not support SHRCC's recommendation that the EMF require a survey of community service usage over the first five years of the Project given that these services are expected to have sufficient capacity to accommodate the anticipated population growth. The IAC also expects that SHRCC would routinely monitor its own community service provision without the need for an additional monitoring process.

The IAC acknowledges the Project will likely generate the need for an additional general practitioner, but this is not a matter that can be addressed through the EES process.

Neighbour agreements

The IAC supports the neighbour agreement model, although it agrees with the Proponent that it will not 'fix' the concerns held by landowners about amenity and other impacts of the Project. It will, however, provide a mechanism for landowners to receive some level of compensation for the changes they will experience.

Whether or not landowners wish to participate is a matter for them, and the IAC makes no comment on the adequacy of the compensation amounts or the geographic basis for their application.

The IAC has recommended MM-SC02 be changed to delete the now superfluous reference to signatories being able to make a submission at the EES hearing.

Memorandums of Understanding

The IAC supports the MoUs as a framework for consultation, information sharing and collaboration between the Proponent and Councils. How they will operate and ultimately how successful they will be determined by the parties. Given that the MoUs have been established and can be terminated by either party, it is not appropriate they be a requirement under the EMF.

Some submitters raised concerns about the content of the MoUs and the lack of community consultation undertaken by the Councils before agreeing to participate. These are matters for the Councils and their communities.

Community benefit fund

The IAC accepts that a community benefit fund could have merit but believes it is something that would need to be negotiated between SHRCC, GSC and the Proponent, rather than required as part of the Project's approval. The IAC notes that these types of financial arrangements are typically delivered voluntarily.

The IAC encourages the Proponent to discuss how it can support and assist the Councils and their communities in addressing any impacts arising from the Project and is satisfied the MoUs and other initiatives provide a framework for this to occur.

Rural character and amenity

The IAC acknowledges the concerns expressed by landowners and their families in the vicinity of the Project and the strong attachment they feel to their properties and the local area. The IAC accepts that the Project will have amenity and other impacts on some properties but is satisfied they will not be as significant as many fear and that appropriate mitigation measures can be

applied to minimise those impacts. These impacts and mitigation measures are discussed throughout this Report and have been a key focus of the IAC's deliberations.

In assessing these impacts, it is notable the Project is in a relatively isolated area and the number of dwellings and residents potentially affected is not large. As noted in chapter 2 of this report, two dwellings in proximity to the Project will not be occupied during stages of the Project and there are only three other dwellings within one kilometres of the mine boundary. Impacts on dwellings resulting from the pipeline works will be temporary and can be effectively mitigated.

As noted earlier, the IAC supports the neighbour agreement model and agrees that it will partly compensate affected landowners. However, it acknowledges not all landowners will agree to participate and for many the available compensation will be inadequate.

Consultation

Mr Weston noted the SIA did not include direct consultation with landowners and relied instead on the community information sessions. He advised that direct consultation would have been of assistance but was not necessary for the purposes of the SIA and EES. The IAC accepts Mr Weston's assessment but, as it noted in relation to the TIA, it is likely that more direct consultation with landowners as part of the SIA might have alleviated some of the concerns and uncertainties that were evident in submissions.

Social licence

The IAC acknowledges submissions that the Project did not have a 'social licence' and was opposed by a significant majority of submitters. In assessing the Project's effects, the IAC has focused on the content and merits of evidence and submissions, not the number of submitters who support or oppose the Project.

(v) Findings

The IAC finds:

- The EES has appropriately assessed the social effects of the Project.
- The Project's social effects will be predominantly positive, although impacts on housing availability and affordability, and employment will need to be monitored and addressed as issues are identified.
- The mitigation measures provide an appropriate framework for minimising potential adverse social effects.

(vi) Recommendations

The IAC recommends:

Environmental Management Framework

Include the following changes:

a) revised MM-SC01 to include housing requirements associated with the 'construction' phase of the Project

b) revised MM-SC02 to delete the now superfluous reference to "*making a submission at the EES hearing*".

These changes are included at appendix E.

15.3 Health and wellbeing impacts

(i) The issue

The issue is whether the Project will have unacceptable health impacts.

(ii) What did the EES say?

The EES discussed potential health impacts in relation to noise, air, water and radiation in the relevant technical reports. Social impacts were discussed in the SIA.

The EES proposed various mitigation measures to address health impacts that are discussed in the relevant chapters of this report.

(iii) Evidence and submissions

The Proponent relied on the evidence of Dr Wright who prepared a Human Health Risk Assessment (HHRA) appended to her evidence report. The HRRA had been prepared following the exhibition of the EES and did not involve any direct consultation with stakeholders.

Dr Wright relied on the assessments in the relevant EES technical reports and concluded the predicted impacts in relation to air emissions, radiation, noise and water are each below relevant standards and guidelines developed to protect human health. Dr Wright also assessed impacts on community wellbeing, based on whether existing community resilience and resources are sufficient to manage changes and impacts associated with the Project. She concluded that impacts can be adequately managed through existing resources and the recommended mitigation measures, particularly the stakeholder engagement processes included in the EMF. She recommended that an additional mitigation measure in relation to farmer wellbeing be included in the EMF (MM-SC05).

Dr Wright explained the methodology used in the SIA and responded to related issues raised by submitters. These included whether local baseline studies should have been prepared as part of the SIA. Dr Wright responded that available community information was adequate, and that the small local population did not justify local baseline data.

Submissions raised various health issues related to noise, air and water quality, radiation and transport hazards that are discussed in other chapters of this report. Concerns were also raised about mental health impacts on the local community, particularly in the context of suicide rates in farming communities.

Many submitters, including MFMF, were critical of Dr Wright's reliance on the findings of various technical reports that they believed were flawed. They submitted that potentially unforeseen health impacts could be irreversible and for these reasons the IAC should take a cautious approach to Dr Wright's evidence. Dr Wright conceded that if the assessments in the technical reports she had relied on were incorrect, this would likely require a reassessment in the SIA.

(iv) Discussion

As submitters noted, the HHRA is largely reliant on the impact assessments in various technical reports included in the EES. The veracity of these reports and their assessment of impacts and mitigations is discussed in the relevant chapters of this report.

The IAC is generally satisfied with those assessments, although it has recommended various changes to the EMF to better mitigate anticipated effects. On this basis, the IAC is satisfied the HHRA's reliance on the exhibited technical reports is sound and the HHRA is suitable for the purposes of the IAC's assessment. The HHRA does not need to be revised or updated.

The IAC acknowledges the distress the Project has caused some local residents, while accepting that those who support or would obtain financial benefit or employment from the Project would be likely to experience positive mental health outcomes. The IAC agrees with Mr Weston and Dr Wright that the concerns of local residents about the effects of the Project might diminish over time if the impacts are not as significant as initially expected. Effective stakeholder communication will be key to addressing these concerns and the IAC is satisfied the EMF requires appropriate consultation processes. The IAC supports the addition of MM-SC05 as recommended by Dr Wright.

(v) Findings

The IAC finds:

- The EES and Human Health Risk Assessment have appropriately assessed the Project's potential health and wellbeing effects.
- The Project's potential health and wellbeing effects can be satisfactorily mitigated and are acceptable.

15.4 Economic impacts

(i) The issues

The issues are the extent of the Project's economic benefits and disbenefits and how they should be calculated.

(ii) What did the EES say?

The EES includes an EIA that modelled the Project's economic impact and included the summary shown in figure 25. The EIA relied on a computable general equilibrium (CGE) model.

Figure 25 EES summary of the Project's economic impacts

Region	Total change in Gross State Product (GSP)/ Gross Regional Product (GRP) relative to base case (present value, 7% discount rate)	Average change in GSP/GRP per annum relative to base case (undiscounted)	Average change in FTEs per annum relative to base case
Project Area	$2.0b	$206.5m	480
Victoria	$1.3b	$126.3m	230

Source: EES Attachment IV, Table 4.1

The EIA found that positive economic effects are concentrated in the local area, and that there will some 'crowding out' in other parts of Victoria in the manufacturing, mining, dwelling and agricultural sectors. This reflects the Project's resource demands and the associated redistribution of capital and labour. It concluded these impacts would be small in scale relative to the larger benefits the Project will generate.

(iii) Evidence and submissions

The Proponent relied on EES chapter 18 and the EIA, and the evidence of Mr Richards. It advised the EIA had been prepared in response the Scoping Requirements and Mr Richard's evidence had been provided in response to submissions that had raised economic impact issues.

The Proponent highlighted the Project's economic benefits associated with local employment and expenditure.

The Proponent submitted the CGE modelling used for the EIA was appropriate for assessing the economic impact component of the socio-economic effects of the Project. For reasons discussed by Mr Richards, it did not support the use of a cost benefit analysis (CBA) as advocated by Mr Lightfoot.

Mr Richards provided an overview of the Project's expected economic impacts, including the extent to which Gross State and Regional Product would increase over the life of the Project. He explained the EIA methodology and findings, including the use of CGE modelling.

The Proponent concluded that the purpose of the EIA "*…is to estimate economic impacts on the economy as a whole, and not to provide an assessment of net social benefit/cost…*" and for this reason the use of CGE modelling was appropriate.

GSC and SHRCC noted the economic benefits that would result from the Project and the potential to reinforce the viability of local towns, services and infrastructure. Other submitters shared this view and welcomed the economic benefits the Project would bring, particularly in the local context.

Some submitters challenged the assessment of economic benefit, including the methodology and adequacy of the EIA. MFMF submitted that the CGE model had limitations in assessing economic impacts and that a CBA analysis would have provided a broader assessment of costs and benefits, consistent with the Scoping Requirements.

MFMF relied on the evidence of Mr Lightfoot and Professor Malcolm that was presented by Mr Lightfoot at the Hearing. He discussed various issues associated with the EIA and use of CGE modelling, and preferred the use of CBA modelling, arguing it was consistent with Victorian Government guidance about assessing economic impacts.

He concluded the CGE analysis did not provide the necessary information to determine impacts on community, region or State welfare and that a social CBA was necessary to inform any decision about planning permission for the Project. He did not dispute the outcome of the CGE modelling that informed the EIA.

In response to questions, Mr Lightfoot advised he had not read the Scoping Requirements, the exhibited SIA or EMF, or the IAC's ToR. He acknowledged the ToR would determine the matters to be considered by the IAC and might inform the choice of economic modelling.

MFMF concluded "*The IAC cannot not reach any conclusion on the economic effects of the Project on the evidence presented by the Proponent*".[64]

[64] D259, p14

(iv) Discussion

The EIA assessment is suitable for the purposes of the EES and establishes the Project will have wide-ranging economic benefits for the local area, region and State. Locally, the Project will enhance economic and social capacity and the viability of towns and communities, aspirations that are consistent with policy and no doubt shared by many in the community. There will be some challenges associated with housing and workforce demands, but these can largely be mitigated through initiatives such as the Workforce Accommodation Strategy, Employment Policy and consultation mechanisms such as the MoUs and other requirements in the EMF.

In relation to the use of CGE modelling, the IAC is satisfied that when the EIA is read in conjunction with the SIA (and other elements of the EES) the Project's social and economic impacts can be understood and assessed. In this context, it is not necessary to use the CBA modelling advocated by Mr Lightfoot and MFMF.

(v) Findings

The IAC finds:

- The EIA appropriately assessed the economic impacts of the Project for the purposes of the EES.
- The EIA contributes to the overall assessment of social and economic impacts when read in conjunction with other elements of the EES.
- The Project will bring economic benefits to the local area, region and State.

15.5 Overall conclusions on social and economic effects

Subject to the IAC's recommendations, there are no social or economic impacts that preclude the Project being approved or the draft evaluation objectives being achieved.

16 Rehabilitation and closure

16.1 Introduction

Rehabilitation and closure are discussed in EES chapter 19 and technical report P.

The exhibited EMF includes the following mitigation measures:

- MM-RH01 (in relation to the rehabilitation plan)
- MM-RH02 (in relation to unplanned closure rehabilitation)
- MM-RH03 (in relation to unplanned closure rehabilitation bond).

Additionally, the IAC had regard to:

- relevant submissions and evidence.

Table 21 lists the rehabilitation and closure evidence.

Table 21 Rehabilitation and closure evidence

Party	Expert	Firm	Area of expertise
Proponent	Rod Masters	SLR Consulting Australia	Soil management and rehabilitation

The works approval under the MRSD Act requires a rehabilitation plan to be approved. Technical report P provides a draft rehabilitation plan.

The IAC notes the water supply pipeline is not intended to be removed at the end of the Project.

16.2 Final landform

(i) The issue

The issue is whether the rehabilitated Project site would be suitable for agricultural use.

(ii) What did the EES say?

The mining sequence is a conventional open cut operation comprising removal of topsoil and overburden to expose the ore which extends from a depth of approximately 20 to 50 metres below present ground level. Mined out voids would be used to dispose tailings from processing operations and so avoid the need for construction of dedicated above-ground tailings storage facilities.

Within each tailings cell, some minor bunds, approximately five metres high would be built of clay material to reduce the distance between ore mining and tailings deposition while maintaining safe working conditions.

The time taken for tailings to sufficiently consolidate is still being determined and would be outlined in the ground control management plan, including a process for monitoring consolidation. Further consolidation would occur during overburden placement. The ground control management plan would also detail an inspection and test plan to verify that tailings are adequately consolidated prior to overburden backfill.

The time for the full mining sequence within each mine cell, from initial excavation of overburden, extraction of ore and replacement of tailings and subsequent progressive rehabilitation is expected to be approximately two years. The sequence is shown in figure 7.

During filling, the tailings settle and as more tailings are deposited, they continue to settle as the water content is either decanted for reuse or seeps into the pit floor. Once the tailings reach sufficient strength overburden would be placed on the tailings as part of the rehabilitation process. The load of the overburden on the tailings continues to compress the tailings. EES technical report J showed that settlement would be largely completed within two years of when tailings are first placed in the pit.

The post-mining landform is to be a gently undulating plain consistent with the existing landform. The goal is to restore final landform levels and local relief like current conditions, avoiding sharp relief between the existing and rehabilitated landscapes.

Rehabilitation monitoring would continue for at least 2 years post closure to ensure rehabilitation progress remains acceptable and no longer requires active intervention. This would be when:

- the final landform is achieved
- drainage is stable and in accordance with final landform design
- soil fertility and erosion hazard are equivalent or better than pre-existing conditions
- vegetation and weed cover are acceptable.

Although relatively small in area, mining would impact some existing public roads and adjacent roadside native vegetation. Public roads post mine closure would be reinstated to the satisfaction of the local road authority.

The decommissioning phase of the Project includes removing mining infrastructure and the removal and/or remediation of contaminants and hazardous materials if required. All fixed plant, buildings, mine roads and water storage infrastructure would be completely decommissioned and removed prior to, or during the mine closure process. If desired, certain infrastructure such as water supply pipelines and electrical infrastructure may be retained to assist the future land use.

(iii) Evidence and submissions

Submissions expressed concern about final land stability and the EES assessment of differential settlement as “minor”.

Mr Masters’ opinion was settlement areas could be addressed by stripping the topsoil and adding subsoil before respreading the stripped topsoil over the levelled area.

His view was that given the relatively gentle topography and landscape characteristics within the MLA, and the available topsoil and subsoil resource, he was confident that the site can be successfully rehabilitated and returned to a similar pre-mining condition subject to adherence to a detailed soil management plan. The nature of the topsoils and the methods of reinstating the various soil layers are discussed in chapter 13 of this report.

Modelling was undertaken to estimate the likely rate and depth of subsidence during dewatering and settlement of wet tailings, which was a key input into the rehabilitation plan.

(iv) Discussion

The Proponent's closing submissions acknowledged that further work is needed to refine its rehabilitation plans, but there is nothing before the IAC to suggest the proposed rehabilitation is not feasible. The IAC is also satisfied the stated aims of the rehabilitation plan are appropriate.

In relation to the final landform stability and shape, the IAC is satisfied the site can be returned to a suitable form with the inclusion of surveys to monitor settlement of tailings and the final surface to identity and then rectify any areas of differential settlement. This is addressed in the recommended MM-RH01.

The IAC is satisfied that if differential settlement is identified then soil from the appropriate soil profile could be sourced from either the on-site stockpiles or from a suitable off-site source that replicates the soil type.

Issues related to the productivity of the final surface are discussed in chapter 13 of this report.

(v) Findings

The IAC finds:

- The EES has appropriately planned for the progressive rehabilitation of the mine site to a stable landform.
- Rehabilitation issues such as stability and differential settlement can be suitably managed through the EMF and the rehabilitation plan.

(vi) Recommendation

The IAC recommends:

Environmental Management Framework

Include the following change:

a) Revised MM-RH01 to include a requirement for identifying areas of differential tailings settlement.

This change is included at appendix E.

16.3 Rehabilitation assurance

(i) The issues

The issue is what assurance there is that the Project site will be rehabilitated.

(ii) What did the EES say?

Under the MRSD Act, mining cannot commence until the work plan has been approved and a rehabilitation bond has been provided. The holder of the mining licence must rehabilitate the land in accordance with the approved rehabilitation plan which is a required component of the work plan.

The ERR bond calculator will be used as the basis for preparing an estimate for rehabilitation, decommissioning and closure as part of the final work plan submission. The estimate will consider the extent of proposed disturbance for Area 1 and Area 3, but also the processing plant.

(iii) Evidence and submissions

Submissions drew the IAC's attention to the suggested failure of rehabilitation in other projects in Victoria, mineral sands mines in Western Victoria and gold and other mines in western and eastern Victoria.

The Proponent's closing submission identified that while the MRSD Act will be amended, the amendments do not affect the requirement to hold a bond based on the costs of implementing the rehabilitation plan.

(iv) Discussion

The IAC notes that mitigation measures require the Project land to be rehabilitated in accordance with the rehabilitation plan to be approved by ERR (MM-RH01). The staged and progressive rehabilitation of the pits limits the area of land that would need rehabilitation at any time (MM-RH02). The rehabilitation bond required by ERR would cover the unplanned closure of the mine (MM-RH03). To ensure the final rehabilitation objective of returning the area to productive agricultural use, MM-RH05 requires a trial plot to prove and refine the procedures in the soil management plan and rehabilitation plan.

(v) Findings

The IAC finds:

- The statutory framework is in place to enable an appropriate rehabilitation bond to be calculated and held.

16.4 Overall conclusions on rehabilitation and closure

Subject to the IAC's recommendations, there are no rehabilitation and closure impacts that preclude the Project being approved or the draft evaluation objectives being achieved.

PART C: IMPLEMENTATION AND ASSESSMENT

17 Project implementation

17.1 Environmental Management Framework

17.1.1 Introduction

The IAC's ToR 38f require the IAC's report to contain:

> recommendations as to the structure and content of the proposed environmental management framework, including with respect to monitoring of environmental effects, contingency plans and site rehabilitation.

The EMF is included at EES chapter 21.

The IAC discusses the relevant elements of the EMF in Part B of this report where it makes various recommendations that are included in the recommended EMF at appendix E.

The IAC notes the Proponent made extensive changes to the exhibited EMF following its consideration of submissions and evidence. These changes, in combination with the further changes recommended by the IAC, have significantly improved the EMF.

The following sections discuss issues associated with the status of the EMF and whether an Independent Technical Reviewer (ITR) should be required.

17.1.2 The status of the Environmental Management Framework

(i) Submissions

The Proponent outlined the role of the EMF as the overarching Project management plan and the various requirements it would establish.

The Proponent advised the EMF had been prepared as a component of the EES and not a standalone, enforceable document. It sought to address this by including a link in the revised Incorporated Document between the plans required under the Incorporated Document and the requirements in the EMF.

Clause 4.2.2 of the Proponent's day 3 Incorporated Document (D272) requires that any plan required by the Incorporated Document must:

> i. be generally in accordance with the Minister's assessment of the environmental effects of the Goschen Rare Earths and Mineral Sands Project dated [INSERT] under the Environment Effects Act 1978 (Minister's Assessment); and
>
> ii. address the requirements of the environmental management framework dated [insert] tabled before the Inquiry and Advisory Committee for the Goschen mineral sands and rare earths project (EMF),
>
> unless otherwise approved by the responsible authority.

The Proponent submitted that the IAC could recommend that a similar condition be included on the mining licence or as a condition of approval of the work plan for mining within the mining licence.

The EPA raised issues about the status and enforceability of the EMF through the Incorporated Document. It submitted there were two common approaches by which the requirements of an EMF could be enforced:

(a) the first is preferred by the Proponent. It proposes a condition of the Incorporated Document and the Mining Licence that plans prepared under those documents must address the requirements of the EMF. EPA accepts this approach is open to the IAC;

(b) the second is to make compliance with the EMF a condition of the Incorporated Document and the Mining Licence. The Proponent has acknowledged that the Suburban Rail Loop East, Metro Tunnel Project and North East link provided for a stand-alone, enforceable EMF. It was also proposed by the proponent in the Fingerboards Mineral Sands Project.[65]

The EPA provided a modified Incorporated Document and supporting material to demonstrate how the second approach might be implemented.

The Proponent did not support the second approach described by the EPA, noting that the Goschen Project is a simpler, more geographically confined project subject to a specific regulatory regime and did not warrant a standalone enforceable document.

(ii) Discussion

The IAC is satisfied the EMF will provide an appropriate framework for the design, construction and operation of the Project, subject to the recommended changes discussed in Part B of this report and included in appendix E.

In relation to the PIL, the Proponent's preferred framework for implementing the EMF through the Incorporated Document is appropriate and the IAC was not persuaded the alternative approach outlined by the EPA is necessary. However, the IAC agrees with the EPA that greater certainty would be achieved by augmenting clause 4.2.2 so that plans required under the Incorporated Document must address and "*be consistent*" with the EMF. This clause should retain the general reference to the EMF rather than specify EMF tables 21-5, 21-6 or 21-7 (as indicated by the EPA) so that all relevant elements of the EMF are considered. This change is included in the recommended Incorporated Document at appendix F.

In relation to the MLA, the IAC agrees with the Proponent's suggestion that the EMF could be implemented through a similar condition in the mining licence or works approval under the MRSD Act. In any event, these approvals would need to be consistent with the Minster's assessment and implement the EMF. How this is done is a matter for ERR following the Minister's assessment.

The IAC is not opposed to the alternative approach described by the EPA but believes the Proponent's approach is simpler and equally effective.

The IAC has also recommended various language and content changes to the EMF that clarify its requirements and the actions that need to be undertaken and will assist in its implementation. Some of these address drafting matters raised by the EPA.

The EMF will need further revision, including format changes and updated page and section numbering, so that it can be read as a standalone document rather than as part of the EES.

[65] D270, pages 5 and 6

17.1.3 Independent Technical Reviewer

(i) Submission

The EPA submitted an ITR should be required for the Project and the roles of an independent auditor and a peer reviewer are different. Its view was that an ITR should be established as proposed during the Fingerboards Mineral Sands Project which would have two broad functions:

- to review detailed design documents
- monitor and audit compliance with statutory approvals.

The EPA recognised that alternative approaches may be as effective, but believed it was necessary to ensure that an appropriate mechanism was in place to ensure peer review and auditing is undertaken. The EPA submitted the ITR should be independent and have appropriate expertise in noise, air quality and groundwater.

Other submitters argued that some form of further technical review was necessary because the EES was flawed, or subsequent approval processes needed to be informed by independent review and advice.

The Proponent noted the various auditing and review provisions in the EMF and did not support the use of a further review or auditing process. It highlighted the role of the Project Auditor that would be established under the EMF, the scope of the Auditor's responsibilities and the need for it to be independent. It submitted the circumstances and risk profiles between the Fingerboards and Goschen projects were significantly different and noted the EPA had first raised the need for an ITR in its closing submission on the final day of the Hearing.

(ii) Discussion

The IAC is satisfied the recommended auditing and review requirements in the EMF, combined with the need for further, more detailed approvals, negates the need for a standalone ITR process to be established.

As the Proponent noted, the EMF requires an overarching, independent Project Auditor be appointed to audit and review various Project activities and the implementation of various plans that are required. This is in addition to other review and reporting requirements in the EMF in relation to various matters.

Project approvals, particularly under the MRSD Act, will provide an opportunity for further technical review of specific matters as the Project is progressively refined. It is expected that some of these matters will fall within the scope of the Project Auditor.

In relation to the Fingerboards Project, the IAC has not reviewed or formed any views about the project but notes the Proponent's submission that the circumstances of the two projects are significantly different in some respects. In terms of the Goschen Project, the IAC is generally satisfied the modelling and investigations that underpin the EES are sufficiently rigorous to warrant confidence in the predicted outcomes. This in part reflects the conservative assumptions that underpinned much of the analysis in the EES. Consequently, the IAC has not had to recommend significant additional work be undertaken, although it has recommended some further modelling and investigations in relation to specific issues. The references to this additional work have included associated review or approval requirements, where appropriate, and do not require review by a standalone ITR.

(iii) Findings

The IAC finds:

- The EMF can be effectively implemented through the recommended Incorporated Document and approval under the MRSD Act.
- The Project does not require the establishment of an Independent Technical Reviewer.

17.2 Draft Planning Scheme Amendment GC218

(i) Introduction

The IAC was appointed as an advisory committee pursuant to part 7, section 151(1) of the P&E Act.

The IAC's ToR clause 5 requires the IAC to:

> a. review draft Amendment GC218 to the Gannawarra and Swan Hill Planning Schemes (PSA), which is proposed to facilitate the project;
> b. consider any relevant issues raised in public submissions received in relation to the draft PSA;
> c. recommend any changes to the draft PSA that it considers necessary to ensure consistency with relevant policy and legislation.

ToR clause 15 includes:

> The IAC is to consider and provide advice on draft PSA GC218 which proposes planning controls and provisions for the various works and activities outside of the mining licence area. The PSA is proposed to apply a special controls overlay to the pipeline and road upgrade areas for the project and to regulate the use and development of the project in accordance with an incorporated document to be included in the Gannawarra and Swan Hill planning schemes.

ToR clause 38g requires the IAC's report include:

> recommendations with respect to the merits, structure and content of the draft PSA.

The IAC notes the Proponent made various changes to the exhibited Incorporated Document following its consideration of submissions and evidence. These change, in combination with the further changes recommended by the IAC, have improved the document.

(ii) What did the EES say?

The EES includes draft PSA GC218 as Attachment III. It seeks to amend the Gannawarra and Swan Hill Planning Schemes and applies to the PIL, including road works, the water pipeline, and Kangaroo Lake pump station.

The draft PSA seeks to apply the SCO and introduce the Incorporated Document.

The rationale for the PSA and how it would operate are discussed in EES Attachment III.

(iii) Submissions

The Proponent outlined how the draft PSA and Incorporated Document would operate, noting the Incorporated Document:

> …would effectively operate as planning approval for those parts of the Project within the Project Infrastructure Area, as it provides that no planning permit is required for, and no

> provision in the planning schemes operates to prohibit, restrict or regulate the use and development of the Project Land for the purposes of the Project.[66]

The Proponent proposed various changes to the exhibited Incorporated Document over the course of the Hearing and in its day 3 version (D282).

Substantive issues about the draft PSA raised in evidence and submissions are discussed in Part B of this report.

The EPA made submissions about the Incorporated Document in relation to the EMF that are discussed in section 17.1 of this report. It also sought revisions to the explanatory report in its initial written submission (S147) as did SHRCC (S134).

GSC (S143) noted the schedule to clause 72.03 needed to include Map 1SCO.

Submitters raised various issues about the exhibition and approval of the draft PSA.

Submissions on drafting that were received following the Hearing in relation to the Incorporated Document did not raise any additional issues that warrant further changes.

(iv) Discussion

The IAC has reviewed the draft PSA and is satisfied that the use of the SCO and Incorporated Document is an appropriate use of the Victoria Planning Provisions.

The recommended Incorporated Document will provide a suitable framework for managing the use and development of those elements of the Project within the PIL.

As discussed in relation to the EMF, the IAC believes that clause 4.2.2 should be revised so that plans required under the Incorporated Document must address and '*be consistent*' with the EMF. This is included in the recommended Incorporated Document included at appendix F.

As discussed in chapter 3 of this report, the SCO4 mapping will need to be extended to cover the A2 pipeline route and this is recommended below.

The IAC is satisfied the preparation and exhibition of the draft PSA have been consistent with the requirements of the P&E Act.

The IAC has not reviewed the detailed drafting of the explanatory report but agrees it would benefit from review and updating depending on the outcome of the Minister's assessment. This process should include any required corrections to other elements of the Amendment such as including a reference to Map SC01 in clause 72.03 and any consequential changes that might be required by the Minister's assessment.

The IAC notes that the EES technical report K indicated the Minister for Planning would be the responsible authority for the Project, despite the draft PSA establishing the respective Councils as the responsible authorities. The Proponent confirmed the draft PSA was correct and the Councils would be the responsible authorities.

(v) Findings

The IAC finds:

- The use of the SCO and Incorporated Document are an appropriate use of the Victoria Planning Provisions.

[66] D14, paragraph 207

- Draft Planning Scheme Amendment GC218, including the recommended Incorporated Document and revised mapping, will appropriately facilitate the Project within the PIL and should be approved.

(vi) Recommendations

The IAC recommends:

Draft Planning Scheme Amendment GC218

Approve draft Planning Scheme Amendment GC218 subject to:

a) extend the Specific Controls Overlay Schedule 4 mapping over the water supply pipeline option A2.

Incorporated Document

Include the following change:

a) revised clause 4.2.2 to require that plans required under the Incorporated Document must address and "*be consistent*" with the Environmental Management Framework.

The Incorporated Document change is included at appendix F.

17.3 Development licence

(i) Introduction

The IAC's ToR clause 4f require it to:

> review the development licence application and relevant submissions and provide advice that can be used to inform the EPA's consideration of the application prepared by the proponent for the project.

ToR clause 19 provides that the IAC is to:

> …provide advice that can be used to inform the EPA's consideration of the development licence application prepared by the proponent, consistent with section 238 of the EP Act. The IAC may request any further information from the proponent that it considers necessary to assist it to provide that advice. The advice should recommend avoidance, mitigation or management measures that the IAC considers are necessary to ensure compliance with any relevant legislation and/or policy pertinent to the development licence application.

ToR clause 38h requires the IAC's report to include:

> recommendations with respect to the development licence applications, including conditions that might appropriately be attached to the development licences if issued.

The development licence application (APP026623) is included as Attachment II in the exhibited EES. The application seeks approvals under Section 45 of the EP Act for sewage treatment (activity type A03) and power generation (activity type KO1).

The application noted that:

> A separate permission will be prepared for the disposal of tailings in-pit during mining operations. This activity is not covered by this DL and is deemed to require an A18 (Discharge or deposit of waste to aquifer) permit given that deposited tailings would discharge water that would infiltrate the local groundwater aquifer.[67]

[67] EES Attachment II, page 5

The Proponent advised that an A18 permit application requires a detailed project design and is not required to undergo public exhibition. It had not yet applied for the permit.

The development licence application seeks permission for the following proposed activities:

a. A03 (Sewerage treatment) – required for the on-site sewage treatment plant to support workers at the project site as it exceeds a design or actual flow rate of 5000 litres per day.

b. K01 (Power generation) – required for on-site power stations with a rated capacity of at least 5 MW of electrical power generated from the consumption of fuel. Specifically, it is proposed to install and operate dual fuel generators (diesel/liquified natural gas) to generate up to 12 MW of electricity. Fourteen generators are proposed, including two on standby for faults and maintenance.

Both activities require an operating licence prior to the activities commencing. The Development Licence must be held before an operating licence can be issued.

(ii) What did the EES say?

Power generation would be by means of a standalone 12 MW dual fuel (diesel/liquified natural gas) power station. The dimensions of the power station would be approximately 62.5 by 10.5 by 6 metres. The 12 MW power station would comprise 12 duty and two standby 0.85 MW dual fuel generators. To achieve the power requirements of the Project, the 12 duty diesel generators would target operating between 70-90 per cent of full load for optimal efficiency.

It was found that the predicted maximum NO_2 ground level concentrations at or beyond the site boundary resulting from the power station emissions exceeded the 1-hour human health criterion and the annual average vegetation criterion. Modelling indicated that exceedances of the health criterion extend to between 500 and 800 metres from the site boundary into the surrounding field and exceedances of the vegetation criterion extend to approximately 50 metres from the site boundary.

To minimise emissions from the power station to the extent practicable in accordance with the GED, emissions reduction technology, such as selective catalytic reduction (e.g. AdBlue), would be implemented. Selective catalytic reduction is an advanced emissions control technology that reduces NO_2 emissions by approximately 90 per cent.

The Proponent is in negotiations with potential renewable energy developers to source the Project's electricity needs from renewable energy.

An on-site sewage treatment plant would be needed to support approximately 100 workers per 12-hour shift during operations. The sewage treatment plant would treat effluent from on-site ablutions (showers and toilets) to a standard similar to Class C recycled water. The sewage treatment plant would have a maximum capacity of up to 20,000 litres per day.

Deposited tailings would discharge water that would infiltrate the local groundwater aquifer. Mine dewatering systems such as groundwater dewatering bores are planned. A flocculant would be used to facilitate the recovery of water from the tailings placed in the pit. The groundwater mounding lateral extent may be reduced through the use of engineering design features such as extraction bores or interceptor drains.

(iii) Submissions and evidence

The submissions that referred to the power station raised issues related to:

- transitioning to renewable energy
- the use of diesel, including NO_2 emissions on humans and plants, and volatile organic compounds and carcinogens in exhaust emissions
- noise impacts.

Submissions in relation to the on-site wastewater treatment plant raised concerns about sewage contaminate stormwater impacts on crops.

Dr Shepherd provided the following additional information:

- The highest part of the roof line of the power station will be 6.5 metres, with the exhaust stack height at 8.4 metres.[68]
- The kiln and dryer[69]are expected to use approximately 3 GJ/h (or 22,500 GJ/annum) of natural gas. The Scope 1 greenhouse gas emissions associated with the kiln and dryer gas consumption were estimated to be 1,160 tCO_2-e per annum (0.0515 tCO-e/GJ).
- An estimate was made based on US EPA AP42 emission factors for natural fired gas fired boilers of the NOx emissions for the kiln and Dryer. The NO_2 emission factor for large uncontrolled wall fired boilers is equivalent to 117 g/GJ. For the kiln and dryer (3GJ/h), this would be approximately equivalent to 0.1 g/s.

(iv) Discussion

K01 (Power generation) development licence

The EES contained basic process flow diagrams showing the three proposed phases for the treatment of the ore. These diagrams did not identify all the potential sources of emissions to the environment or what pollution controls would be installed. This information gap was partially addressed on day 1 of the Hearing with the Proponent's presentation on the hydromet plant.[70] The IAC considers that a fuller description of the processing plant should be provided identifying all points where there is a potential discharge or release to the environment.

While it was partly discussed by Mr Beer on day 1, a description of the process chemistry would aid in understanding what are the potential substances of concern based on their chemical stability and solubility.

There were two issues identified with the modelling of emissions from the power station. The first relates to the physical dimensions of the building holding the generators. The differential between the building height and the height of the exhaust stack was only about 2 metres. This clearance may not avoid the entrainment of the exhaust fumes within the building downwash from any wind passing over the building. Raising the stack height to at least 3 metres above the highest part of the roofline may minimise the early grounding of the plume.

The modelling of emissions from the power station showed an exceedance of the NOx APAC off-site. Mr Shepherd stated during the Hearing that AERMOD was run using the uncontrolled emission rate for NOx. Modelling of these emissions should be based on the configuration of the proposed diesel generators with the proposed fuels and with the pollution control devices fitted.

[68] D248, Item 43
[69] D18, item 42
[70] D98

Revised modelling of the emissions using increased stack heights and taking into account either alternative fuels or the use of emission control devices for diesel fuel would show a reduction in the area of any exceedance of the NOx APAC.

The IAC accepts that a green power source is not yet available to supply electrical energy at the Project site and hence the need for a fossil fuel power station. In time, alternative green power sources may become available to the Project thereby reducing its greenhouse emissions.

The IAC provides recommendations below in relation to matters that the Proponent should address as part of the application. They are in addition to other relevant recommendations in chapter 9 of this report.

A03 (Sewerage treatment) development licence

The IAC makes no specific findings or recommendations regarding the A03 development licence and is not aware of any reasons why the application should not proceed.

A18 (Discharge or deposit of waste to aquifer) permit

There was considerable evidence and submissions made regarding the groundwater impact assessment that are discussed in chapter 11 of this report. This was partly due to substantial information on tailings chemistry being provided during the Hearing and the incorrect identification of contaminants of concern based on the objectives for groundwater of less salinity than that contained in the local Loxton Parilla Sands aquifer. The understanding of groundwater chemistry was based on one set of monitoring results. The IAC considers the understanding of groundwater chemistry would be enhanced if further data is collected on both groundwater chemistry and properties.

The IAC considers the preparation of the A18 permit application would be assisted if the Proponent engaged an environmental auditor experienced in groundwater assessment to:

- review all the monitoring data for the existing monitoring bores
- determine the need for additional monitoring bores based on projected groundwater flows as well as the screening levels of the bores to ensure samples are representative of the layer of groundwater that would be impacted by any discharge from the mine
- review the tailings chemistry and leachability testing and advise on the stability and solubility of chemicals of potential concern
- review the proposed methods of minimising water seepage from the tailings to advise whether all practicable measures are being taken to minimise any discharge to groundwater
- provide advice on suitable means to determine the hydraulic conductivity and other aquifer properties required to develop a Hydrogeologic model of the Project site
- develop a hydrogeologic model for the Project site
- benchmark any change in groundwater from the Project site against the relevant environmental objectives and indicators specified in the ERS.

As discussed in chapter 11 of this report, the IAC has recommended some additional requirements and detail be included in MM-GW04A in relation to groundwater modelling to inform the A18 permit process.

The EMF includes a discussion of the A18 permit requirement and a set of 'standard' conditions in section 21.3.3. Given the permit is yet to be issued, the IAC has modified this text to simply note a permit is required and will be available for inspection.

(v) Findings

The IAC finds:

- The K01 (Power generation) development licence application would benefit from addressing additional information relating to process, alternative energy and modelling.
- The A03 (Sewerage treatment) development licence application should proceed.
- An A18 (Discharge or deposit of waste to aquifer) permit application would benefit from including monitoring, review and other information discussed in this report.

(vi) Recommendations

The IAC recommends:

K01 (Power generation) development licence

The Proponent should address the following in support of the development licence application:

a) Provide piping and instrumentation diagrams or equivalent to demonstrate there are no other air discharge points that must be included within the application.

b) Periodically report to the Environment Protection Authority Victoria on the availability of an alternative green power supply for its operations.

c) Re-run the AERMOD (air dispersion model) for emissions from the diesel generators using selective catalytic reduction and alternative fuels (LNG and LPG) and ensure that the exhaust plume is discharged at least 3 metres above the roofline of the power station or at a height where it can demonstrate plume downwash is minimised.

17.4 Matters of National Environmental Significance

(i) Introduction

The IAC's ToR clause 38i requires the IAC's report to contain:

> Specific findings and recommendations about the predicted impacts on matters of national environmental significance and their acceptability, including appropriate controls and environmental management.

(ii) What did the EES say?

EES chapter 20 addresses MNES. On 19 December 2018, the Commonwealth Minister for the Environment (under delegation) determined the Project is a 'controlled action' under the EPBC Act. The relevant controlling provisions were:

- Ramsar wetlands (Kerang wetlands, a wetland of international significance)
- listed threatened species and communities
- nuclear actions.

On 30 January 2023, the Commonwealth Minister for the Environment (under delegation) approved a variation of the proposal under section 158B of the EPBC Act. Changes made to the original EPBC Act referral (referral 2018/8291) were:

- a reduction in the proposed mining area from 8,300 hectares to 1,479 hectares

- an increase in disturbance footprint to allow for the pump station and water supply pipeline from Kangaroo Lake to the MLA.

Further information and assessment under each of the MNES controlling provisions were then provided.

The Victorian EES process is accredited under the bilateral assessment agreement between the Commonwealth and Victoria to assess potential impacts on MNES.

The EPBC Act is supported by Significant impact guidelines. These guidelines provide detailed criteria for each MNES to assist in determining whether an impact is likely to be 'significant'.

Ramsar wetlands

Ramsar wetlands are designated under the Ramsar Convention. In designating a wetland, countries agree to establishing and overseeing a management framework aimed at conserving the wetland and ensuring its 'wise use'. Wise use is broadly defined under the Convention as maintaining the ecological character of the wetland. To achieve this, ecological character descriptions are prepared which provide a benchmark against which to assess any future change in ecological character. Ecological character descriptions include both critical and non-critical components, processes and services (CPS) to the ecological character and then sets limits of acceptable change for each critical CPS.

Kangaroo Lake is one of 23 named lakes, marshes and swamps that form the Kerang Wetlands Ramsar site.

The EES assessed the potential impacts of the Project against the relevant criteria in the Significant impact guidelines and each of the critical CPS. The assessment concluded the Project would not have a significant impact on the Kerang Wetlands Ramsar site and the critical CPS of Kangaroo Lake would be unaffected by the Project.

Listed threatened species and communities

Assessments against the significant impact guidelines were undertaken for the following listed species:

- Murray hardyhead
- Silver perch
- Flathead galaxias
- Murray cod
- Growling grass frog
- Superb parrot.

No EPBC listed flora species would be affected by the Project. When assessed against the relevant criteria in the Significant impact guidelines it was concluded the Project would not have a significant impact on threatened species and ecological communities.

The Project was recognised as having a significant impact through the clearance of 11.347 hectares of the plains mallee box woodlands. This community was listed after the determination of the Project as a controlled action. In accordance with the EPBC Act Policy Statement 'Listing events under the EPBC Act' this community was not considered a threatened ecological community and no offsets under the EPBC Act would apply. Nevertheless, offsets are required under Victorian policy for the removal of native vegetation and will be provided. Additionally, measures to avoid equivalent Victoria EVCs have been adopted.

Further detail of this assessment is provided in chapters 3 and 4 of this report.

Nuclear action

There are no specific criteria for nuclear actions under the Significant impact guidelines, all nuclear actions require referral to the Commonwealth. Nuclear actions are defined in section 22 of the EPBC Act. The EES assessed the Project against the two relevant definitions being the disposal for radioactive waste (section 22(1)(e)) and storage of radioactive material (section 22(1)(g)).

The EES concluded as the tailings were not considered radioactive, section 22(1)(e) was not applicable.

The Project would constitute a nuclear action consistent with the definition under section 22(1)(g) for the storage of some of the product materials. Such product materials would be contained in various methods (such as bulka bags, lined shipping containers etc) to ensure there would be no emissions from products and access to relevant areas on-site would be restricted.

The EES concluded the Project would not have significant radiological impacts.

(iii) Submissions and evidence

Ramsar wetlands

Submissions were made the Project would impact on Kerang wetlands from:

- water extraction at Kangaroo Lake - this is discussed in section 4.3 of this report
- altered surface water flows or contaminants of concern reaching the wetlands from surface - this is discussed in section 10.2 of this report.

Listed threatened species and communities

Submitters were concerned about general impacts to listed species and communities, this is addressed in chapters 3 (Natural Grasslands of the Murray Valley Plains, listed flora and other threatened ecological communities) and 4 (aquatic fauna) of this report.

Since the EES, additional surveys by Dr Callister identified four patches of Natural Grasslands of the Murray Valley Plains on Lookout Road (pipeline option A3). This is addressed at chapter 3 of this report.

Nuclear action

There were no submissions relating directly to the 'nuclear action' trigger under the EPBC Act.

Mr Hondros and Mrs Secen-Hondros provided evidence explaining the relevant definition of nuclear action for the Project for the purposes of the EPBC Act. In response to question from the IAC, Mr Hondros gave evidence the only applicable definition of 'environment' for the purposes of the EPBC Act was ecosystems and their constituent parts, including people and communities (section 528).

Evidence concluded potential exposure of members of the public was below the dose limit of 1 mSv/y. Potential exposure to flora and fauna would be below the screening level of 10 *u*Gy/h.

Evidence and submissions in relation to potential exposure scenarios are addressed at section 14.4 of this report.

(iv) Discussion

Ramsar wetlands

The IAC is satisfied the Project will not have a significant impact on the Kerang Wetlands Ramsar site and the critical CPS of Kangaroo Lake will be unaffected by the Project.

Listed threatened species and communities

The IAC accepts the EES assessment the Project will not have a significant impact on listed flora and fauna species. This is discussed further in chapters 3 and 4 of this report.

The IAC has recommended changes to the Incorporated Document to ensure impacts to the natural grasslands community is avoided entirely along the pipeline route. This is discussed further in section 3.3 of this report.

It is possible the natural grasslands community may exist along roads to be upgraded. Potential impacts (if any) to this community from such works have not been assessed. The IAC has recommended further assessments of impacts on native vegetation associated with road works prior to final design, including further survey work of any previously identified treeless patches of vegetation which may include the natural grasslands community. This is discussed further in chapter 3 of this report.

SHRCC raised concern the natural grasslands community may exist at intersections along the haulage route and that further survey should be undertaken to inform swept path design. The IAC has included this recommendation in chapter 3 of this report.

Nuclear action

The IAC is satisfied radiation impacts can be appropriately managed through the EMF and other approvals required under the *Radiation Act*.

The IAC accepts the EES conclusion that the Project would not have significant radiological impacts.

(v) Findings

The IAC finds:

- The Project will not have a significant impact on the Kerang Ramsar wetlands site.
- The Project will not have a significant impact on listed flora or fauna species.
- The potential for significant impacts to the natural grasslands community from the haulage route needs to be assessed.
- Any impact on Plains Valley Grasslands community is not relevant for the EPBC Act assessment as the listing was after the controlled action decision.

17.5 Draft work plan and community engagement plan

(i) Introduction

The IAC's ToR clause 38e require the IAC's report to contain:

> recommendations for any appropriate conditions that may be lawfully imposed on any approval for the project, including with respect to the content of a work plan or conditions that might appropriately be attached to approval of a work plan if issued under the MRSD Act;

A work plan will be required under the MRSD Act and include risk management, community engagement and rehabilitation plans.

Draft community engagement and rehabilitation plans were exhibited as part of the EES. The Proponent advised other plans such as the risk management plan and tailings management plan would be prepared following the EES process and included in the draft work plan during the detailed design of the Project.

The draft work plan noted it is "*…a preliminary version only and is not intended to fully comply with the MRSD Act requirements*".

The draft community engagement plan is dated May 2023, and its cover page indicates it was prepared for EES Technical Reference Group review.

(ii) Submissions

The Proponent described the work plan requirements and approval process, and advised:

> The draft Work Plan is a preliminary document and is not in the form of a work plan suitable for final approval under the MRSD Act. The draft is intended to inform the EES process, including through providing a basis for recommendations in respect of appropriate management and mitigation measures, such that the final Work Plan submitted for approval under the MRSD Act would be informed in turn by the Minister's assessment of the EES.[71]

The Proponent advised the draft work plan had been prepared and exhibited in accordance with the Scoping Requirements and that:

> At this pre-approvals stage, detailed design is not sufficiently progressed to develop a work plan which could fully meet requirements of the MRSD Act and MRSDMI Regulations to the extent which would be required for approval.[72]

The EPA advised it will assess the formal work plan in accordance with the EPA/ERR MoU.

Submissions were highly critical of the lack of detailed information in the draft work plan, including a detailed explanation of the Project's operations and the lack of risk assessments. Submitters said the lack of information made it impossible to make informed comments on the plan. Concerns were also expressed that the work plan variation process would enable the Project to be progressively modified without addressing the issues raised during the EES process.

(iii) Discussion

The IAC notes that the exhibited work plan and stakeholder engagement plan are draft documents that will need substantial revision and additional material before being considered for approval. For these reasons, the IAC has not reviewed the plans in detail, assessed them against the requirements of the MRSD Act or made detailed recommendations about their content. Instead, it has provided some general observations included below.

The draft work plan will need to be updated to:

- reflect the Project as described in the EES and modified during the EES process
- reflect the current technical reports exhibited with the EES and the additional technical information provided by the Proponent during the EES process
- address the relevant recommendations included in this Report, including those in relation to the EMF and rehabilitation plan.
- include a mechanism for the EMF to be enforceable.

The draft community engagement plan should be updated to:

[71] D14, paragraph 205

[72] D248, Query No. 9

- reflect the Project as described in the EES and modified during the EES process
- review and update the description of key stakeholder issues/concerns (table 7.2)
- complete and update the stakeholder engagement plan (table 9.1)
- address the relevant recommendations included in this report, including those in relation to the EMF and consultation processes.

The IAC has recommended some changes to the draft work plan references in the EMF to clarify its role and highlight that revisions and additional material are required.

The IAC understands the frustration of submitters about the lack of detail and specific content in the draft work plan, however it acknowledges the Proponent's explanation of why an incomplete plan was exhibited as part of the EES. The work plan will be progressed through a separate process under the MRSD Act, and consistent with the Minister's assessment of the EES.

The IAC also acknowledges the concerns about future Project modifications through variations to the work plan, however any variations would need to be consistent with the Minister's assessment.

(iv) Findings

The IAC finds:

- The draft work plan and community engagement plan will need to be revised and updated to:
  - be consistent with the requirements of the Mineral Resources (Sustainable Development) Act
  - implement the relevant requirements of the Minister's assessment
  - have regard to the relevant Inquiry and Advisory Committee findings and recommendations, including those related to the Environmental Management Framework and draft rehabilitation plan.

(v) Recommendation

The IAC recommends:

Environment Management Framework

Include the following change:

a) revised references to the draft work plan to clarify its role, including revisions in section 21.3 (Environmental management systems and documentation).

These changes are included at appendix E.

17.6 Other approvals

The Project will require various approvals that are discussed in EES chapter 5.

(i) Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The potential for significant impacts to the natural grasslands community from the haulage route needs to be assessed. Outcomes from this assessment could inform final approval under the Act.

The IAC is not aware of any other matters that would preclude approval under the EPBC Act.

The IAC notes this is a matter for the Commonwealth to determine.

(ii) Mineral Resources (Sustainable Development) Act 1990

The Project requires a mining licence and approval of a work plan under the MRSD Act. The Proponent has lodged an application for a mining licence (application MIN007256) that was exhibited between 9 January and 2 February 2024. As discussed above, a draft work plan was exhibited with the EES.

Consistent with its ToR, the IAC has not considered the mining licence application but has undertaken a higher order review of the draft work plan and associated community engagement plan. The work plan is discussed in section 17.5 of this report.

(iii) Planning and Environment Act 1987

Mining works within the mining licence in accordance with an approved work plan are exempted from the need for a planning permit. Works outside the mining licence (including works associated with road works and water supply) are not subject to this exemption. It is proposed these works be the subject of an Incorporated Document under the SCO that provides conditional approval for the works.

The draft PSA to implement the SCO and Incorporated Document is discussed in section 17.2 of this report, where the IAC recommends it be approved subject to various changes.

(iv) Environment Protection Act 2017

The Project requires development licences under the EP Act for:

- A03 sewage treatment
- K01 power generation.

An A18 (Discharge or deposit of waste to aquifer) permit will also be required.

Development licence issues are discussed throughout the report, including a higher order summary in section 17.3.

The IAC is satisfied there are no impediments to licences being issued, subject to implementing the IAC's recommendations.

(v) Road Management Act 2004

Road upgrades and works will require the consent of the relevant road authority (i.e. Department of Transport and Planning (DTP), GSC or SHRCC) under the Road Management Act 2004 and the preparation of a TMP to the satisfaction of the relevant road authority.

Traffic and transport are discussed in chapter 7 of this report. The IAC is satisfied there are no impediments to approval under this Act, subject to implementing the recommended mitigation measures.

(vi) Water Act 1989

The Water Act 1989 regulates the impacts on and use of surface water and groundwater. The Project would require the following approvals under the Act:

- extraction of surface water and groundwater
- consents for works on or over waterways.

Surface water and groundwater are discussed in chapters 10 and 11 of this report. The IAC is satisfied there are no impediments to approval under this Act, subject to implementing the recommended mitigation measures.

(vii) Aboriginal Heritage Act 2006

The Aboriginal Heritage Act requires the approval of a CHMP before the Project can proceed. Chapter 5 discusses the CHMP process, including its status and further actions that are necessary to finalise it.

On the material presented to it, the IAC is not aware of any impediments to the CHMP being approved.

(viii) Flora and Fauna Guarantee Act 1988

The FFG Act lists threatened flora and fauna species and communities and includes requirements for removing listed species.

A range of listed species are present in the Project area and their removal from public land would require approval under the Act. The IAC is satisfied there are no impediments to approval under this Act, subject to compliance with relevant mitigation measures.

(ix) Radiation Act 2005

The Project will require or need to be consistent with various licences under the *Radiation Act*, including a Radioactive Management Licence that requires approval by the Department of Health of the following:

- Radiation Management Plan
- Radioactive Waste Management Plan
- Radiation Environmental Plan.

Radiation is discussed in chapter 14 of this report. The IAC is satisfied there are no impediments to approval under this Act, subject to implementing the recommended mitigation measures.

18 Integrated assessment

This chapter provides the IAC's overarching assessment and conclusions about the Project and its responses to the draft evaluation objectives and its ToR.

18.1 Response to Terms of Reference

Clause 38 specifies the matters the IAC's report must contain. The IAC's response is included in table 22.

Table 22 Summary of IAC response to clause 38 of the Terms of Reference

Terms of Reference	IAC response and findings	Report reference
38a. analysis and conclusions with respect to the environmental effects of the project and their significance and acceptability;	The Project's environmental effects are not expected to be significant and can be acceptably managed through the recommended EMF, Incorporated Document and other recommendations. The IAC has recommended various further investigations be undertaken through the EMF to refine the Project design and improve operational management. This additional work is not required to establish whether the Project should proceed. The IAC is satisfied the Project can proceed, subject to applying its recommendations.	Parts B and C
38b. findings on whether acceptable environmental outcomes can be achieved, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;	The Project will achieve acceptable environmental outcomes, subject to applying the IAC's recommendations and through the further approvals that are required, including those under the: - *MRSD Act* - *Environment Protection Act* - *Radiation Act*. Elements of the Project design and the management framework proposed in the exhibited EES were refined during the Hearing process in response to submissions and evidence. These revisions will improve the Project's performance having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development.	Parts B and C
38c. recommendations and/or specific measures that it considers necessary and appropriate to prevent, mitigate or offset adverse environmental effects;	The IAC has provided recommended versions of the EMF and Incorporated Document intended to prevent, mitigate or offset adverse environmental effects. These documents, particularly the EMF, have been substantially revised and improved during	Part B Appendices E and F

Terms of Reference	IAC response and findings	Report reference
	the EES process in response to submissions, evidence and further investigations by the Proponent.	
38d. recommendations as to any feasible modifications to the design or management of the project that would offer improved environmental outcomes;	The IAC has recommended various changes to the design and management of the Project, including further work that could lead to additional changes. These recommendations mainly relate to the operation and management of the Project, rather than the design. The key recommendations relate to: - assessing native vegetation and habitat impacts - designing road work upgrades - determining the water pipeline route - addressing landscape impacts - improving consultation - undertaking noise modelling - improving dust prevention - monitoring groundwater impacts - rehabilitating the site for agriculture - reviewing radiation baselines and impact assessment.	Part B
38e. recommendations for any appropriate conditions that may be lawfully imposed on any approval for the project, including with respect to the content of a work plan or conditions that might appropriately be attached to approval of a work plan if issued under the MRSD Act;	The IAC has provided some general commentary and findings about the work plan, but not any specific recommendations. The exhibited draft work plan was a preliminary version and did not comply with the requirements of the MRSD Act. The Proponent explained more detailed Project design was required before the work plan could be finalised. This detailed design will need to have regard to the Minister's assessment and the recommended EMF. They will also inform a revised work plan application and its consideration.	Section 17.5
38f. recommendations as to the structure and content of the proposed environmental management framework, including with respect to monitoring of environmental effects, contingency plans and site rehabilitation;	The IAC has recommended various content changes to the EMF. The general structure is considered appropriate. The EMF has been progressively refined and improved during the EES process in response to submissions, evidence and further investigations undertaken by the Proponent. The recommended EMF is significantly more comprehensive and responsive than the exhibited version.	Parts B and C

Terms of Reference	IAC response and findings	Report reference
	The recommended EMF requires additional monitoring and analysis of various issues, related to: - noise - groundwater - rehabilitation - radiation.	
38g. recommendations with respect to the merits, structure and content of the draft PSA;	The preparation and exhibition of the Draft PSA GC218 were consistent with the requirements of the P&E Act. The use of the SCO and an Incorporated document are an appropriate use of the Victoria Planning Provisions. Draft PSA GC218 is appropriate and should be approved, subject to including the recommended Incorporated Document and extending the SCO4 mapping to include a second water pipeline option.	Part C
38h. recommendations with respect to the development licence applications, including conditions that might appropriately be attached to the development licences if issued; and	The IAC has undertaken a higher order review of the required development licence application and provided some recommendations about the K01 (Power generation) development licence. It has also provided some commentary in relation to a future A18 (discharge to aquifer) permit and recommended a revised mitigation measure in the EMF.	Section 17.3
38i. specific findings and recommendations about the predicted impacts on matters of national environmental significance and their acceptability, including appropriate controls and environmental management.	The potential for significant impacts to the natural grasslands community from the haulage route needs to be assessed. The Project will not have any significant impacts on any other matters of national environmental significance. Impacts on plains mallee box woodlands community are not relevant for the EPBC Act assessment as the listing was after the controlled action decision.	Section 17.4

18.2 Assessment against the draft evaluation objectives

Table 23 summarises the IAC's assessment of whether the Project meets the draft evaluation objectives and provides a cross reference to the relevant discussion in the Report.

Table 23 IAC's integrated assessment against the draft evaluation objectives

Draft evaluation objective	IAC response and report reference
To achieve the best use of available mineral sands resources, in an economic and environmentally	The Project will enable the economic and environmentally sustainable use of mineral sands resources. Local industries will be enhanced by the Project, although there will

Draft evaluation objective	IAC response and report reference
sustainable way, including while maintaining viability of local industries.	potentially be some adverse local employment and housing impacts. These impacts would likely be of a temporary nature and there are various mitigation measures designed to monitor and manage those impacts. Refer to chapter 15.
To avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and commonwealth policies.	The Project will acceptably avoid or minimise potential adverse effects on biodiversity values, subject to applying the IAC's recommendations. Offset requirements will be met, subject to undertaking further work in relation to road works and native vegetation impacts. A positive design feature of the Project is that the selection of mining areas and the water pipeline route have significantly avoided potential impacts on native vegetation, habitat and biodiversity. Refer to chapters 3, 4 and 17.
To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Kerang Wetlands Ramsar site) over the short and long-term.	The Project will acceptably minimise effects on water resources, subject to applying the IAC's recommendations. The Project is not expected to impact on the Kerang Wetlands Ramsar site. The recommended EMP includes additional groundwater and monitoring and assessment requirements. Refer to chapters 10 and 11.
To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.	The Project will acceptably protect health and wellbeing, and minimise effects on air quality, noise and social amenity, subject to applying the IAC's recommendations. The recommended EMF includes additional and revised mitigation measures in relation to air quality, noise, visual impact and radiation. Refer to chapters 6, 8, 9, 14 and 15.
To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.	The Project will minimise adverse land use and social effects, subject to applying the IAC's recommendations. On balance, there will be positive social impacts. Transport impacts can be acceptably mitigated and managed through the various EMF and Incorporated Document requirements, including the need for a Traffic Management Plan. Agricultural impacts will mainly relate to the temporary loss of the mining site from agricultural production and will not be significant. Refer to chapters 7, 12, 13 and 15.
To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values.	The Project will avoid or minimise adverse heritage effects, subject to applying the IAC's recommendations and compliance with a Cultural Heritage Management Plan. Refer to chapter 5.

Draft evaluation objective	IAC response and report reference
To minimise adverse effects on landscape and visual amenity associated with the environs of the project site.	The Project will minimise adverse landscape and visual effects, subject to applying the IAC's recommendations, including requirements for landscape plans and works. Refer to chapter 6.

18.3 Other elements of the Terms of Reference

Clause 39 specifies the matters the IAC's report should include. This information is included in table 24.

Table 24 IAC response to clause 39 of the Terms of Reference

Terms of Reference requirement	Report reference
39a. information and analysis in support of the IAC's findings and recommendations;	Parts B and C
39b. a list of all recommendations, including cross-references to relevant discussions in the report;	Table 25
39c. a description of the public hearing conducted by the IAC, and a list of those persons consulted with or heard;	Chapter 1 and appendix C
39d. a list of all submitters in response to the exhibited EES; and	Appendix B
39e. a list of the documents tabled during the proceedings.	Appendix D

Table 25 IAC response to clause 39b. of the Terms of Reference

Recommendation	Report reference
Environmental Management Framework	
Revised MM-BD01 Minimise impacts to trees	Chapter 3
Revised MM-BD02 Minimise impacts to native vegetation	Chapter 3
Revised MM-BD05 Control spread and/or introduction of weeds and/or pathogens – General	Chapter 3
New MM- BD06 Native vegetation revegetation within the Mining Licence Area and pipeline route	Chapter 3
New MM-BD07 Minimise impacts to biodiversity – road upgrades	Chapter 3
Revised MM-FE02 Minimise impacts to Kangaroo Lake flora and fauna habitats	Chapter 4
Revised MM-FE03 Minimise impact to native fauna	Chapter 4
Revised MM-FE04 Minimise impact to native fauna – Pipeline	Chapter 4
Revised MM-FE05 Minimise impact to native fauna - Kangaroo Lake	Chapter 4
Revised MM-CH01 Protection of cultural heritage values	Chapter 5
Revised MM-HH01 Protection of historic heritage values	Chapter 5
Revised MM-LV01 Minimise adverse effects on landscape and visual amenity	Chapter 6

Recommendation	Report reference
Revised MM-TP01 Minimise adverse social effects	Chapter 7
Revised MM-TP02 Minimise adverse social and land use effects	Chapter 7
Revised MM-NV06 Minimise risk of harm from noise emissions so far as reasonably practicable – Mine Planning	Chapter 8
Revised MM-NV09 Noise management plan	Chapter 8
Revised MM-AQ01 Minimise risk of harm from dust emissions so far as reasonably practicable – General practice	Chapter 9
Revised MM-AQ02 Minimise risk of harm from dust emissions so far as reasonably practicable – Mine planning	Chapter 9
Revised MM-AQ03 Minimise risk of harm from dust emissions so far as reasonably practicable – Process plant	Chapter 9
Revised MM-AQ07 Rainwater tanks	Chapter 9
New MM-AQ08 Air quality impact assessment update	Chapter 9
Revised MM-SW01 Development of a Surface Water Management Plan (SWMP) for construction, operation and closure activities.	Chapter 10
Revised MM-GW01 Tailings management plan	Chapter 11
Revised MM-GW04 Groundwater management plan	Chapter 11
Revised MM-GW04A Groundwater modelling	Chapter 11
Revised MM-GW05 Groundwater risk assessment	Chapter 11
Revised MM-SLR01 Minimise effects on native soils – Mine Site	Chapter 13
Revised MM-SLR02 Minimise effects on native soils – Pipeline	Chapter 13
Revised MM-SLR04 Minimise effects on native soils	Chapter 13
Revised MM-AG01 Minimise potential adverse land rehabilitation effects	Chapter 13
Revised MM-AG03 Minimise potential adverse biosecurity effects	Chapter 13
Revised MM-RH04 Quality assurance and adaptive management	Chapter 13
Revised MM-RH05 Soil Reinstatement Trial plots	Chapter 13
New R-ADM03 reassessment of radiation impact assessment	Chapter 14
Revised MM-SC01 Workforce Accommodation Strategy:	Chapter 15
Revised MM-SC02 Neighbour Agreement	Chapter 15
Revised MM-RH01 rehabilitation	Chapter 16
Revised MP-GW01 Baseline groundwater modelling	Chapter 11
Revised MP-GW03 Rehabilitation / closure phase groundwater monitoring	Chapter 11
Revised CP-GW02 Rehabilitation/closure phase groundwater review	Chapter 11
Revised table 21.7 Baseline environmental conditions	Chapters 4 and 13

Recommendation	Report reference
Various references to the 'work plan'	Chapter 17
Various other minor drafting changes	Chapter 17
Draft Planning Scheme Amendment GC218	
Adopt draft Planning Scheme Amendment GC218, subject to the following:	Chapter 17
Specific Controls Overlay Schedule 4 mapping	
Extend the Specific Controls Overlay Schedule 4 mapping over the water supply pipeline option A2	Chapter 17
Goschen Rare Earths and Mineral Sands Project Incorporated Document	
New requirement in clause 4.2.3 that the development plan demonstrate how areas of the EPBC listed Natural Grasslands of the Murray Valley Plains community are avoided entirely by the chosen pipeline route or construction methods.	Chapter 3
Revised clause 4.2.2 to require that plans required under the Incorporated Document must address and '*be consistent*' with the EMF.	Chapter 17
Revised clause 4.3.3 to replace "information" with "details".	Chapter 3
K01 (Power generation) development licence	
The Proponent should undertake various actions in support of the development licence application.	Chapters 9 and 17
The Environment Protection Authority Victoria should review emissions from the processing plant to establish whether the prescribed exemptions for general discharges or emissions to the atmosphere apply.	Chapter 9

PART D: APPENDICES

Appendix A Terms of Reference

Terms of Reference

Goschen Mineral Sands Project
Inquiry and Advisory Committee

VICTORIA State Government | Department of Transport and Planning

Version: July 2023

The Goschen Mineral Sands and Rare Earths Project Inquiry and Advisory Committee (IAC) is appointed to inquire into, and report on, the proposed Goschen Mineral Sands and Rare Earths Project (the project) and its environmental effects in accordance with these terms of reference.

The IAC is appointed pursuant to:

- section 9(1) of the *Environment Effects Act 1978* (EE Act) as an inquiry; and
- part 7, section 151(1) of *the Planning and Environment Act 1987* (P&E Act) as an advisory committee.

The IAC will also provide advice that can be used to inform the Environment Protection Authority's (EPA) consideration of the development licence application under the *Environment Protection Act 2017* prepared by the proponent for the project.

Name

1. The IAC is to be known as the 'Goschen Mineral Sands and Rare Earths Project IAC'.

Skills

2. The IAC members should have the following skills:
   a. groundwater and surface water;
   b. biodiversity and ecology;
   c. rehabilitation of minerals sands mines, soils and erosion;
   d. amenity including noise and air quality; and
   e. land use and socio-economic impacts.
3. The IAC will comprise an appointed Chair (IAC Chair) and other members.

Purpose of the IAC

4. The IAC is appointed by the Minister for Planning under section 9(1) of the EE Act to hold an inquiry into and report on the environmental effects of the project. The IAC is to:
   a. review and consider the environment effects statement (EES), the other exhibited documents, and submissions received in relation to the project;
   b. consider and report on the potential significant environmental effects of the project having regard to the evaluation objectives in the EES scoping requirements and relevant policy and legislation;
   c. consider and report on potential significant impacts on relevant matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act);
   d. identify any project modifications or additional measures beyond those identified in the EES the IAC considers necessary and effective to avoid, mitigate or manage the environmental effects of the project consistent with relevant policy and legislation;
   e. advise on how these modifications or measures should be implemented through the necessary approvals and consents for the project; and
   f. review the development licence application and relevant submissions and provide advice that can be used to inform the EPA's consideration of the application prepared by the proponent for the project.
5. The IAC is also appointed as an advisory committee under section 151(1) of the P&E Act to:
   a. review draft Amendment GC218 to the Gannawarra and Swan Hill Planning Schemes (PSA), which is proposed to facilitate the project;

b. consider any relevant issues raised in public submissions received in relation to the draft PSA;
c. recommend any changes to the draft PSA that it considers necessary to ensure consistency with relevant policy and legislation.

6. The IAC is to produce a report of its findings and recommendations to the Minister for Planning to inform the Minister's assessment under the EE Act, which will be considered by statutory decision makers for the project.

Background

Project outline

7. The project proposes to develop the Goschen Mineral Sands and Rare Earths Project which has an approximate mining area of 1,480 hectares and is located approximately 20 kilometres south of Swan Hill in north-west Victoria. The proposed mining methods involve open pit mining to extract approximately 5 million tonnes of ore per annum over a projected mine life of 20-25 years. Mine products are proposed to be transported via road or rail for export overseas.

8. The key components of the project include:
   a. the development of a mineral sands mine;
   b. mining unit plants;
   c. wet concentrator plant;
   d. rare earth mineral concentrate flotation plant;
   e. hydrometallurgical plant;
   f. water supply infrastructure, including a 38-kilometre pipeline from Kangaroo Lake and onsite water storage;
   g. in-pit tailings disposal; and
   h. additional site facilities, such as a 9.5 MW power station, administration building, warehouse, heavy equipment laydown area, workshop, laboratory, security guardhouse, lighting, chemical and fuel storage, vehicle washdown and weighbridge.

9. The project's proponent is VHM Limited, who is responsible for preparing technical studies, consulting with the public and stakeholders and preparing the EES and draft PSA.

EES assessment process

10. In response to a referral under the EE Act from the proponent, the then Minister for Planning determined on 10 October 2018 that an EES was required for the project and issued his decision with procedures and requirements for the preparation of the EES as specified in **Attachment 1**.

11. The EES was prepared by the proponent in response to the EES scoping requirements issued by the Minister for Planning in May 2019.

12. The EES will be placed on public exhibition for thirty (30) business days, together with the development licence application and the draft PSA. This public comment process is in accordance with the procedures and requirements issued for this EES by the Minister for Planning. VHM Limited is responsible for public notice of EES exhibition.

Commonwealth assessment process

13. Because of its potential impacts on matters of national environmental significance, the project was determined to be a controlled action for the purposes of the EPBC Act on 19 December 2018. The relevant controlling provisions under the EPBC Act relate to Ramsar wetlands (sections 16 and 17B); listed threatened species and communities (sections 18 and 18A) and nuclear actions (section 21 and 22A).

14. Under the bilateral agreement between the Australian and Victorian governments, the Victorian EES process is serving as the accredited process for the assessment purposes of the EPBC Act. The assessment of environmental effects to be made by the Victorian Minister for Planning will be provided to the Commonwealth Minister for the Environment and Water to inform the approval decision under the EPBC Act.

Planning approval process

15. The IAC is to consider and provide advice on draft PSA GC218 which proposes planning controls and provisions for the various works and activities outside of the mining licence area. The PSA is proposed to apply a special controls overlay to the pipeline and road upgrade areas for the project and to regulate the use and development of the project in accordance with an incorporated document to be included in the Gannawarra and Swan Hill planning schemes.

Development licence process

16. A development licence application for the project has been prepared in accordance with the provisions of the *Environment Protection Action 2017* (EP Act). The development licence application will be jointly advertised with the EES, in accordance with section 70A of the EP Act.

17. Section 52(2)(e) of the EP Act provides that: *if the notice for the proposed development licence is intended to be combined under section 70(a) with a notice for works given under the Environment Effects Act 1978, any submissions… must be made together with any submissions made for the Environment Effects Statement relating to the works; and must be made within the time limits within which the submissions must be made for that Environment Effects Statement.*

18. The EPA may appoint the Chair of the IAC as the convener of a conference of interested persons as per section 237 of the EP Act, enabling the IAC to also be a conference of interested persons under section 236 of the EP Act.

19. The IAC is therefore, to provide advice that can be used to inform the EPA's consideration of the development licence application prepared by the proponent, consistent with section 238 of the EP Act. The IAC may request any further information from the proponent that it considers necessary to assist it to provide that advice. The advice should recommend avoidance, mitigation or management measures that the IAC considers are necessary to ensure compliance with any relevant legislation and/or policy pertinent to the development licence application.

Other approvals

20. The project will require other statutory approvals and/or consents, as outlined in the EES, including:

    a. a mining licence and approved work plan under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act);
    b. an approved cultural heritage management plan under the *Aboriginal Heritage Act 2006*;
    c. approvals under the *Water Act 1989* for extraction of surface water and groundwater;
    d. approvals under the *Radiation Act 2005*;
    e. a permit to remove listed flora and fauna under the *Flora and Fauna Guarantee Act 1988*;
    f. an authority to take or disturb wildlife under the *Wildlife Act 1975*; and
    g. consents for works on or over waterways under the *Water Act 1989*.

Process

Stage 1 – Submissions

21. Submissions on the EES, development licence application and draft PSA are to be provided in writing on or before the close of submissions. Submissions will be collected by the office of Planning Panels Victoria (PPV) through the Engage Victoria platform. All submissions must state the name and address of the person making the submission. Submissions will be collected and managed in accordance with the '*Guide to Privacy at PPV*'.

22. Petition responses will be treated as a single submission and only the first names from a petition submission will be registered and contacted.

23. Pro-forma submitters will be registered and contacted individually if they provide their contact details. However, the IAC may encourage pro-forma submitters who want to be heard at the hearing to present as a group, given their submissions raise the same issues.

24. All written submissions and other supporting documentation or evidence received through the course of the IAC process may be published online, unless the IAC specifically directs that the submission or other material, or part of it, is to remain confidential.

25. Electronic copies of each submission on the EES, development licence application and draft PSA are to be provided to the proponent, Department of Transport and Planning (DTP) (Impact Assessment and Regional Planning Services), Gannawarra Shire Council and Swan Hill Rural City Council.

26. As each submission on the joint process may be relevant to the development licence application, electronic copies of each submission, including the contact details of submitters are to be provided to the EPA. The EPA may contact submitters regarding matters related to the development licence application.

27. PPV will retain any written submissions and other documentation provided to the IAC for a period of five years after the time of its appointment.

Stage 2 – Public hearing

28. The IAC must hold a public hearing and may make other such enquiries as are relevant to undertaking its role.

29. When it conducts a public hearing, the IAC has all the powers of an advisory committee that are specified in section 152(2) of the P&E Act.

30. Prior to the commencement of the public hearing, the IAC must hold a directions hearing to make directions it considers necessary or appropriate as to the conduct, scope or scheduling of the public hearing.

31. The IAC may inform itself in any way it sees fit, but must review and consider:
    a. the exhibited EES, development licence application and draft PSA;
    b. all submissions and evidence provided to the IAC by the proponent, state agencies, local councils and submitters;
    c. the views of Traditional Owners and Registered Aboriginal Parties (if known);
    d. any information provided by the proponent and parties that respond to submissions or directions of the IAC; and
    e. any other relevant information that is provided to, or obtained by, the IAC.

32. The IAC must conduct its process in accordance with the following principles:
    a. The public hearing will be conducted in an open, orderly and equitable manner, in accordance with the principles of natural justice.
    b. The public hearing will be conducted with a minimum of formality and without legal representation being necessary for parties to be effective participants.
    c. The IAC process and hearing itself is to be exploratory and constructive, with adversarial behaviour discouraged and with cross-examination / questioning to be regulated by the IAC in the context of these three principles.

33. The IAC may limit the time of parties appearing before it.

34. The IAC may direct that a submission or evidence is confidential in nature and the hearing be closed to the public for the purposes of receiving that submission or evidence.

35. The IAC may conduct a public hearing when there is a quorum of at least two of its members present or participating through electronic means, one of whom must be the IAC Chair.

36. If directed by the IAC, an audio recording of the hearing must be undertaken by the proponent. If recorded, the audio recording will be provided to PPV as a weblink and would be made publicly available as soon as practicable after the conclusion of each day of the hearing, or otherwise as directed by the IAC.

37. Any other recording of the hearing by any other person or organisation may only occur with the prior consent of, and strictly in accordance with, the directions of the IAC.

Stage 3 – Report

38. The IAC must produce a written report for the Minister for Planning containing its:
    a. analysis and conclusions with respect to the environmental effects of the project and their significance and acceptability;
    b. findings on whether acceptable environmental outcomes can be achieved, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;

c. recommendations and/or specific measures that it considers necessary and appropriate to prevent, mitigate or offset adverse environmental effects;
d. recommendations as to any feasible modifications to the design or management of the project that would offer improved environmental outcomes;
e. recommendations for any appropriate conditions that may be lawfully imposed on any approval for the project, including with respect to the content of a work plan or conditions that might appropriately be attached to approval of a work plan if issued under the MRSD Act;
f. recommendations as to the structure and content of the proposed environmental management framework, including with respect to monitoring of environmental effects, contingency plans and site rehabilitation;
g. recommendations with respect to the merits, structure and content of the draft PSA;
h. recommendations with respect to the development licence applications, including conditions that might appropriately be attached to the development licences if issued; and
i. specific findings and recommendations about the predicted impacts on matters of national environmental significance and their acceptability, including appropriate controls and environmental management.

39. The report should include:
    a. information and analysis in support of the IAC's findings and recommendations;
    b. a list of all recommendations, including cross-references to relevant discussions in the report;
    c. a description of the public hearing conducted by the IAC, and a list of those persons consulted with or heard;
    d. a list of all submitters in response to the exhibited EES; and
    e. a list of the documents tabled during the proceedings.

Timing

40. The IAC should hold a directions hearing no later than 20 business days from the final date of the exhibition period.

41. The IAC should commence the hearing no later than 50 business days from the final date of the exhibition period.

42. The IAC must submit its report in writing to the Minister for Planning within 40 business days from its last day of its proceedings, unless the report writing period spans the Christmas-New Year period, in which case 50 business days will apply.

43. The DTP's Impact Assessment Unit must liaise with PPV to agree on the directions hearing and hearing dates, which are to be included on all public notices.

Minister's assessment

44. The Minister for Planning will make an assessment of the environmental effects of the project after considering the IAC's report as well as the EES, submissions and any other relevant matters.

45. PPV will notify submitters of the release of the Minister for Planning's assessment and IAC report.

Fee

46. The fees for the members of the IAC will be set at the current rate for a panel appointed under part 8 of the P&E Act.

47. All costs of the IAC, including the costs of obtaining any expert advice, technical administration and legal support, venue hire, accommodation, recording proceedings and other costs must be met by the proponent.

Miscellaneous

48. The IAC may apply to the Minister for Planning to vary these terms of reference in writing, at any time prior to submission of its report.

49. The IAC may retain specialist expert advice, additional technical support and/or legal counsel to assist if considered necessary.

50. PPV is to provide any necessary administrative support to the IAC. In addition, the proponent is to provide any necessary administrative or technical support to the IAC in relation to the conduct of the hearing (if required).

Sonya Kilkenny MP
Minister for Planning

Date: 7/8/2023

The following information does not form part the Terms of Reference.

Project Management

1. For matters regarding the IAC process, please contact Planning Panels Victoria, by phone (03) 8624 5712 or email Planning.Panels@delwp.vic.gov.au.
2. For matters regarding the EES process please contact the Impact Assessment Unit in DTP by phone (03) 8508 2276 or email environment.assessment@delwp.vic.gov.au.

Attachment 1

Procedures and requirements issued under section 8B(5) of the *Environment Effects Act 1978* for the Goschen Mineral Sands and Rare Earths Project EES.

REFERRAL NUMBER 2018-04

DECISION ON PROJECT: Goschen Mineral Sands Project

Decision under section 8B(3)(a) of the *Environment Effects Act 1978*

Assessment through an Environment Effects Statement (EES) under the *Environment Effects Act 1978* **is required** for the reasons set out in the attached Reasons for Decision.

Procedures and requirements under section 8B(5) of the *Environment Effects Act 1978*

The procedures and requirements applying to the EES process, in accordance with both section 8B(5) and the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Ministerial Guidelines), are as follows:

(i) The EES is to document the investigation and avoidance of potential environmental effects of the proposed project, including for any relevant alternatives (such as for the mining extent, methods for mining and processing, water supply and transport of mining outputs), as well as associated environmental mitigation and management measures. In particular the EES should address:

a. Effects on biodiversity and ecological values within and near the site, and associated with adjacent road reserves, including: native vegetation; listed threatened ecological communities and species of flora and fauna; and other habitats values;

b. Effects on surface water environments, including local waterways and the broader catchment, as well as groundwater resources (hydrology, quality, uses and dependent ecosystems);

c. Effects on the land uses and landscape values of the site and surrounding areas, including the implications for agricultural productivity;

d. Effects on land stability, erosion and soil productivity associated with the construction and operation of the project, including progressive rehabilitation works;

e. Effects on Aboriginal and non-Aboriginal cultural heritage values;

f. Effects of project construction and operation on air quality and noise on nearby sensitive receptors (in particular residences);

g. Both positive and adverse socio-economic effects, at local and regional scales, potentially generated by the project, including increased traffic movement and indirect effects of the project construction workforce on the capacity of local community infrastructure; and

h. Solid and liquid waste that might be generated by the project during construction and operation.

(ii) The matters to be investigated and documented in the EES will be set out in detail in scoping requirements prepared by the Department of Environment, Land, Water and Planning (the department). Draft scoping requirements will be exhibited for 15 business days for public comment, before being finalised and then issued by the Minister for Planning.

(iii) The level of detail of investigation for the EES studies should be consistent with the scoping requirements issued for this project and be adequate to inform an assessment of the potential environmental effects (and their acceptability) of the project and any relevant alternatives, in the context of the Ministerial Guidelines.

(iv) The proponent is to prepare and submit to the department a draft EES study program to inform the preparation of scoping requirements.

(v) The department is to convene an inter-agency Technical Reference Group (TRG) to advise the proponent and the department, as appropriate, on scoping and adequacy of the EES studies during the preparation of the EES, as well as coordination with statutory approval processes.

(vi) The proponent is to prepare and submit to the department its' proposed EES Consultation Plan for consulting the public and engaging with stakeholders during the preparation of the EES.

Once completed to the satisfaction of the department, the EES Consultation Plan is to be implemented by the proponent, having regard to advice from the department and the TRG.

(vii) The proponent is also to prepare and submit to the department its proposed schedule for the studies, preparation and exhibition of the EES, following confirmation of draft scoping requirements. This is to enable effective management of the EES process on the basis of an agreed alignment of the proponent's and department's schedules, including for TRG review of technical investigations and the EES documentation.

(viii) The proponent is to apply appropriate peer review and quality management procedures to enable the completion of EES studies and documentation to an acceptable standard.

(ix) The EES is to be exhibited for a period of 30 business days for public comment, unless the exhibition period spans the Christmas–New Year period, in which case 40 business days will apply.

(x) An inquiry will be appointed under the *Environment Effects Act 1978* to consider and report on the environmental effects of the proposal.

Notification

The following parties (proponent and relevant decision-makers) are to be notified of this decision in accordance with sections 8A and 8B(4)(a)(i) of the *Environment Effects Act 1978*:

- VHM Exploration Limited (proponent)
- Minister for Resources
- Minister for Water
- Minister for Energy, Environment and Climate Change
- Secretary of Department of Economic Development, Jobs, Transport and Resources
- Secretary of Department of Environment, Land, Water and Planning
- Executive Director of Aboriginal Victoria
- Executive Director of Heritage Victoria
- Rural City of Swan Hill
- Gannawarra Shire
- Grampians Wimmera Mallee Water Authority
- Environment Protection Authority

Richard Wynne

RICHARD WYNNE MP
Minister for Planning

Date: 10/10/18

Appendix B List of submitters

No.	Submitter	No.	Submitter
1	Ronald Kelly	29	Tony and Cindy Fox
2	Dean Wall	30	Leanne Pola
3	John Trudinger	31	John Nicholson
4	Stuart Cuthbert	32	Bernard Hyde
5	Steven Coughlan	33	Donna Johns
6	Anthony Joy	34	Joe Fox
7	Ron Douglas	35	Annette Kelly
8	Ian Smith	36	Dylan Fox
9	Helen Sharpley	37	Joanne Eastman
10	Carly O'Regan	38	Ella Barry
11	Bulk Transport Equipment	39	Rohan and Michelle Oliver
12	The Exchange Hotel Kerang	40	Doug and Kerrie Cunning
13	Vesna Rendulic	41	Kimberley Theunissen
14	Pia Witt	42	Ian Fisher
15	Andrew Mutch	43	Jorja McDonald
16	Derek Foong	44	Beverley Power
17	Kerang Traders	45	Braidon Bennett
18	Dieu Nguyen	46	Brooke Bennett
19	KIG Energy Pty Ltd	47	Kristy and Brenton Cunning
20	Stephanie Stavrides	48	Alistair Smith
21	Adam Bujdoso	49	Lyn Johnston
22	Michael Allen	50	Anthony Brady
23	Brigitte McLean	51	Luca Devlin
24	Christopher Brown	52	Jessie McDonald
25	Murray River Group of Councils	53	John Oliver
26	Robin Judd	54	Milli Moncrieff
27	Deborah Rice	55	Lisa Clingan
28	Kerry Knights	56	Shelby Neil

No.	Submitter	No.	Submitter
57	Georgina Beach	86	Anna Bowie
58	Anita McDonald	87	Cleo Lanyon
59	Clinton Cummins	88	Nicholas Storey
60	Aaron Tonkin	89	Kieran Sullivan
61	Michelle Baker	90	Mitch McIntyre
62	Sandra Bennett	91	Danny Radcliffe
63	Sharon Smith	92	Nicholas Bennett
64	Jane Hildebrant	93	Vicky McDonald
65	Nola Bennett	94	Kristin Bennett
66	Patricia Rowe	95	Don Leathbridge
67	Gordon Bennett	96	Brittany Fox
68	Harvey Simpson	97	Stephen Lyons
69	Daniel Brullo	98	Veronica Parker
70	Susan Lamont	99	Emma Crofts
71	Joel Reither	100	Tayla Crofts
72	Simon Perrin (supplementary Bendigo & District Environment Council Incorporated submission)	101	Steven Dovigi
73	Conor McDonald	102	Melissa W [surname not provided]
74	Claire Hogan	103	Mark Pola
75	Declan McDonald	104	Andrew and Katrina McDonald
76	Hannah McDonald	105	Brendan Hogan
77	Ken Alexander	106	Isabella Salvo
78	Mary-Ellen Lamont	107	Kristy Notting
79	Mine Free Mallee Farms Inc	108	Sarah Young
80	Pinnacle Hire Pty Ltd	109	Simone Shore
81	Annmaree McIntyre	110	Harry Allen
82	Maurice Bennett	111	Steven McDonald
83	Janalle Bennett	112	Mardy McDonald
84	Kyra Batten	113	Bradley Bennett
85	Margaret Ingram	114	Shane and Melanie Dickeson

No.	Submitter	No.	Submitter
115	Damian Stahl	144	Jarrod Tonkin
116	Patrick McDonald	145	Kieran Hogan
117	Nathan and Amy Cunning	146	Avis Curthoys
118	Michele Brady	147	Environment Protection Authority Victoria
119	Ken Jenkins	148	Roby J Leathbridge
120	Minerals Council of Australia - Victorian Division	149	Alicia Harvey
121	Wesley Pye	150	Sustainable Living in the Mallee Inc.
122	Ian Ellis	151	Harry Kennedy
123	The Bendigo & District Environment Council	152	Stewart McCann
124	Clayton and Clancy Griffiths	153	Victorian Farmers Federation
125	Lynne Power	154	Maryla Johns
126	Brook M	155	Patrick Batten
127	Lilian Fox	156	Chris Nalder
128	Tony Brady	157	Stuart Simms
129	David Brady	158	Lyle Fox
130	Craige Kennedy	159	Andrew Graham
131	Catherine Brady	160	Kerry McFarlane
132	Trent Collins	161	Name Withheld
133	Kristie Parkes	162	John Brady
134	Swan Hill Rural City Council	163	Elizabeth McLeod
135	Craig Muir	164	Genevieve Fahey
136	Georgia Sheahan	165	John Fogarty
137	Friends of the Earth Australia	166	Nicholas Slater
138	Ailsa Page	167	Jo-Anne Nalder
139	Nikita Powney	168	Debbie Carruthers
140	Bill Brasser	169	Joan Shepherd
141	Sharyn McCann	170	Georgia Male
142	Bailey Burt	171	Donna Bedggood
143	Gannawarra Shire Council	172	Moira Fogarty

No.	Submitter
173	Scott [surname not provided]
174	John Steer
175	Bev Leathbridge
176	Daniel & Diane Steer
177	Leonnie Bish
178	Barbara Collins
179	Julian Poloniato
180	John Peter Pola Snr
181	John Peter Pola Jnr
182	Kathryn Ross

Appendix C List of parties

Submitter	Represented by
VHM Limited (Proponent)	Emily Porter SC, Robert Forrester and Rupert Watters of Counsel instructed by Tim Power of White & Case who called expert evidence on: - agriculture from Jim Shovelton of Meridian Agriculture - air quality from Dr Jason Shepherd of SLR Consulting Australia - economics from Noel Richards of Deloitte - fauna from Rob Gration of EcoAerial - flora from Dr Kate Callister of Nature Advisory - groundwater from Dr Jon Fawcett of CDM Smith - human Health from Dr Jackie Wright of Environmental Risk Sciences Pty Ltd (enRiskS) - noise and vibration from Jim Antonopoulos of SLR Consulting Australia - radiation from Jim Hondros and Rose Secen-Hondros of JHRC - social from Glenn Weston of Public Place - soil management and rehabilitation from Rod Masters of SLR Consulting Australia - surface water from Adrian Moon of Pitt & Sherry - transport from James Warfe of AECOM. Ron Douglas, Gavin Williams and Gavin Beer (VHM Limited) provided background and explanatory presentations.
Mine Free Mallee Farms Inc (MFMF)	Dr Michelle Sharpe of Counsel instructed by Dominica Sophia Tannock of DST Legal who called expert evidence in: - air quality from Peter Ramsay of Peter J Ramsay & Associates - economics from Chris Lightfoot (consultant economist) - hydrology (ground and surface water) from Dr Phillip Macumber of Phillip Macumber Consulting Services - noise from Les Huson of Les Huson & Associates - radiation from Dr Harry Watts of Watts & Fisher Pty Ltd - radiation and health from Associate Professor Tilman Ruff AO of University of Melbourne - soil rehabilitation from Robert Sonogan (consultant).
Department of Transport and Planning (DTP) Impact Assessment Unit	Cameron Pearce
Environment Protection Authority Victoria (EPA)	Serena Armstrong of Counsel instructed by Hannah McGuigan and Vanessa Wilson of the Victorian Government Solicitor's Office.

Submitter	Represented by
Gannawarra Shire Council	Geoff Rollinson and Roger Griffiths
Swan Hill Rural City Council	Michelle Grainger and David Bergin
Bendigo & District Environment Council (BDEC)	Ian Magee assisted Kirsty McDonald
Sustainable Living in the Mallee Inc.	Dr Jacqui Kelly
Victorian Farmers Federation	Lisa Gervasoni
Bradley Bennett	
Braidon Bennett	
Gordon Bennett	
Nola Bennett	
Craige Kennedy	
Daniel Brullo	
Debbie Carruthers	
Doug and Kerrie Cunning	
Kristy and Brenton Cunning	
Tony and Cindy Fox	
Dylan Fox	
Ian Fisher	
Jane Hildebrant	
Joanne Eastman	
John Fogarty	
Kathryn Ross	
Kerry McFarlane	
KIG Energy Pty Ltd	Greg Fonti
John Peter Pola Jr	
John Peter Pola Snr	
Leanne Pola	
Roby Leathbridge	
Simon Perrin	supplementary BDEC submission
Stuart Simms	

Appendix D Document list

No.	Date	Description	Provided by
1	24 Jan 2024	Directions Hearing notice letter	Planning Panels Victoria (PPV)
2	29 Jan 2024	Letter to IAC - Concerns about submissions - 28 Jan 2024	Ms Carruthers
3	31 Jan 2024	Letter to IAC - EES submission and procedural matters	Swan Hill Rural City Council
4	12 Feb 2024	Email from Proponent to IAC - submissions from VHM affiliates	VHM Limited (Proponent)
5	13 Feb 2024	Request for Further Information (RFI) – dated 12 February 2024	PPV
6	15 Feb 2024	Directions and Distribution List (v1)	PPV
7	21 Feb 2024	Hearing Timetable (v1)	PPV
8	22 Feb 2024	Email – Clarification on Request for Further Information (RFI) – dated 20 Feb 2024	Dr Perrin
9	22 Feb 2024	Email – Clarification on Request for Further Information (RFI) – dated 20 Feb 2024	Ms Carruthers
10	22 Feb 2024	Letter responding to requests for clarification on Request for Further Information (RFI)	PPV
11	26 Feb 2024	Email from Proponent - Expert witness-related matters	Proponent
12	5 Mar 2024	Submitter mapping (within 3km of the mining licence) (Direction 12) **[CONFIDENTIAL]**	Proponent
13	5 Mar 2024	Submitter mapping (within 1km pf the water pipeline route) (Direction 12) **[CONFIDENTIAL]**	Proponent
14	6 Mar 2024	Proponent - Part A Submission (Direction 11)	Proponent
15	6 Mar 2024	Proponent - Summary of themes raised in submissions (Direction 11a) *Note: updated summary provided 15 March 2024 (see D67 and D68) in response to D30 and D36*	Proponent
16	6 Mar 2024	Proponent - Expert Witness Statement of Adrian Moon - Surface Water	Proponent
17	6 Mar 2024	Proponent - Expert Witness Statement of James Warfe - Traffic	Proponent
18	6 Mar 2024	Proponent - Expert Witness Statement of Jason Shepard - Air quality	Proponent
19	6 Mar 2024	Proponent - Expert Witness Statement of Jim Hondros and Rose Secen-Hondros - Radiation	Proponent
20	6 Mar 2024	Proponent - Expert Witness Statement of Jim Antonopoulos - Noise	Proponent

No.	Date	Description	Provided by
21	6 Mar 2024	Proponent - Expert Witness Statement of Robert Gration - Fauna	Proponent
22	6 Mar 2024	Proponent - Expert Witness Statement of Rod Masters - Soil	Proponent
23	6 Mar 2024	Proponent - Expert Witness Statement of Glenn Weston - Social	Proponent
24	6 Mar 2024	Proponent - Expert Witness Statement of Jackie Wright - Human Health	Proponent
25	6 Mar 2024	Letter to IAC - concerns regarding information and RFI	Ms Eastman
26	7 Mar 2024	Proponent - Expert Witness Statement of Jim Shovelton - Agriculture	Proponent
27	7 Mar 2024	Proponent - Expert Witness Statement of Jon Fawcett - Groundwater	Proponent
28	7 Mar 2024	Proponent - Expert Witness Statement of Kate Callister - Flora	Proponent
29	7 Mar 2024	Proponent - Expert Witness Statement of Noel Richards - Economics	Proponent
30	7 Mar 2024	Letter to IAC – concerns in regard to submission summary	Ms Hildebrant
31	7 Mar 2024	Email to IAC - Request to amend Direction 21b attendance at additional expert conclaves	Environment Protection Authority Victoria (EPA)
32	7 Mar 2024	Hearing Timetable (version 2)	PPV
33	7 Mar 2024	Email to IAC – Letter sent to Mine Free Mallee Farms (MFMF) responding to technical questions raised by expert	Proponent
34	7 Mar 2024	Letter from Proponent to MFMF – Response to technical questions raised by Dr Watts	Proponent
35	7 Mar 2024	Email to IAC – Response to EPA request to attend additional expert conclaves	Mine Free Mallee Farms (MFMF)
36	7 Mar 2024	Letter to IAC - concerns in regard to submission summary	Ms Carruthers
37	8 Mar 2024	Email to IAC – Response to EPA request to attend additional expert conclaves	Proponent
38	8 Mar 2024	Site visit itinerary 2 April 2024 (Direction 10) *Note: updated itinerary provided 27 March 2024 (see D125 and D126).*	Proponent
39	8 Mar 2024	Site visit itinerary - Map 1 – Overview	Proponent
40	8 Mar 2024	Site visit itinerary - Map 2 - Kangaroo Lake	Proponent
41	8 Mar 2024	Site visit itinerary - Map 3 - Pipeline	Proponent

No.	Date	Description	Provided by
42	8 Mar 2024	Site visit itinerary - Map 4 – Lalbert *Note: updated Map 4 provided 27 March 2024 (see D125 and D127).*	Proponent
43	8 Mar 2024	Email to IAC – Clarification on Rail Freight Alliance addendum to Council submission	Swan Hill Rural City Council
44	8 Mar 2024	Email to IAC - Clarification of request to attend additional expert conclaves	EPA
45	8 Mar 2024	Letter responding to EPA request to attend additional expert conclaves	PPV
46	8 Mar 2024	Email to IAC – Request for addition to site visit itinerary	Ms Pola
47	12 Mar 2024	Email to Proponent - Addition to site visit itinerary	PPV
48	12 Mar 2024	Email to Leanne Pola – Response to request for addition to site visit itinerary	PPV
49	12 Mar 2024	Letter to IAC – concerns regarding Expert Witness Statement on Fauna dated 10 Mar 2024	Ms Hildebrant
50	12 Mar 2024	Email to IAC – Response to EPA's clarification of request to attend additional expert conclaves dated 8 Mar 24	MFMF
51	12 Mar 2024	Email to IAC – Request regarding Memorandum of Understanding dated 11 Mar 2024	MFMF
52	12 Mar 2024	Goschen IAC - Letter responding to Joanne Eastman information and RFI query	PPV
53	12 Mar 2024	Email to IAC – Response to Memorandum of Understanding	Proponent
54	12 Mar 2024	Memorandum of Understanding between VHM Limited and Gannawarra Shire Council	Proponent
55	13 Mar 2024	Email to IAC – Update on Expert evidence and request for an extension	MFMF
56	13 Mar 2024	MFMF - Expert Witness Statement of Phillip Macumber – Hydrology	MFMF
57	13 Mar 2024	MFMF - Expert Witness Statement of Harry Watts - Radiation	MFMF
58	13 Mar 2024	MFMF - Expert Witness Statement of Les Huson – Noise	MFMF
59	13 Mar 2024	Email to MFMF – Response on update of experts, economic evidence and request for an extension	PPV
60	13 Mar 2024	Email to IAC – Further information on extension request and update economic evidence	MFMF
61	13 Mar 2024	MFMF - Expert Witness Statement of Peter Ramsay – Air quality	MFMF
62	13 Mar 2024	MFMF - Expert Witness Statement of Robert Sonogan – soil rehabilitation	MFMF

No.	Date	Description	Provided by
63	14 Mar 2024	Email to IAC – Response on MFMF update on experts and request for an extension	Proponent
64	14 Mar 2024	Email to IAC – Request for separate site visit to surrounding homes	Ms Pola and Ms Bennett
65	15 Mar 2024	Email to Leanne Pola and Nola Bennett – Response to request for separate site visit to surrounding homes	PPV
66	15 Mar 2024	Email to MFMF - IAC response to MFMF request for an extension and economic experts	PPV
67	15 Mar 2024	Email to IAC – Response to concerns regarding submission summary (D30 and D36)	Proponent
68	15 Mar 2024	Proponent - Summary of themes raised in submissions (06.02.24) (updated 15.03.24)	Proponent
69	17 Mar 2024	MFMF - Expert Witness Statement of Assoc. Prof. Tilman Ruff – Radiation and health (with letter and CV)	MFMF
70	17 Mar 2024	MFMF - Assoc. Prof. Tilman Ruff – Goschen Radiation health background paper	MFMF
71	17 Mar 2024	Email to IAC - Changes announced to planning process with attachments – 17 Mar 2023	MFMF
72	18 Mar 2024	Email to MFMF - IAC response to MFMF correspondence on changes announced to planning process	PPV
73	18 Mar 2024	Email to IAC – Response on economic evidence and matters raised by the proponent (D63)	MFMF
74	18 Mar 2024	MFMF - Economics Expert Report - Goschen Mineral Sands Project	MFMF
75	18 Mar 2024	MFMF - CVs of Professor Malcolm and Mr Lightfoot and synopsis of Mr Lightfoot experience	MFMF
76	18 Mar 2024	Proposed timetable of the presentation by MFMF experts (Direction 16)	MFMF
77	18 Mar 2024	Email to IAC - Short version of Professor Malcolm CV to support expert report economic assessment	MFMF
78	18 Mar 2024	Email to IAC – Response to MFMF economic evidence and correspondence (D73)	Proponent
79	18 Mar 2024	Email to MFMF – IAC interim response to MFMF economic evidence and correspondence	PPV
80	18 Mar 2024	Email to Proponent – IAC interim response to Proponents response to MFMF economic evidence and correspondence (D73)	PPV
81	18 Mar 2024	Email to Proponent and MFMF - IAC response MFMF economic evidence	PPV

No.	Date	Description	Provided by
82	18 Mar 2024	Email from Proponent to Parties – Online document share details (Dropbox) (Direction 2)	Proponent
83	18 Mar 2024	Proponent - Document share instructions - Dropbox how to upload files	Proponent
84	18 Mar 2024	Proponent - Document share instructions - Dropbox how to view files	Proponent
85	19 Mar 2024	Overview of the EES process for Goschen Mineral Sands project	Department of Transport and Planning Impact Assessment Unit
86	19 Mar 2024	Email from Proponent to IAC - Indicative order of expert witnesses (Direction 16)	Proponent
87	21 Mar 2024	Hearing Timetable (v3)	PPV
88	21 Mar 2024	Proponent - Part B Submission (Direction 26)	Proponent
89	21 Mar 2024	Proponent - Day 1 Environmental Management Framework (EMF) (Direction 24) (Pdf and Word)	Proponent
90	21 Mar 2024	Proponent - Day 1 GC218 Explanatory Report (Direction 24) (Pdf and Word)	Proponent
91	21 Mar 2024	Proponent - Day 1 Incorporated Document (Direction 24) (Pdf and Word)	Proponent
92	21 Mar 2024	Response to Swan Hill Rural City Council PSA recommendations	Proponent
93	21 Mar 2024	Response to themes raised in submissions	Proponent
94	21 Mar 2024	Responses to IAC RFIs	Proponent
95	21 Mar 2024	Technical Note 1 (TN01) - Fate of flocculant in groundwater	Proponent
96	21 Mar 2024	Presentation of Ron Douglas (VHM CEO)	Proponent
97	21 Mar 2024	Presentation of Mineral sands plant process overview	Proponent
98	21 Mar 2024	Presentation of Hydromet Plant (Corrected)	Proponent
99	21 Mar 2024	Email to IAC – Update on MFMF economics expert evidence	Proponent
100	21 Mar 2024	Email to IAC - Objection to Proponent expert witness statement of Mr Fawcett (Groundwater)	MFMF
101	22 Mar 2024	Email to MFMF - Objection to Proponent expert witness statement of Mr Fawcett (Groundwater)	PPV
102	22 Mar 2024	Email to Parties - Expert witness statements and update on soil & agronomy and groundwater conclaves	Proponent
103	22 Mar 2024	Joint statement of health and radiation experts dated 21 March 2024	Proponent
104	22 Mar 2024	Joint statement of noise experts - 22 March 2024	Proponent

No.	Date	Description	Provided by
105	22 Mar 2024	Joint statement of air quality experts - 21 March 2024	Proponent
106	22 Mar 2024	EPA - Opening Submissions	EPA
107	22 Mar 2024	Email to Parties - Material Safety Data Sheets Attachment B to Document 94	Proponent
108	22 Mar 2024	Proponent - Material Safety Data Sheets (Phase 1 1A and 2)	Proponent
109	25 Mar 2024	Opening presentation materials	Proponent
110	25 Mar 2024	Joint statement of soil management and rehabilitation experts (collated) – dated 21 March 2024	Proponent
110a	25 Mar 2024	Joint statement of soil management and rehabilitation experts - Rob Sonogan signature page	Proponent
111	25 Mar 2024	Introductory Submissions – Rehabilitation, Soils and Agronomy	Proponent
112	25 Mar 2024	Presentation of Rod Masters - Soil management and rehabilitation	Proponent
113	25 Mar 2024	Presentation of Jim Shovelton - Agriculture	Proponent
114	26 Mar 2024	Email to IAC – Economic evidence	MFMF
115	26 Mar 2024	MFMF – Supplementary Economics Expert Report - Chris Lightfoot and Bill Malcolm	MFMF
116	26 Mar 2024	MFMF - Experience Synopses Professor Malcom and Mr Lightfoot	MFMF
117	26 Mar 2024	Proponent - Introductory Submissions - Flora and Fauna	Proponent
118	26 Mar 2024	Proponent - Presentation of Rob Gration - Fauna	Proponent
119	26 Mar 2024	Proponent - Presentation of Kate Callister - Flora	Proponent
120	27 Mar 2024	Proponent - Introductory Submissions - Traffic and transport	Proponent
121	27 Mar 2024	Proponent - Presentation of James Warfe - Traffic	Proponent
122	27 Mar 2024	Proponent - Introductory Submissions – Noise and Vibration	Proponent
123	27 Mar 2024	Proponent - Environment Reference Standard – Consolidated version prepared by EPA 29 Mar 2022	Proponent
124	27 Mar 2024	Proponent - Presentation of Jim Antonopoulos - Noise	Proponent
125	27 Mar 2024	Email from Proponent to IAC - Updated site inspection itinerary (version 2)	Proponent
126	27 Mar 2024	Proponent - Site visit itinerary (version 2)	Proponent
127	27 Mar 2024	Proponent - Site visit itinerary - Map 4 - Lalbert (version 2)	Proponent
128	27 Mar 2024	Amendment to the Expert Witness Statement of Jim Antonopoulos	Proponent
129	27 Mar 2024	Email from Proponent to IAC - Amendment to the Expert Witness Statement of Jim Antonopoulos	Proponent

No.	Date	Description	Provided by
130	28 Mar 2024	Joint statement of groundwater experts (unsigned)	Proponent
131	1 Apr 2024	Goschen IAC - Further IAC questions for the Proponent	PPV
132	2 Apr 2024	Updated joint statement of groundwater experts (signed)	Proponent
133	2 Apr 2024	Introductory Submissions on Air Quality	Proponent
134	2 Apr 2024	Presentation of Dr Jason Shepherd – Air quality	Proponent
135	3 Apr 2024	Supplementary report of Dr Macumber on ATC Williams and Right Solutions reports	MFMF
136	3 Apr 2024	Introductory Submissions - Radiation	Proponent
137	3 Apr 2024	Presentation of Jim Hondros and Rose Secen-Hondros - Radiation	Proponent
138	3 Apr 2024	Introductory Submissions - Surface Water	Proponent
139	3 Apr 2024	Presentation of Adrian Moon - Surface Water	Proponent
140	4 Apr 2024	Email from IAU to IAC – Clarification of DTP Impact Assessment Unit IAC submission (D85)	IAU
141	4 Apr 2024	IAU combined attachments - Statement of Decision, Reasons for Decision, scoping requirements and IAU submission	IAU
142	4 Apr 2024	Questions for Dr Shepherd	Joanne Eastman
143	4 Apr 2024	Introductory Submissions - Groundwater	Proponent
144	4 Apr 2024	Presentation of Dr Jon Fawcett - Groundwater	Proponent
145	5 Apr 2024	Technical Note 2 (TN02) - Tailings Leachate Analysis Comparison	Proponent
146	5 Apr 2024	Introductory Submissions - Social and Human health	Proponent
147	5 Apr 2024	Presentation of Glenn Weston - Social	Proponent
148	5 Apr 2024	Hearing Timetable (v4) and accompanied site visit VHM Kerang Warehouse	PPV
149	8 Apr 2024	Letter from Ogyris Ecological Research to IAC - Flora Study – 7 April 2024	Dr Sluiter
150	8 Apr 2024	Presentation of Dr Jackie Wright - Human health	Proponent
151	8 Apr 2024	Letter from Maurice Bennett - Neighbour Agreement - 8 April 2024	MFMF
152	8 Apr 2024	EPA - Main Submissions (PDF and Word)	EPA
153	8 Apr 2024	Attachment 1 - Fingerboards Mineral Sands Project IAC Report Volume 1	EPA
154	8 Apr 2024	Attachment 2 - EPA Publication 1992 Guide to the ERS	EPA
155	8 Apr 2024	Attachment 3 - Dust on Unsealed Road 2015 Study	EPA

No.	Date	Description	Provided by
156	8 Apr 2024	Attachment 4 - Section 54 EP Act 2017	EPA
157	8 Apr 2024	Attachment 5 - Section 69 EP Act 2017	EPA
158	8 Apr 2024	Proponent - Day 2 Environmental Management Framework (EMF) (Pdf and Word)	Proponent
159	8 Apr 2024	Proponent - Responses to EPA recommendations	Proponent
160	8 Apr 2024	Letter from SLIM to IAC - Aquatic ecologist cross examination	Sustainable Living in the Mallee (SLIM)
161	9 Apr 2024	Questions for Dr Wright	Bendigo & District Environment Council (BDEC)
162	9 Apr 2024	Hearing submission	Victorian Farmers Federation (VFF)
163	9 Apr 2024	Hearing submission	Swan Hill Rural City Council
164	9 Apr 2024	D163 Attachment A - Swan Hill Housing Summit Report - December 2023	Swan Hill Rural City Council
165	9 Apr 2024	D163 Attachment B - Community Benefit Projects List	Swan Hill Rural City Council
166	9 Apr 2024	D163 Attachment C - Incorporated Document	Swan Hill Rural City Council
167	9 Apr 2024	ASX announcement - Approvals Progress and Increased Area 2 Mineral Resource Estimate - 9 April 2024	Proponent
168	9 Apr 2024	Email from MFMF to IAC - Questions for VHM re the Ore Body - 9 April 2024	MFMF
169	10 Apr 2024	Email from MFMF to IAC - Questions for Gannawarra Shire Council - 10 Apr 2024	MFMF
170	10 Apr 2024	Gannawarra newsletter - March April 2024	MFMF
171	10 Apr 2024	Email from MFMF to IAC - Instructions to Dr Macumber - 10 Apr 2024	MFMF
172	10 Apr 2024	Email from MFMF to IAC - Dr Macumber's CV and qualifications – 10 Apr 2024	MFMF
173	10 Apr 2024	Email from Proponent to IAC - Responses to MFMF's questions re the Ore Body - 10 Apr 2024	Proponent
174	10 Apr 2024	Presentation Dr Phillip Macumber – Hydrology (updated 12 April 2024)	MFMF
175	10 Apr 2024	Email from Swan Hill Rural City Council to IAC - Reports referred to within submission	Swan Hill Rural City Council
176	10 Apr 2024	Hearing submission	MFMF

No.	Date	Description	Provided by
177	10 Apr 2024	Hearing submission	Gannawarra Shire Council
178	10 Apr 2024	Email to IAC - Issues with presentation of Dr Macumber (D174)	Proponent
179	10 Apr 2024	Email to IAC - Outstanding response on Neighbourhood Agreements	Ms Carruthers
180	11 Apr 2024	Questions for Dr Macumber	BDEC
181	11 Apr 2024	Email to IAC - Update on groundwater expert qualifications with letter from University of Melbourne	Proponent
182	11 Apr 2024	Email to IAC – Response to groundwater expert qualifications update	MFMF
183	12 Apr 2024	Hearing Timetable (v5)	PPV
184	14 Apr 2024	Email to IAC - Request correspondence regarding qualifications and conferral	MFMF
185	15 Apr 2024	Presentation of Dr Harry Watts - Radiation	MFMF
186	15 Apr 2024	Presentation of Assoc. Prof. Tilman Ruff – Radiation and health	MFMF
187	15 Apr 2024	Technical Note 3 (TN03) - Landscape and Visual Update Photomontages	Proponent
188	15 Apr 2024	188. Proponent - Technical Note 4 (TN04) - Crop Radionuclide Uptake Impact Assessment	Proponent
189	15 Apr 2024	Draft Goschen Community Reference Group (CRG) Terms of Reference	Proponent
190	15 Apr 2024	Joint statement of economic experts	Proponent
191	15 Apr 2024	Questions for Dr Watts and Assoc. Prof. Ruff	BDEC
192	15 Apr 2024	Email to IAC - Verification of qualifications emails	Proponent
193	15 Apr 2024	Email to IAC - Replacement verification of qualification statement letter	Proponent
194	16 Apr 2024	Presentation of Mr Chris Lightfoot - Economics	MFMF
195	16 Apr 2024	Presentation of Noel Richards - Economics	Proponent
196	16 Apr 2024	Submission on aquatic ecology	Proponent
197	16 Apr 2024	Targeted Survey for Southern Purple Spotted Gudgeon (April 2024)	Proponent
198	16 Apr 2024	Email from to IAC - figures referenced in Hydromet plant presentation	Proponent
199	16 Apr 2024	Email from Proponent to MFMF - IAC Request for documents referred to in Mr Lightfoot presentation – 16 Apr 2024	Proponent

No.	Date	Description	Provided by
200	16 Apr 2024	Email from MFMF to Proponent - Documents referred to in Mr Lightfoot presentation – 16 Apr 2024	MFMF
201	16 Apr 2024	Economic Evaluation for Business Cases – Technical Guide – August 2013	MFMF
202	16 Apr 2024	Guidance on using CBA versus CGE models to estimate net social benefit – Dept of Jobs, Skills, Industry and Regions	MFMF
203	16 Apr 2024	Hearing Presentation	Ms Pola
204	16 Apr 2024	Video - Major rain event and flooding in 2022 *(not uploaded to Engage Victoria due to file size)*	Ms Pola
205	16 Apr 2024	Video - Truck and Dust *(not uploaded to Engage Victoria due to file size)*	Ms Pola
206	16 Apr 2024	Hearing Presentation	Mr Pola Snr
207	16 Apr 2024	Comparison of surface water flow	Mr Pola Snr
208	16 Apr 2024	Video - Daniels video water off Cannie Ridge *(not uploaded to Engage Victoria due to file size)*	Mr Pola Snr
209	16 Apr 2024	Video - Daniels video water running off Cannie ridge *(not uploaded to Engage Victoria due to file size)*	Mr Pola Snr
210	16 Apr 2024	Hearing Presentation	Mr Pola Jnr
211	17 Apr 2024	Email to IAC - Goschen Closing Submissions and Timetable	Ms Carruthers
212	17 Apr 2024	Photo 1 - John and Jane Bennett	Mr G Bennett
213	17 Apr 2024	Photo 2 - Map of farm	Mr G Bennett
214	17 Apr 2024	a. Photo 3 - 1988 next to area 1 facing north b. Photo 4 - 1988 Shepherd Rd	Mr G Bennett
215	17 Apr 2024	a. Photo 5 - 1989 May Nalder Rd b. Photo 6 - 1989 Nalder Rd. May c. Photo 7 - 1989 Nalder Rd d. Photo 8 - 1989 R12 Nalder Rd	Mr G Bennett
216	17 Apr 2024	a. Photo 9 - 1992 Nalder Rd Dec b. Photo 10 - 1992 R12 Nalder Rd	Mr G Bennett
217	17 Apr 2024	a. Photo 11- 2011 Flood Jan b. Photo 12 - 2011 Flood c. Photo 13 - 2011 Jan Flood d. Photo 14 - 2011 Jan Nalder Rd e. Photo 15 - 2011 Nalder Rd Jan f. Photo 16 - 2011 Nalder Rd g. Photo 17 - 2011 R12	Mr G Bennett

No.	Date	Description	Provided by
218	17 Apr 2024	a. Photo 18 - 2022 corner Bennett and Shepherd Rd area 1 of mine site b. Photo 19 - 2022 flood Oct c. Photo 20 - 2022 Oct d. Photo 21 - 2022 October	Mr G Bennett
219	17 Apr 2024	a. Photo 22 - 2024 Jan b. Photo 23 - 2024 Nalder Rd	Mr G Bennett
220	17 Apr 2024	Photo 24 - Fleabane	Mr G Bennett
221	17 Apr 2024	Photo 25 - Feathertop	Mr G Bennett
222	17 Apr 2024	Letter to IAC - Aquatic ecologist cross examination response D196 and D197	SLIM
223	18 Apr 2024	Dr Kate Callister response to IAC questions on notice	Proponent
224	19 Apr 2024	Hearing Timetable (v6)	PPV
225	19 Apr 2024	The Mine to Product Strategy (MTPS) A Sustainable Future for Australian Renewables White Paper	KIG Energy
226	19 Apr 2024	Transforming Energy Landscapes VHM Limited's Goschen Project from Mining to Magnets (Hearing submission)	KIG Energy
227	19 Apr 2024	Hearing submission (Maps and Images) (*updated 22 April 2024*)	Mr B Bennett
228	21 Apr 2024	228. Email from MFMF to IAC - Correspondence between MFMF and University - 21 Apr 2024	MFMF
229	21 Apr 2024	Hearing submission	D & K Cunning
230	21 Apr 2024	Hearing Slide: a. 1 - Bish Road b. 2 - Water flow looking from the Area 3 c. 3 - Same area of water but looking southwest to Area 3 d. 4 - Marsh Native Reserve Road e. 5 - Marsh Native Reserve Road f. 6 - Harvest	D & K Cunning
231	21 Apr 2024	Hearing submission	Mr M Bennett
232	22 Apr 2024	Hearing presentation	B & K Cunning
233	22 Apr 2024	Hearing submission	B & K Cunning
234	22 Apr 2024	Hearing submission	T & C Fox
235	22 Apr 2024	Hearing submission	Mr D Fox
236	22 Apr 2024	Hearing submission	Mr Fogarty

No.	Date	Description	Provided by
237	22 Apr 2024	Hearing submission (*updated 24 April 2024*) 237a. Submission 182 with corrections	Ms Ross
238	22 Apr 2024	Attachment - Submitter 813 - Mr Ian Ross representing MFG Fingerboards submission	Ms Ross
239	22 Apr 2024	Attachment - Ian Ross Letter Bairnsdale Advertiser	Ms Ross
240	22 Apr 2024	Hearing submission	C & M Kennedy
241	22 Apr 2024	Gannawarra Times article	C & M Kennedy
242	22 Apr 2024	Goschen Project Landholders Group Inception meeting minutes - 25 Feb 2019	C & M Kennedy
243	22 Apr 2024	Correspondence to IAU landholder group concerns draft scoping requirements - 3 May 2019	C & M Kennedy
244	22 Apr 2024	Letter from Jaclyn Symes MP - 19 June 2019	C & M Kennedy
245	22 Apr 2024	Hearing submission	Ms Bennett
246	22 Apr 2024	Hearing submission	Mr G Bennett
247	22 Apr 2024	Email to IAC - Updated version of the responses to IAC's requests for information (RFI)	Proponent
248	22 Apr 2024	Proponent - Responses to Requests for Information (RFI) v2) - Clean (updated D94)	Proponent
249	22 Apr 2024	Proponent - Responses to Requests for Information (RFI) v2 - Mark Up (updated D94)	Proponent
250	22 Apr 2024	Hearing submission	Mr B Bennett
251	23 Apr 2024	Hearing presentation	BDEC
252	23 Apr 2024	Email to IAC - Response to IAC RFI	EPA
253	23 Apr 2024	Hearing presentation	C & M Kennedy
254	23 Apr 2024	Hearing submission	Mr B Bennett
255	24 Apr 2024	Hearing presentation	Dr Perrin
256	24 Apr 2024	Hearing submission	SLIM
257	24 Apr 2024	Submitter mapping (within 5km of the mining licence) **[CONFIDENTIAL]**	Proponent
258	26 Apr 2024	Hearing presentation (updated)	Joanne Eastman
259	26 Apr 2024	Closing submission	MFMF
260	26 Apr 2024	Hearing submission	Roby Leathbridge
261	26 Apr 2024	Hearing submission (amended), enclosing attachment: a) Conservation advice for the plains mallee box woodlands	Debbie Carruthers

No.	Date	Description	Provided by
262	26 Apr 2024	Hearing submission, enclosing attachments: a) Appendix A – VHM Prospectus b) Appendix B – Expert witness statement of Dr Jackie Wright c) Appendix C – Iluka Resources Ltd voting intentions report 2024	Jane Hildebrant
263	29 Apr 2024	Closing submission	Swan Hill Rural City Council
264	29 Apr 2024	Closing submission	Proponent
265	29 Apr 2024	Day 3 EMF	Proponent
266	29 Apr 2024	Day 3 Incorporated Document	Proponent
267	29 Apr 2024	TN05 - Water pipeline route	Proponent
268	29 Apr 2024	TN06 – Roads	Proponent
269	29 Apr 2024	Clarification on required generator numbers	Proponent
270	29 Apr 2024	Closing submission, enclosing attachments: a) Appendix 2 - EPA mark up of EMF (groundwater only) b) Appendix 3 - EPA Publication 668 Hydrogeological Assessment (Groundwater Quality) Guidelines c) Appendix 4 - Fingerboards IAC Technical Note 40 d) Appendix 5 - Fingerboards IAC Technical Note 35 e) Appendix 6 - Fingerboards Incorporated Document Tabled Document 780 f) Appendix 7 - Mr Antonopoulos Materials Requested by the EPA	EPA
271	30 Apr 2024	Clean Word version of Day 3 EMF	Proponent
272	30 Apr 2024	Clean Word version of Day 3 Incorporated Document	Proponent
273	30 Apr 2024	Email regarding Proponent's closing submission, enclosing: a) Extract of Proponent's closing submission	MFMF
274	2 May 2024	Closing email to Parties	PPV
275	2 May 2024	Comments on Day 3 EMF	Joanne Eastman
276	2 May 2024	Comments on Day 3 Incorporated Document	Joanne Eastman
277	6 May 2024	Comments on Day 3 EMF and Incorporated Document	Jane Hildebrant
278	6 May 2024	Comments on Day 3 EMF and Incorporated Document	Leanne and Peter Pola
279	7 May 2024	Comments on Day 3 EMF and Incorporated Document	Swan Hill Rural City Council
280	7 May 2024	Comments on Day 3 EMF	Debbie Carruthers

No.	Date	Description	Provided by
281	7 May 2024	Comments on Day 3 EMF	EPA
282	7 May 2024	Comments on Day 3 Incorporated Document	EPA

Appendix E IAC recommended Environmental Management Framework

The following EMF includes the IAC's recommended changes based on the Proponent's day 3 version (D271).

Tracked Added

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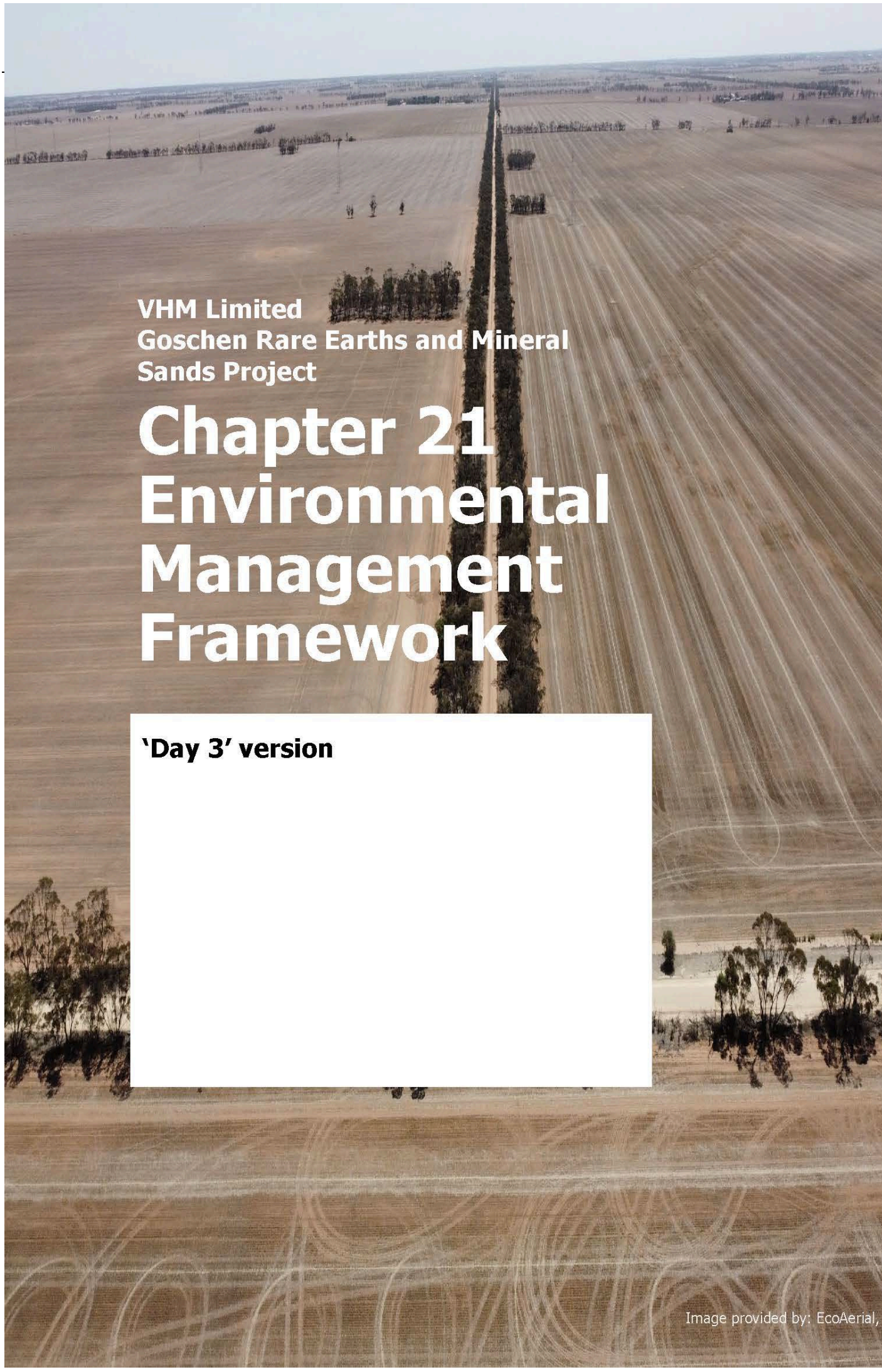

VHM Limited
Goschen Rare Earths and Mineral Sands Project

Chapter 21 Environmental Management Framework

'Day 3' version

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21. Environmental Management Framework

21.1 Introduction

This chapter presents the Environmental Management Framework (EMF) for the Goshen Rare Earths and Mineral Sands Project (the Project) in response to Section 3.8 of the Environment Effects Statement (EES) Scoping requirements.

The purpose of the EMF is to provide a transparent and integrated framework to manage the environmental effects associated with the construction, operation and closure phases of the Project. The EMF outlines the relevant statutory approvals and consents required for the Project and how the mitigation measures will be given effect by the conditions of those approvals and

consents or by Environmental Management Plans (EMPs) to be approved pursuant to statutory approvals and consents.

The objectives of the EMF are to:

- Set out the mitigation measures developed to first avoid, as far as reasonably practicable, then minimise and manage potential environmental impacts.
- Identify the relevant statutory approvals, consents and EMPs to be approved pursuant to the statutory approvals and consents that will give effect to the mitigation measures.
- Ensure clear accountabilities are identified for implementing the mitigation measures and monitoring the Project's environmental performance in accordance with relevant legislation and statutory approvals and consents.

Development of this EMF was guided by the EES scoping requirements, relevant legislation, policy and guidelines including the statutory approvals and consents that will be required. The EMF and associated mitigation measures have been informed by the specialist studies undertaken for the EES.

It is important to note that the Ministerial Guidelines and the EES scoping requirements define 'environment' broadly to include physical, biological, heritage, cultural, social, health, safety and economic aspects. References to 'environment' or 'environmental' impacts or management measures in this EMF are intended to reflect the same broad definition.

21.1.1 Scoping Requirements

Section 3.8 of the scoping requirements establishes the requirement for an EMF to be prepared for the Project:

> *Inadequate management of environmental effects during project construction, operation, rehabilitation and closure will not realise the necessary environmental outcomes, statutory requirements or stakeholder confidence. Hence, the proponent will need to provide an environmental management framework (EMF) for the project within the EES. The EMF will articulate clear accountabilities for managing and monitoring environmental effects and hazards associated with construction, operation, rehabilitation and closure phases of the project.*

Table 21-1 outlines the EES scoping requirements for the EMF along with the relevant section within this chapter where these requirements are addressed.

Table 21-1 Scoping requirements

EES scoping requirement	Relevant sections
EMF should describe the baseline environmental conditions to be used to monitor and evaluate the residual environmental effects of the project, as well as the efficacy of applied environmental management and contingency measures.	Section 21.7
The framework should include the following: The context of required approvals and consents and the statutory application of these post-EES.	Section 21.1.2
Any existing or proposed environmental management system to be adopted.	Section 21.3
Organisational responsibilities and accountabilities for environmental management.	Section 21.4

A register of environmental risks associated with the project which is to be maintained during project implementation (including matters identified in preceding sections in these directions as well as other pertinent risks).	Section 21.5
The environmental management measures proposed in the EES to address specific issues, including commitments to mitigate adverse effects and enhance environmental outcomes	Section 21.6
Arrangements for management of and access to baseline and monitoring data, to ensure the transparency and accountability of environmental management and to contribute to the improvement of environmental knowledge	Section 21.7
The proposed objectives, indicators and monitoring requirements for managing (at least): • biodiversity (including MNES) values on and near the project site • biodiversity (including MNES) offsets to be established and managed offsite • noise, vibration, and emissions to air, including dust and greenhouse gases • public health and safety; • potential impacts on downstream surface water and groundwater beneficial uses and sensitive receivers • monitoring of water quality and water table level • ongoing protection of relevant cultural heritage values • groundwater and surface water functions, including behaviour and quality, stormwater runoff • erosion and sediment control, and flood risk • solid and liquid waste, including recycling and handling of potentially hazardous or contaminated waste, potential acid sulfate soils (PASS), radioactive material and other excavated spoil • Aboriginal and cultural heritage values • traffic during construction, including managing temporary disruption and changed accessibility • disruption of and hazard to the existing infrastructure • social impacts • land use • landscape and visual values • landform and slope stability • traffic and road management measures • site rehabilitation, including handling of topsoil, overburden, tailings and mining by-products • emergency management.	Section 21.3 Section 21.6 Section 21.9
The EMF should outline auditing requirements to review and continuously improve the effectiveness of environmental management and to ensure compliance with statutory conditions.	Section 21.9.3
The EMF will set the scope for later environmental management plans for construction, operation and closure phases of the project.	Section 21.3

Similarly, the EMF will outline a program for community consultation, stakeholder engagement and communications for the project, including opportunities for local stakeholders to engage with the proponent to seek responses to issues that might arise when the project is undertaken.	Section 21.10

21.1.2 Implementation of the Environmental Management Framework

The Project will be delivered within the context of this EMF, in accordance with the obligations and requirements of the statutory approvals and consents required for the Project.

The Minister for Planning will publish an assessment of the EES, which will then inform all decision makers responsible for issuing approvals and consents for the Project.

A range of approvals and consents are required for the Project, as set out in section 21.2 below and described in EES Chapter 5 Legislation and approvals. The key approvals include:

- The mining licence and work plan (and associated management plans), which will regulate mining activities on land subject to the mining licence (Mining Licence Area); and
- The Incorporated Document (and the various plans required under it), which will regulate the use and development of land outside the mining licence that is required for supporting infrastructure, including the water pipeline and road upgrade works (Project Infrastructure Land).

Before the commencement of each Project phase (construction, operation, rehabilitation and closure), it will be the responsibility of VHM Limited (VHM) to obtain the required statutory approvals and consents, together with any secondary consents required under them (i.e. approval of management plans that are required by conditions of the mining licence or Incorporated Document). VHM will prepare, implement and maintain environment plans and EMPs for each relevant phase of the Project to meet the requirements of the statutory approvals and consents.

VHM has made various commitments in the EES regarding the measures it will take to avoid, manage and monitor the potential environmental impacts of the Project. These measures, which have been informed by the impact assessments undertaken for the EES, are presented in Tables 21-5 and 21-7 below, along with a brief explanation as to how they will be implemented (i.e. the applicable environment plan or EMP into which the measure will be incorporated).

It is proposed that both the mining licence and the Incorporated document include conditions that require any plan to be prepared under them to address the requirements of this EMF, subject to the Minister for Planning's assessment under the *Environment Effects Act 1978.*

21.2 Approvals and statutory obligations

VHM is responsible for preparing the EES for the Project under the EE Act. VHM is also responsible for seeking the following key approvals:

- Mining Licence under the *Mineral Resources (Sustainable Development) Act 1990 (Vic).*
- Approval of the Work Plan under the *Mineral Resources (Sustainable Development) Act 1990 (Vic).*
- Approval of the Project under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* for potential impacts on Matters of National Environmental Significance.
- Development licence for sewage treatment and power generation under the *Environment Protection Act 2017 (Vic).*

- Permit for the discharge or deposit of waste to aquifer under the *Environment Protection Act 2017 (Vic).* Depositing tailings in-pit would trigger the need for an A18 permit for the discharge or deposit of waste to aquifer. This permission is separate to the trigger for a development licence (refer to Section 21.3.3).
- Planning Scheme Amendment (Specific Controls Overlay) to the Gannawarra Planning Scheme and the Swan Hill Planning Scheme under the *Planning and Environment Act 1987 (Vic).*
- An approved Cultural Heritage Management Plan (CHMP) under the *Aboriginal Heritage Act 2006 (Vic).*
- Road reserves permit, road opening permits, vehicle crossing permits, over-sized vehicle/over dimensional load permits in accordance with the *Road Management Act 2004 (Vic)* and *Road Safety Act 1986 (Vic).*
- A permit under the *Flora and Fauna Guarantee Act 1988 (Vic).*
- Approval from the North Central Catchment Management Authority would be required for any works on, over or under a designated waterway in accordance with the *Water Act 1989 (Vic).*
- An approved radiation management plan, radioactive waste management plan and radiation environment plan would also be required for the project under the *Radiation Act 2005 (Vic).*
- A Groundwater Extraction Licence in accordance with the *Water Act 1989 (Vic)* for the dewatering of artificially mounded water which might intersect mining pits. This would be sought from Grampians Wimmera Mallee Water.

It is worth noting that some of the approvals listed above will apply to both the Mining Licence Area and the Project Infrastructure Land, whereas others will relate to just one of those areas (or part of it). **Table 21-2** and **Table 21-3** below outline the relevant area to which each approval will apply, together with the phase of the Project it will be required for and the approval authority.

Table 21-2 Key approvals

Legislation	Statutory approval	Approval authority	Project phase	Project area
Environment Protection and Biodiversity Conservation Act 1999 (Cth)	Approval of the controlled action	Commonwealth Minister for the Environment	Construction, operation, and closure	Mining Licence Area and the Project Infrastructure Land
Mineral Resources (Sustainable Development) Act 1990 (MRSD Act)	Mining Licence Approved Work Plan VHM will require a mining licence and approved Work Plan under the MRSD Act. The company may apply for a mining licence over land for which it has an exploration or retention licence (Section 15 of the	Minister for Resources	Construction, operation, and closure	Mining Licence Area

	MRSD Act). VHM can apply for a mining licence for up to 20 years.			
Environment Protection Act 2017	Development Licence Prescribed permits In accordance with Schedule 1 of the Environment Protection Regulations 2021, VHM require a development licence for sewage treatment (A03) and for power generation (K01). A permit is also anticipated for in-pit deposition of tailings as it will be a discharge or deposit of waste to aquifer (A18).	Minister for Energy, Environment and Climate Change EPA	Construction, operation, and closure	Mining Licence Area (Area 1 & 3)
Planning and Environment Act 1987 (Vic)	Planning Scheme Amendment to the Gannawarra Planning Scheme and Swan Hill Planning Scheme It is proposed to apply a Specific Controls Overlay with an Incorporated Document	Minister for Planning	Construction, operation and closure	Project Infrastructure Land
Aboriginal Heritage Act 2006 (Vic)	A Cultural Heritage Management Plan is required for the Project	Minister for Aboriginal Affairs / First Peoples–State Relations and relevant Registered Aboriginal Party	Construction and operation	Mining Licence Area and the Project Infrastructure Land
Radiation Act 2005	An approved radiation management plan, radioactive waste management plan and radiation environment plan ~~would also be~~ are required for the project.	Minister for Health	Construction and operation (including transport)	Mining Licence Area, the Project Infrastructure Land, and all transport routes to Port
Local Government Act 1989	Approval may be sought under the Local Government Act 1989 for road closures and discontinuance, where	Minister for Local Government	Construction and operation	Mining Licence Area and the Project Infrastructure Land

	the provisions of the Road Management Act 2004 are not met.			
Road Management Act 2004 and Road Safety Act 1986	Agreement is required between the land manager (Gannawarra Shire Council or Swan Hill Rural City Council) and the beneficiary landowner (VHM) prior to approval of works within the road reserve. Road reserves permit, road opening permits and vehicle crossing permits. Over-size vehicle / Over dimensional load permits	Gannawarra Shire Council Swan Hill Rural City Council VicRoads NHVR	Construction and operation	Mining Licence Area and the Project Infrastructure Land
Flora and Fauna Guarantee Act 1988	Any removal of protected flora, which includes threatened flora species and the plants that make up threatened communities, listed under the FFG Act from public land requires a Protected Flora Licence or Permit under the Act, obtained from DEECA	Minister for Energy, Environment and Climate Change / DEECA	Construction	Mining Licence Area and the Project Infrastructure Land

The water supply arrangements for the Project to draw water from Kangaroo Lake (which is within Goulburn-Murray Water's area of responsibility), to the mine site (which is within Grampians Wimmera Mallee Water's area of responsibility), will be managed through a delivery deed between Goulburn Murray Water and VHM. Notwithstanding, Grampians Wimmera Mallee Water will be consulted during the preparation of any water delivery deed.

There are various other consents that will also be required for Project infrastructure. These are included in **Table 21-3** below.

Table 21-3 Other approvals and consents

Project Component & Secondary Consent	Relevant Authority	Details	Project area
KL Pump station: Works Licence Operation Licence	GMW	A licence application will be needed for the construction of the pump station site. This will require the completion of a Form 29 (Construct) and then a notification of outcome and Operate (another Form 29) once the works have been completed.	Project Infrastructure Land

		Engagement with GMW will be necessary for the level of design required for the construction licence, with aspects of design likely to include: - Maintenance of bank stability - Sound proofing specifications - Location/length/anchoring of intake pipes - Intake screen(s) - Security - Safety in design - Construction schedule	
KL Pump station: Permit for Works on a waterway	North Central CMA	As per S.67 of *Water Act 1989,* any works within the bed and banks of designated waterways in Victoria require a permit from the local Catchment Management Authority. Kangaroo Lake is a designated waterway; thus, construction of pump station pad and intake pipes will require a Works Permit. Likely design requirements (to be confirmed with engagement) will be components needed for GMW: - Lake bank stability - Construction schedule	Project Infrastructure Land
Water Pipeline: Private Works Licence Operation Licence	GMW	A licence application will be needed for the construction of the pipeline. This will require the completion of a Private Works Licence (Form 130 - Construct) and then a notification of outcome and Operate (another Form 130) once the works have been completed. https://waterregister.vic.gov.au/about/forms-and-fees/forms-for-licences-registrations Engagement with GMW will be undertaken for the level of design required for the construction licence, but aspects of design will likely include: - Backfill stability/consolidation - Location/design any relief valves - Safety in design - Construction schedule	Project Infrastructure Land Mining Licence Area
Water Pipeline (x5 channel crossing): Private Works Licence	GMW	**NOT REQUIRED** Where the water pipeline crosses GMW infrastructure, such as existing water supply channels, the licence to construct is included in the one Water Pipeline construction licence (Form 130) – see above.	-

Water Pipeline (Rail crossing): Approval to build within VicTrack land	VicTrack	VicTrack manages applications for any works that occur on their land or adjacent to their infrastructure. In regards the Goschen Project it is proposed that approval will be sought from VicTrack for the water pipeline to cross the rail track and will need to cover works for installation and maintenance. The application will include detailed drawings that must: - show all works occurring within VicTrack land - show underground services and overhead services - be compliant with the Design Requirements and Guidelines and the Overhead Works Guidelines - show all existing services within VicTrack land (once confirmed on-site) in the vicinity of proposed works.	Project Infrastructure Land
Water Pipeline (Creek crossing): Permit for Works on a waterway	North Central CMA	As per S.67 of *Water Act 1989,* any works within the bed and banks of designated waterways in Victoria require a permit from your local Catchment Management Authority. Avoca Outfall is a designated waterway; thus, construction of pipeline beneath creek line will require a Works Permit.	Project Infrastructure Land
60ML Process Water Pond Construction Licence Operation Licence	GWM Water	**NOT REQUIRED** No construction or operating licence is required for the PWP given the 60ML storage that has an embankment <5m in height and thus is not a high consequence water storage, and does not need either a construction or operating licence from the water authority.	-
Groundwater dewatering: Groundwater extraction licence	GWM Water	A Take & Use (Section 51 – *Water Act 1989*) licence is required for interception and extraction of groundwater within the pits, which is predicted to occur due to mounding from deposition of slurry tailings.	Mining Licence Area

Information regarding the regulatory framework for the Project is provided in **Chapter 5: Legislative framework.**

21.2.1 Duties under the Environment Protection Act 2017

The *Environment Protection Act 2017* (EP Act) introduced new prevention-based duties to protect human health and the environment. The General Environmental Duty (GED) is the cornerstone of the EP Act. It imposes an ongoing duty on any person or entity who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste, to minimise those risks, so far as reasonably practicable.

When determining what is reasonably practicable, the EP Act gives regard to the following:

- The likelihood of those risks eventuating
- The degree of harm that would result if those risks eventuated
- What a person concerned knows, or ought reasonably to know
- The availability and sustainability of ways to eliminate or reduce risks
- The cost of eliminating or reducing risks.

Satisfaction of the GED requires a proactive approach to risk identification, assessment and the implementation of controls to minimise impacts to human health and the environment from pollution or waste so far as is reasonably practicable. The GED is a concurrent separate obligation in relation to the proposed mitigation measures outlined in the EMF. Additional mitigation measures may be required during the life of the mining operations to minimise the risk of harm to human health or the environment so far as reasonably practicable under the GED. These additional measures may evolve overtime as the 'state of knowledge' evolves, and innovation and technology advancement.

Also, under the EP Act, the Environment Reference Standard (ERS) provides the indicators and objectives needed to support environmental values and is a tool that can be used to assess the impacts on human health and the environment that may result from a proposal or activity. This application of the ERS must be seen within the context of the GED and preventing harm from pollution and waste as part of the broader environment protection framework under the EP Act. Because it is preventative in nature, this framework seeks to maintain environmental values and minimise risks of harm to human health and the environment, rather than setting and authorising acceptable levels of pollution and waste. The focus on prevention allows for continual improvement in managing these risks as knowledge expands and more effective risk- reduction techniques and technologies emerge.

This EMF has been prepared to meet the obligations under the EP Act by requiring steps to be taken to continually seek to eliminate or reduce risks as the 'state of knowledge' evolves. Importantly, the EMF requires controls to be continually evaluated and staff to be adequately trained in compliance with the GED. These obligations will continue during all project phases and will be implemented via the suite of management plans, mitigation measures, and monitoring requirements described in the EMF.

Where this EMF and the mitigation measures refer to "risks (or risks) of harm", it should be taken to refer to risks of harm to human health and the environment within the meaning of the EP Act.

21.3 Environmental management systems and documentation

21.3.1 Environmental management system

The EMF outlines the plans required for delivery of the Project, including among other things, to provide a structure for delivery partners to mitigate, monitor and adaptively manage potential environmental impacts of a project. Environmental management documentation must comply with this EMF and address relevant legislation, approval conditions and contractual requirements.

VHM adopted an Environmental Management System (EMS) that is aligned with AS/NZS ISO 14001:2016 and sets out a framework to conduct all activities with the goal of achieving best practice environmental and health and safety performance, to ensure there is no harm to people and that any potential environmental impacts are managed to be as low as reasonably practicable.

The EMS will be based on the principle of continual improvement and the 'plan, do, check, act' cycle in line with ISO14001.

The existing VHM EMS will be used to support the EMF in ensuring best practice environmental and health and safety performances are met.

21.3.2 Environmental and site management plans

The EMF outlines the plans required for delivery of the Project. Environmental management documentation must comply with this EMF and address relevant legislation, approval conditions and contractual requirements. A series of management plans ~~would~~ will be prepared for different components and phases of the Project. These management plans ~~would~~ will be required to implement and achieve compliance with relevant standards, guidelines and statutory approval obligations for the approvals and consents outlined in **Section 21.1.2** and to reflect the mitigation and monitoring measures as outlined in **Section 21.6** and **Section 21.8**. The management plans and documentation required to be approved are described below.

Work Plan

A Work Plan is required to address information set out in section 40(3) of *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) and regulation 42, regulation 43(2), regulation 44 and regulation 45 and regulation 46 *Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019* (MRSDMI Regulations).

A Draft Work Plan has been prepared (EES Attachment I) ~~in consideration of the required information requirements outlined above~~ but is not intended to fully comply with the MRSD Act requirements. ~~The aim of the attached draft Work Plan is to be an illustration of a Work Plan and provide an indication of the detail of the project description for mining activities that will fall within the Mining Licence.~~

The final Work Plan will require approval for assessment by the Earth Resources Regulator (ERR) branch of Department of Energy, Environment and Climate Action (DEECA)~~, and as part of the assessment process may require further changes to meet the requirements of the MRSD Act and would also be subject to comment by relevant agencies~~.

The final Work Plan would be implemented during the construction, operation, decommission and rehabilitation phases for Activities within the mining licence area and will include the following document package to meet the obligations of the information that must be provided for a mining operation under the MRSD Act 1990 and the associated~~s~~ MRSDMI Regulations ~~MRSD(MI)R 2019~~:

- Risk Management Plan (RMP) – to provide a document that meets the requirements of section 40(3)(b) of the MRSD Act ~~Mineral Resources (Sustainable Development) Act 1990~~ and Regulation 44 and 45 of the MRSDMI Regulations 2019 ~~Mineral Resources (Mineral Industries) Regulations 2019~~ and to provide environmental mitigation and monitoring to meet the obligations under the *Environment Protection Act 2017*. The plan itself includes risk treatment plans for key areas of activity
- Rehabilitation Plan - to support the Work Plan in accordance with the items prescribed under the *MRSD Act* ~~1990~~ and regulation 43 of the MRSDMI Regulations ~~Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019~~
- Community Engagement Plan (CEP) - The CEP would ensure that relevant stakeholders have been consulted regarding the mining program, and potential issues raised by stakeholders are identified at an early stage.

A series of risk treatment plans and sub-plans/procedures would sit under the risk management plan, that will form part of the final Work Plan and onsite systems. The scope and content of these plans is driven by the key environmental risks and impacts of the Project identified through the ~~this~~ EES, regulatory requirements and applicable policies and guidelines.

Table 21-4 outlines other key management plans required under the key approvals identified.

Additional plans, and any amendments to plans, are expected to be developed throughout the Project in response to the conditions of approval, monitoring results, and review and updates to the environmental risk assessment.

VHM ~~would~~ will also develop procedures setting out how activities in the management plans ~~would~~ will be implemented. Procedures will apply across key risk mitigation activities and will include (but not be limited to):

- Record control: How records will be taken, stored and distributed.
- Complaints: How complaints will be recorded and responded to.
- Monitoring: How monitoring activities will be conducted and responded to.
- Spill response: Measures to be implemented to respond to spills, including need for water quality testing and reporting.
- Fire and bushfire management planning: Measures to mitigate risks from bushfires burning onto the mining licence area and from fires igniting on-site and escaping to surrounding areas.

Incorporated document to the Gannawarra and Swan Hill Planning Schemes

An Incorporated document will ~~is proposed to~~ facilitate the delivery of infrastructure required to support the Project on land outside the area subject to mining licence (i.e. on the Project Infrastructure Land). The Incorporated document will be implemented through ~~introduced by~~ a Specific Controls Overlay (SCO) ~~that is~~ applied to the Project Infrastructure Land ~~via an amendment to~~ in the Gannawarra and Swan Hill Planning Schemes. The Incorporated document will set out the requirements for the use and development of Project infrastructure within the SCO area only. This includes:

- A requirement to prepare an Environmental Management Plan (EMP) prior to the commencement of any works – The EMP will be prepared in consultation with Gannawarra Shire Council and Swan Hill Rural City Council, to the satisfaction of the Minister for Planning. The EMP will include, but not be limited to, details for; environmental mitigation measures; the management of construction impacts, performance and monitoring processes, and;
- A requirement to provide details of the proposed removal of native vegetation, including offsets, necessary for the construction and delivery of infrastructure in accordance with the application requirements in the *Guidelines for removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning (DELWP), December 2017).

21.3.3 Permit under the Environment Protection Regulations 2021

In accordance with the *Environment Protection Regulations 2021*, depositing tailings in-pit would trigger the need for an A18 permit for the discharge or deposit of waste to aquifer. VHM will comply with ~~a set of standard~~ approved conditions as part of the A18 permit.

A copy of this permit ~~must~~ will be kept at the activity site and be easily accessible to persons who are engaging in an activity conducted at the activity site. Information regarding the requirements of the permit and the Act duties ~~must~~ will be included in site induction and training information.

~~VHM will immediately notify the Authority by calling 1300 EPA VIC (1300 372 842) in the event of:~~

- ~~A discharge, emission or deposit which gives rise to, or may give rise to, actual or potential harm to human health or the environment.~~
- ~~A malfunction, breakdown or failure of risk control measures at the site which could reasonably be expected to give rise to actual or potential harm to human health or the environment.~~
- ~~Any breach of the permit.~~
- ~~VHM will provide the Authority with a Permission Information and Performance Statement (PIPS) in the form determined by the Authority within 2 months of receiving notification in writing from the Authority. The PIPS may be released to the public (in whole or in part).~~
- ~~Information and monitoring records used for the preparation of, inclusion in, or support of, any reporting or notification that is required of VHM by the Authority (including data reporting, performance reporting, documents evidencing any risk and monitoring program) must be:~~
  - ~~Retained for five years.~~
  - ~~Made available to the Authority on request.~~
- ~~VHM will develop a risk management and monitoring program for VHM's activities which:~~
  - ~~Identifies all the risks of harm to human health and the environment which may arise from the activities VHM are engaging in at VHM's activity site.~~
  - ~~Clearly defines VHM's environmental performance objectives.~~
  - ~~Clearly defines VHM's risk control performance objectives.~~
  - ~~Describes how the environmental and risk control performance objectives are being achieved.~~
  - ~~Identifies and describes how VHM will continue to eliminate or minimise the risks identified so far as reasonably practicable (SFARP).~~
  - ~~Describes how the information collated in compliance with this clause, is or will be disseminated, used or otherwise considered by VHM or any other entity.~~
- ~~The risk management and monitoring program will be:~~
  - ~~Documented in writing.~~
  - ~~Signed by a duly authorised officer of the licensed entity.~~
  - ~~Made available to the Authority on request.~~
- ~~VHM will not discharge waste to aquifer at a rate of more than the permit limit.~~
- ~~VHM will keep records of:~~
  - ~~The quantity, quality and type of waste discharged or deposited to aquifer at each point of discharge.~~
  - ~~The results from all monitoring undertaken in accordance with the groundwater management and monitoring plan.~~
  - ~~Any exceedances of trigger values.~~
  - ~~Any implemented contingency measures.~~
- ~~The records will be kept for five years and made available to the Authority on request.~~

Cessation of the A18 permit would occur once the activity of tailings deposition cease.

21.4 Roles and responsibilities

Several government authorities have roles and responsibilities relevant to the EMF. In some instances, these roles and responsibilities differ for different aspects of the Project, due to the legislation that applies. The mining licence area ~~would~~ will be primarily regulated by Earth Resources Regulation under the MRSD Act. Activities outside of the mining licence area, (i.e. on the Project Infrastructure Land covered by the specific controls overlay as defined in the planning scheme amendment), would be regulated by the responsible authority and local Councils, under the *Planning and Environment Act 1987 (Vic).*

VHM will be responsible for overseeing the delivery of the Project including stakeholder and community engagement, project approvals, design, construction, operation, and closure.

The roles and responsibilities of the key stakeholders relevant to environmental management of the Project are outlined in **Table 21-4**. Contractor responsibilities ~~would~~ will be included as conditions in the Project contracts.

Table 21-4 Roles and responsibilities

Organisation/position	Responsibility
Government roles and responsibilities	
Victorian Minister for Planning	- Issue Ministerial assessment of the EES. - Approval of the planning scheme amendment. - Approval of plans and information required by the Incorporated Document.
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	- DCCEEW, under delegation from the Commonwealth Minister for Environment, will consider the Victorian Minister for Planning's assessment under the *Environment Effects Act 1978 (Vic)* (EE Act) and decide whether the Project is approved, approved with conditions or refused under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). - Review and approve environmental management plans and offsets as required under the relevant EPBC approvals. - Administer and enforce environmental management plans and strategies approved pursuant to those approvals. - Receive audit or monitoring reports as required.
Earth Resources Regulator (ERR)	- Minister for Resources to grant the mining licence. - Regulation of activities within mining licence area. - Review and approval of work plan. - Referral authority for radiation management plan. - Regulation of compliance with conditions and requirements in work plan.
Environment Protection Authority Victoria (EPA)	- Approval of development licence and A18 permit applications. - Referral authority for work plan. - Regulation of compliance with conditions of development licence and A18 permit. - Compliance with requirements of the *Environment Protection Act 2017 (Vic) (EP Act)*

Department of Transport and Planning (DTP)	- Management of the EES process. - Referral authority for work plan. - Referral authority for development licence application.
Department of Energy, Environment and Climate Action (DEECA)	- Referral authority for work plan. - Referral authority for development licence application. - Referral authority for biodiversity risk treatment plan (including offsets), radiation management plan, radioactive waste management plan, radiation environment plan, mine rehabilitation plan and community engagement plan.
Department of Health and Human Services (DHHS)	- Issue of radiation management licence. - Review and approval of radiation management plan, radioactive waste management plan and radiation environment plan. - Regulation of compliance with requirements of radiation. - Referral authority for airborne and deposited dust risk treatment plan, water quality and hydrology risk treatment plan and mine rehabilitation plan.
Goulburn-Murray Water (GMW)	- Administers the Private Works Licence for the construction of the pipeline and pump station at Kangaroo Lake, the Water Use Registration for the water allocation from Kangaroo Lake, including the water delivery deed to be entered into with VHM.
Grampians Wimmera Mallee Water (GWM Water)	- Administers the Groundwater Extraction Licence for the dewatering of artificially mounded groundwater which is predicted to intersect mining pit.
Gannawarra Shire Council	- Provide comment on plans and information to meet relevant conditions of the Incorporated Document - Provide comment on development licence. - Provide comment on work plan. - Provide comment on traffic management plan. - Provide comment on Workforce Accommodation Strategy.
Swan Hill Rural City Council.	- Provide comment on plans and information to meet relevant conditions of the Incorporated Document - Provide comment on traffic management plan. - Provide comment on Workforce Accommodation Strategy.
Catchment management authorities (North Central Catchment Management Authority).	- Referral authority for work plan. - Referral authority for development licence. - Approval for works on waterways permit(s).
Approval Authorities (All)	- Ensure statutory approval conditions have regard to mitigation measures outlined in the EMF and these are incorporated into relevant management plans. - Administer and enforce statutory approvals, where relevant. - Review and approve, where required, relevant environmental management plans.

	- Receive and review audit and monitoring reports where required.
VHM roles and responsibilities	
Proponent	- Obtain all relevant statutory approvals for the project - Prepare Earth Resources Regulation Work Plan including Risk Management Plan, Community Engagement Plan and specific management plans including Trigger Action Response Plans that incorporate mitigation measures and monitoring requirements and relevant legislative requirements and approval conditions - Implementation of the various statutory requirements by ensuring appropriate resources are available to implement the management plans and assigns roles and responsibilities to staff, contractors and visitors. - Monitor compliance with approved mitigation measures and approvals conditions, as outlined in the approved Management Plans e.g. Construction Environment Management Plan (CEMP), and take corrective action where required. - Ensure~~s~~ reporting and communication of significant environmental issues with VHM staff and contractors, relevant landowners and government stakeholders - Ensure~~s~~ a site-specific induction is conducted prior to all staff, contractor, sub-contractor or consultant commencing work on site. - Develop contractor specific terms and conditions documentation that reflect Project specific approvals conditions and requirements, and clearly articulate requirements for incorporation of tender responses and engagement of contractor protocols - Review and approve contractor management systems to ensure compliance to VHM systems including relevant statutory approvals. - Prepare audit plan (including a schedule and audit scope).
Contractors and consultants	- All contractors, where appropriate, to prepare management plans in accordance with proponent tender and terms and conditions documents, EMPs/RMPs and CEMP and other relevant legislative requirements, and approval conditions that have been provided by VHM. - Ensure compliance with approved EMPs/RMPs and CEMP during project delivery and take corrective action where required - Contractors and consultants will be responsible for reporting compliance and incidents against the Project approvals conditions.
VHM appointed visitors	- All visitors to the project site ~~would~~ will be required to undergo an induction and follow the instructions developed for the works to be undertaken. This includes adhering to site induction instructions regarding health, safety and environment requirements, standards and procedures and any relevant emergency response procedures.
Project Auditor responsibilities	
Project Auditor appointed by VHM	- Must comprise a professional (or body of professionals) with expertise in a range of disciplines for the purpose of auditing all contractors for compliance with the project approvals.

- Conduct audits for contractors' construction works and operations, at agreed intervals as set out in any environmental management plans, to assess compliance with statutory approvals as required.
- Prepare audit reports where necessary and recommend corrective and preventative actions as required.
- Any auditor appointed must be independent, have relevant expertise, based on qualifications and experience to undertake any required audit activities.

21.5 Risk assessment

Environmental risks associated with the Project have been identified and assessed through the specialist investigations.

21.5.1 Within Mine Site area

Within the Mine Site area (proposed MIN boundary) the environmental risks will be captured within an environmental risk register that will be developed to assist in identifying management measures and to measure their ability to produce the desired outcome as part of the final Work Plan (see EES Attachment I: Draft Work Plan). This risk register will form~~s~~ part of the Risk Management Plan (RMP) of the final Work Plan which will list the mining hazards that may arise from work documented in the Work Plan as required by Regulation 43 of MRSDMI Regulations ~~MRSDA(MI)R~~ and includes mining hazards arising from:

- set up or construction;
- operations and production; and
- details of rehabilitation hazards arising from rehabilitation work under the work plan.

Where mining hazards associated with the project construction/ project operations and/or closure are identified, associated controls will be implemented to reduce the risk of harm or damage to the environment, any member of the public, to land, property or infrastructure in the vicinity of project works.

The RMP will include the following key components:

a) Summary of risk assessment process;

b) Risk register; and

c) Risk treatment plans – all of which will include ~~(EES Attachment I: Draft Work Plan)~~ as a minimum:
   - details of the sensitive receptors, their location and proximity to the site
   - control and mitigation measures
   - performance standards
   - monitoring program and ongoing management

The RMP will be approved by ERR as part of the final Work Plan package and will form the key document where all the management, mitigation and monitoring commitments made as part of the EES (Table 21-5) are held and must be followed by the Mining Licence Holder throughout the phases of mine development.

The environmental risk register ~~would~~ will be maintained and reviewed on a regular basis to ensure it remains relevant and adequately considers risks throughout Project implementation.

21.5.2 Outside Mine Site area

Outside the Mine Site area, the environmental risks will be captured within an environmental management plan (EMP) required to be prepared under Section 4.2 of the Goschen Rare Earths and Mineral Sands Project Incorporated Document ~~to~~ in the Gannawarra Planning Scheme and Swan Hill Planning Scheme. The EMP will document the management measures and ~~to~~ measure their ability to produce the desired environmental outcome as part of the Incorporated Document ~~(see EES Attachment II: Planning Scheme Amendment)~~.

The EMP ~~will~~ must be approved by the Minister for Planning ~~in consultation with Gannawarra Shire Council and Swan Hill Rural City Council~~ and will form the key document where all the management, mitigation and monitoring commitments relevant to the works outside the proposed Mine Site area made as part of the EES (Table 21-5) are held and must be followed throughout the phases of the Project.

21.6 Mitigation measures

Mitigation measures ~~were recommended by technical specialists in order~~ are intended to avoid or minimise and manage potential environmental impacts of the Project. ~~VHM has reviewed the recommended mitigation measures in the technical studies and have adopted a comprehensive set of measures to manage potential impacts from the Project~~.

The proposed mitigation measures for the Project are included ~~outlined~~ in **Table 21-5** ~~and~~ which sets out the phase of the project that the proposed mitigation measure relates to as well as the approval or plan which will implement it.

The mitigation measures are to provide controls on Project activities that may impact on the following subject areas:

- Flora vegetation.
- Fauna ecology.
- Cultural heritage.
- Landscape and visual.
- Traffic and transport.
- Noise and vibration.
- Air quality.
- Surface water.
- Groundwater.
- Geotechnical.
- Land use planning.
- Agriculture.
- Soils and land resource.
- Radiation.
- Social impacts.
- Rehabilitation and closure.

Table 21-5 Mitigation measures

MMID	Mitigation measure	Project Phase	Implementation document
Biodiversity and habitat (Flora and Fauna Ecology): **Evaluation objective:** ***To avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and commonwealth policies.***			
MM-BD01	Minimise impacts to trees Engagement of an arborist to provide recommendations to avoid or minimise impacts to native vegetation, such as: - micro-siting of pipeline and roadworks to avoid trees where possible - assessment of trees deemed to be lost in EES to determine whether any additional measures can be taken to avoid adverse impacts to structural root zones and ensure that trees persist in the long term - assign designated turning points where there are gaps in the roadside vegetation to prevent compaction and damage near trees - identify and carry out any canopy pruning that is required prior to works commencing to prevent branches being hit or torn off with machinery Undertake an arborist survey to inform swept path design and construction techniques for road upgrades.	Construction	Biodiversity Management Plan within Work Plan EMP under Incorporated Document
MM-BD02	Minimise impacts to native vegetation - Prior to the final design of relevant intersections and road upgrades, where there is potential for the EPBC listed Natural Grasslands of the Murray Valley Plains to be present, further survey for this community will be undertaken to inform design and construction techniques. - Any proposed vegetation removal ~~is~~ will not be undertaken until applicable approvals and permits have been issued - Vegetation protection zones (aligned with AS 4790) will be established around native vegetation prior to works and will be maintained for the duration of relevant	All phases	Biodiversity Management Plan within Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	construction (within the area subject to the Incorporated Document) and over the life of the Project (within the area subject to the Work Plan) - Required vegetation / habitat offsets ~~are~~ will be sourced in accordance with Commonwealth and / or State legislation or policy. - Impacted FFG listed species ~~to~~ will be included in revegetation in relevant EVCs in the mine site rehabilitation phase, with seeds and/or cuttings taken from impacted plants where appropriate. - The Rehabilitation Plan (**RH01**) under the Mining Licence ~~to~~ will include requirements to revegetate the mined/closed portions of Bennett Road and Thompsons Road, in consultation with relevant road authorities. - Any areas of native vegetation disturbed in pipeline construction and roadworks construction ~~to~~ will be revegetated with species and communities consistent with those present prior to disturbance, using seeds and/or cuttings taken from impacted plants where appropriate, and following reinstatement of the land in accordance with MM-SLR02.		
MM-BD03	Minimise impacts to remnant native vegetation in vicinity of work areas All construction personnel ~~to~~ will be appropriately briefed prior to works, and no machinery or equipment will be placed inside vegetation/tree protection zones	All phases	Biodiversity Management Plan within Work Plan EMP under Incorporated Document
MM-BD04	Control spread and/or introduction of weeds and/or pathogens - Vehicles - Ensure an appropriately designed clean-down area(s) is established prior to the commencement of works - Ensure vehicles, machinery and plant equipment are clean before entering and leaving the site at the designated clean-down area - Manage waste from clean-down bays by burying the waste below the subsoil	All phases	Biodiversity Management Plan within Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
MM-BD05	Control spread and/or introduction of weeds and/or pathogens - General - Prepare controls to ensure material inspected before entry to and exit from site with rejection of material that contains signs of noxious weeds Control weeds prior to stockpiling of topsoil - Dispose of weed material on site in the designated burn area if possible or seek permission to transport and dispose of the material at a legal place of disposal - High threat weeds, namely Common Heliotrope and African Box-thorn to be treated prior to works commencing - Outbreaks of noxious and/or Weeds or National Environmental Significance (WoNS) within construction and operational areas will be managed. Spread into adjacent land will be prevented - Dispose of material containing declared noxious weeds in accordance with the Catchment and Land Protection Act 1994	All phases	Biodiversity Management Plan within Work Plan EMP under Incorporated Document as considered appropriate in consultation with the relevant responsible authority.
MM-BD06	Native vegetation revegetation within the Mining Licence Area and pipeline route - Revegetation of impacted roadside areas of native vegetation along the pipeline route and within the Mining Licence Area will be undertaken based on impacted Ecological Vegetation Classes. - Preparation of revegetation will commence as soon as possible, with pre-emptive weed control conducted during the active growth/flowering periods of weed species and at least one month prior to planting. - Pre-emptive pest control (e.g., rabbits), cuttings and seed collection will be undertaken. - Works should be conducted in late autumn to winter after and ideally preceding a significant rain event to encourage successful establishment of new plants. - Revegetation species, design and diversity will be based on EVC benchmarks for Ridged Plains Mallee (EVC 96), Woorinen Mallee (EVC 824) and Plains Savannah (EVC 826) and any advice from local indigenous plant nurseries regarding suitable indigenous species for the area.	All phases	Rehabilitation Plan under Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	- Plants should be grouped by life form in dense patches to create a mosaic effect throughout the revegetation zones (this reduces competition and limits the opportunities for weed infestations). A mix of species will create diverse habitat structure and reduce the risk of failure compared using with a few select species. - Along roadsides, plantings of trees and shrubs must consider VicRoads Tree Policy (2016) and other relevant policies to ensure road safety. The majority of revegetation required along the pipeline is less than 1 metre from the road verge, and so any planting of tress and medium to tall shrubs would need to be discussed with VicRoads and/or local Council. - Tube stock will be appropriately protected from rabbits through the installation of tree guards which should be inspected every 3 months for damage requiring replacement. - Once planting is completed, regular, ongoing weed control will be required subject to on-ground conditions for example on a quarterly basis. - Regular watering will be undertaken for at least 12 months after planting depending on rainfall and any signs of plant stress.		
MM-BD07	Minimise impacts to biodiversity – road upgrades Prior to detailed design of the Project (including the mine plan): - Undertake an assessment of the potential impacts of the haulage route upgrade options and alternatives on native vegetation (including listed species and communities), trees and fauna habitat (including fauna corridors). - Investigate (through detailed design and in consultation with relevant road authorities) any feasible options or alternatives (including the potential use of adjacent cleared farmland where it is owned by the Proponent) that will avoid and minimise impacts to remnant roadside vegetation and associated habitat. Without limiting the scope of the assessment, further survey work may be required of any previously identified treeless patches of vegetation which may consist of the EPBC listed Natural Grasslands of the Murray Valley Plains community.	Pre-construction	Biodiversity Management Plan within Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	Consistent with the Guidelines for removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning (DELWP), December 2017) (guidelines), efforts should be focused on areas of native vegetation that has the most value. This assessment is to be undertaken to the satisfaction of the Secretary of DEECA and will inform the avoid and minimise statement required by the application requirements under the guidelines.		
MM-FE01	Minimise impact to native fauna – fauna salvage - Fauna salvage ~~to~~ will be undertaken by suitable qualified specialist where fauna habitat is to be removed - Areas suitable to relocate fauna ~~are~~ will be identified prior to fauna habitat removal - Habitat enhancement strategies ~~are~~ will be implemented in areas of fauna habitat to be retained. This may include the translocation of hollow branches, woody debris and where possible leaf litter from areas where native vegetation is removed, consistent with relevant EVC benchmarks and under the supervision of a suitably qualified project ecologist. Where practicable and advised by the project ecologist, place translocated hollow branches at height to provide elevated habitat.	Construction Operation	Biodiversity Management Plan within Work Plan EMP under Incorporated Document
MM-FE02	Minimise impact to ~~native vegetation –~~ Kangaroo Lake flora and fauna habitats - Soil spoil containment areas ~~are~~ will be identified in consultation with relevant regulatory authorities prior to the commencement of works. - Stockpiles of earthworks and pavement materials, and all fuels/oils/chemicals and equipment will be stored away from the lake. - The pump station and works area/s ~~should~~ will be designed to have the smallest footprint possible and ~~should~~ be designed to minimise the need for in-lake works. - Install No Go Zone (NGZ) exclusion and sediment fencing to prevent ingress and protect areas of the lake's banks and bed. - Aquatic, emergent and riparian habitat ~~would~~ will be reinstated following construction of the pump station.	Construction Operation	EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	- If possible, works at the pump site on Kangaroo Lake ~~are~~ will be undertaken during dry ground conditions. Alternatively bog mats are deployed. - Erosion and sediment controls ~~are to~~ will be in place to minimise the number of erodible surfaces during construction - A waterproof sealed bund ~~is~~ will be installed around the pump works area. - Chemicals ~~are~~ will not ~~to~~ be stored within 1 km of Kangaroo Lake. - Fuels and oils will be stored in a suitably bunded and protected location. - Vehicle movements are to be kept to the minimum required. - Equipment is checked prior to the commencement of works each morning to check for any chemical leaks. - Any vehicle / equipment leaking chemicals is withdrawn from the works area immediately - Any onsite surface water to be filtered prior to release to the lake. Any water discharged from the works site should not detrimentally impact water quality of the lake. Undertake water quality monitoring to confirm the relevant water quality requirements of EPA's Environmental Reference Standard for *Murray and Western Plans, lowlands of the Loddon basin"* (ERS; EPA, 2021) - Following construction, monitoring of water quality, revegetation, weeds, earthworks/structures and any remaining controls should continue until the project area is stabilised and risk of further impacts is negligible.		
MM-FE03	Minimise impact to native fauna - Commonwealth Light Pollution Guidelines (2020) ~~are~~ will be used as guidance for light installation - Nearest veterinary clinic and / or wildlife carer contact details ~~are~~ will be included in any relevant management plans - Buffers in the form of vegetation and bunds are considered around the mine operations area	All phases	Risk Management Plan within Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	- Speed restrictions ~~are~~ will be established within the proposed transport routes and all employees and contractors' drivers are informed of the speed limits at the site induction and provided training on how to deal with vehicle/native fauna interactions - Vehicles exhaust systems ~~are~~ will be maintained to limit noise impacts to fauna - Days of high winds, a water cart ~~is~~ will be deployed to minimise dust / gravel displacement onto fauna habitat / roadside vegetation - Processing pond will have wires strung across at 10 metre intervals with bird deterrent discs hung below the wire. - Chain mesh fencing at least 2 metres in height will be erected around the perimeter of mining Area 1 and Area 3 minimising access to terrestrial fauna.		
MM-FE04	Minimise impact to native fauna - Pipeline - Native fauna specialist will provide~~s~~ input to CEMP in regards strategies to minimise impact and development of a fauna recovery protocol, with periodic review for the duration of the pipeline construction - 30 cm high fauna fence, (constructed from damp course material), ~~is~~ will be erected adjacent to both sides of open trenches - Cover trenches if left open between days of construction activity - Install No Go Zone (NGZ) exclusion fencing around retained areas of Samphire skink habitat along Mystic Park-Beauchamp Road between the Piangil rail line and Bael Bael-Boga Road, and maintain until the completion of adjacent construction activities - Inspection of angled fish screen within one year ~~2 years~~ of operation to assess fitness-for-purpose in minimising risk of entrapment/drowning of aquatic fauna, including fish larvae as small as 4 millimetres	Construction	EMP under Incorporated Document
MM-FE05	Minimise impact to native fauna - Kangaroo Lake - Design the pump station to include an a~~A~~ngled fish screen on the inlet that is designed to Australian best practice standards and is able to effectively protect	Construction	EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	smaller fish (as small as larva of 4 millimetres long) and other aquatic fauna from entrainment and impingement - Undertake a pre-works aquatic fauna / targeted SPSG survey of the area in the vicinity of the pump station to ascertain the actual SPSG and other aquatic fauna usage at that time. Survey to occur in summer to align with SPSG breeding / larvae.		
Cultural Heritage: **Scoping objective:** ***To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values.***			
MM-CH01	Protection of cultural heritage values The project to be delivered in accordance with the approved CHMP which will include (but not be limited to): - The requirement for all personnel involved in ground disturbing activities to participate in an Aboriginal cultural heritage induction. - The need for the proponent to regularly review their compliance with the management conditions contained in the CHMP. - Strategies to be implemented if any suspected ~~cultural artifacts~~ human remains are found within the Project's disturbance footprint. - Process to follow if unexpected Aboriginal places or objects other than human remains are found during the activity. - Custody and management of Aboriginal cultural heritage recovered. - Reviewing compliance with the management plan. - Dispute resolution. - Delays and other obstacles. - Authorised Project Delegates and the handling of sensitive information.	All phases	Cultural Heritage Management Plan
MM-HH01	Protection of historic heritage values An Unexpected Finds Protocol will be prepared to reduce harm to unknown historical heritage values that may be present within the Project area. If historical heritage sites	All phases	EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	are discovered during the construction, operation or closure of the Project, the following steps will be applied: - The person who identified the find will immediately notify the person in charge of the activity. - The person in charge of the activity will then suspend any relevant works at this location of the discovery and to a distance within 50 metres of the relevant site extent and isolate the find via the installation of safety webbing, or other suitable barrier and the material to remain in situ. - Works for the activity may continue outside of the exclusion zone, although if additional heritage is identified this must also be protected following the steps outlined above. - The person in charge of works will notify a suitably qualified archaeologist of the find within 24 hours of discovery. - Relevant management actions will be determined by the suitably qualified archaeologist in relation to the Heritage Act 2017 (Vic) and in consultation with Heritage Victoria. - Site cards for identified historic archaeological sites required to be submitted to Heritage Victoria (HV) within 30 days of discovery. - Approvals must be granted by HV (Heritage Victoria) for works to continue. All historical archaeological sites are protected under the Heritage Act 2017 and cannot be harmed without approval Appropriate contractor induction will be provided to communicate the Unexpected Finds Protocol.		
Landscape and Visual **Evaluation objective:** ***To minimise adverse effects on landscape and visual amenity associated with the environs of the project site.***			
MM-LV01	Minimise adverse effects on landscape and visual amenity	All phases	Risk Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	Detailed Landscape Management Plan/s must be prepared prior to construction that have regard to Technical Report D – Figure 18 and Appendix C and address the following: - Early establishment (within 1 year of commencement of construction) of vegetation screening along the perimeter of the mine site where appropriate, including as a minimum along the western boundary of the processing facility and along the southern boundary of Area 1 ~~(as outlined in Technical Report D – Figure 18 and Appendix C)~~ with planting of suitable fast growing screen species where appropriate. - Ongoing management and maintenance of vegetation and screen planting. ~~- Soil restoration strategies in line with the recommendation of the Soil and Land Resource Technical Report and the Rehabilitation and Closure Technical Report.~~ ~~- The establishment of plant growth medium to support revegetation that will help restore landscape values.~~ ~~- Monitoring of the rehabilitation measures by providing direction of documentation procedures, data collection, record-keeping, and performance tracker for plant establishment~~ Owners of receptors R6, R8 and R12, as shown in Figure 18 of Technical Report D: Landscape and visual ~~(Moir, 2023)~~, will be consulted with and offered landscape planting to provide visual screening at the cost of the Proponent.		
MM-LV02	Minimise adverse effects of visual amenity - lighting - All lighting fixtures installed on-site will be in accordance with the AS4282-1997 Australian Standard and activities associated with the transport, placement and removal of overburden stockpiles will be shielded or limited as far as possible to daylight hours to reduce the requirement (or spill) of night lighting - Wherever possible, lighting should face downwards and be shielded to reduce the likelihood of a light spill and glow effect.	Construction Operation	Risk Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
MM-LV03	Minimise adverse effects on visual amenity - The building materials and finishes ~~should~~ will be sandy/earthy colour tones, where possible, and ~~should~~ utilise non-reflective materials. - Low contrast textures and materials ~~should~~ will be used so far as reasonably practicable ~~to the extent practicable~~	Construction	Risk Management Plan within Work Plan
Traffic and Transport: **Evaluation objective:** ***To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure.***			

MM-TP01	Minimise adverse social effects
	- A community stakeholder and communications plan will be developed with regard to transport with ongoing stakeholder consultation to be undertaken during the lifecycle of the Project. Key notifications to include as a minimum:
	  - Pre-construction stage
	  - Construction, operation and decommission, with: TMP measures and controls; Construction traffic monitoring; and road network monitoring, remediation protocols and maintenance requirements
	  - Operation, with construction close-out meeting, infrastructure hand-back criteria
	  - Post operation
	- Stakeholder consultation will involve, but not be limited to: DTP, NVHR, Swan Hill Rural City Council, Gannawarra Shire Council, emergency service providers, local road users and land owners affected by road closures.
		All phases	Stakeholder Engagement Plan as part of Traffic Management Plan – part of EMP under Incorporated Document.

MM-TP02	Minimise adverse social and land use effects Prior to the commencement of construction (excluding preparatory works), a Traffic Management Plan (TMP) will be developed and implemented to minimise disruption so far as reasonably practicable ~~to the extent practicable~~ to affected local land uses, traffic, car parking, on-road public transport, pedestrian and bicycle movements and existing public facilities during all stages of the Project.	All phases	Traffic Management Plan – part of EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	The TMP will be developed in consultation with the relevant road management authorities and be informed and supported by an appropriate level of transport analysis. The TMP will address ~~include~~, as a minimum the recommendations of ~~those items recommended in Table 38 of~~ EES Technical Report E: Transport (AECOM, June 2023) and Technical Note TN06 29 April 2024 (D268), ~~including~~ and require ~~the~~ the movement of ore/product which would occur during daylight hours between 7.00am and 6.00pm. The TMP will be an overarching document to inform subsequent specific work site TMPs developed by works contractors. In addition, as previously discussed there may be a need for other specific TMPs (see MM-TP07).		
MM-TP03	Minimise adverse land use effects from transport infrastructure Conduct Road safety audits (RSA), at various stages of project development, indicatively suggested at: - All the access points onto minor and major roads. - Functional design stage (and/or concept stage). - Detailed design stage. The audits will include consideration of emergency vehicle access and if road surface upgrades are required.	All phases	Traffic Management Plan part of EMP under Incorporated Document
MM-TP04	Minimise adverse social effects from transport infrastructure TMP will be developed in consideration to VHM's emergency evacuation protocols and must not conflict with any other local emergency plans in place with local businesses and emergency services.	All phases	Traffic Management Plan part of EMP under Incorporated Document
MM-TP05	Site access strategy: A site access strategy will be developed and finalised in consultation with all stakeholders, notably near landowners and relevant road authorities to verify final site access strategy, including access points.	All phases	Traffic Management Plan part of EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
	The locations and arrangements of the site access point used to access the project areas and the water supply pipeline during construction and operations will be investigated further to ensure that safe entry and egress of construction vehicles including heavy vehicles. This includes road section upgrade and provision of appropriate design for all access points intersecting with the public road network. During the design process the speed of major access roads to site access points will be reviewed and verified. Once designs have been completed, they will be subjected to RSAs as highlighted in MM-TP03.		
MM-TP06	Heavy vehicle transport route assessments: High Productivity Freight Vehicles (HPFVS) and Over Size/Over Mass (OSOM) transport route assessments will be completed by a nominated transport contractor from the nominated bulk material locations along with all necessary mitigation measures and stakeholder approvals. Following this assessment final route options will be verified, and any impacts identified along with relevant stakeholders who may need to be contacted to facilitate the safe delivery of materials to the Project sites. Potential impacts include clearance to potential obstructions, such as wires, structures (bridges and culverts), trees, and rail crossing infrastructure for HPFVS and OSOM vehicles.	All phases	Traffic Management Plan part of EMP under Incorporated Document
MM-TP07	Sub-TMPs: Sub TMPs ~~would~~ will be completed by the relevant contractors, including for specific work activities (Worksite Traffic Management Plans). These ~~would~~ will all need to consider and reference back to the overarching project TMP (MM-TP02).	All phases	Traffic Management Plan part of EMP under Incorporated Document
Noise and Vibration: **Evaluation objective:** ***To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.***			

MMID	Mitigation measure	Project Phase	Implementation document
MM-NV01	Minimise risk of harm from noise emissions so far as reasonably practicable – mining equipment Select and use mining fleet and fixed plant: - Having regard to equipment noise emissions, including selecting the quietest available equipment where required to minimise risks of harm to human health and the environment so far as reasonably practicable, and, in all cases, to ensure noise emissions do not exceed the SWL used in the noise model, and - To minimise the risk of harm from tonal, impulsive, or intermittent noise character and high sound energy in the low frequency range so far as reasonably practicable. Undertake noise checks on mining equipment during commissioning and at regular intervals as part of the maintenance program to ensure it is consistent with the above.	All phases	Noise Management Plan within Work Plan Traffic Management Plan part of EMP under Incorporated Document
MM-NV02	Minimise risk of harm from noise emissions so far as reasonably practicable – Hours of Construction Limit~~ing~~ the hours of construction to normal working hours (Mon-Fri 7 am to 6 pm, Sat 7 am to 1 pm, consistent with EPA publication 1834) with the provision that some works justified to be low noise impact works (which are inherently quiet and unobtrusive, and will be consistent with EPA Publication 1834.1) may occur outside the normal working hours provided that the necessary approvals are sought from the relevant authority. These will be specified as part of a CEMP incorporating a Construction Noise and Vibration Management Plan (CNVMP), prepared in consultation with the relevant authority and key stakeholders. All works will be carried out as outlined in the CNVMP, which must include a list of the activities that may occur outside the normal working hours supported by verifiable evidence that these activities will not be audible at sensitive receivers, or otherwise have an impact on these receivers.	Construction	Noise Management Plan within Work Plan EMP under Incorporated Document
MM-NV03	Minimise noise emissions so far as reasonably practicable – work methods	All phases	Noise Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	All staff/contractors ~~to~~ will receive a site induction including details of the ways potentially impacting noise is generated, methods to minimise noise impacts both on-site and on public roads particularly for road trucks. Inspections and/or audits as part of the noise monitoring program will ensure adherence of these methods.		
MM-NV04	Minimise noise emissions so far as reasonably practicable – maintain roads Those roads VHM is responsible for maintenance: ensure in good condition to minimise noise from vehicle traffic over corrugations and potholes.	All phases	Traffic Management Plan part of EMP under Incorporated Document
MM-NV05	Minimise risk of harm from noise emissions so far as reasonably practicable – General Practice Employ best practice across all aspects to minimise noise emissions so far as reasonably practicable, including but not limited to: - turning off plant, equipment and vehicles when not in use for an extended period - fitting broadband reversing noise signals to all applicable mobile plant to avoid tonal noise emissions - ensuring all plant, equipment and vehicles are fitted with appropriate noise attenuation devices as per manufacturer specification (e.g. enclosures, baffles, silencers, mufflers etc.) to reduce sound levels and address features that increase the impacts of noise such as tonal, impulsive or intermittent noise character or high energy in the low frequency range, and all equipment is maintained in good repair - provision of suitable site access routes to allow for all third-party trucks to avoid reversing if control over their reversing alarms is limited - restricting the use of engine brakes to ensure it is used only when justified for safety reason (long downhill slopes)	All phases	Noise Management Plan within Work Plan
MM-NV06	Minimise risk of harm from noise emissions so far as reasonably practicable – Mine Planning	Operation	Noise Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	An independent and qualified environmental auditor must be appointed to review and verify all noise modelling, including: - that the predicted effective noise levels from the mining operations for all periods have been calculated in accordance with clause 70 of the Noise Protocol (EPA publication 1826.4), the Technical guide: Measuring and analysing industry noise and music noise (publication 1997), and is consistent with the algorithms in International Standard ISO9613-2 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. - That the effective noise levels are predicted to be below the noise limits determined in accordance with the Noise Protocol (publication 1826.4). A copy of the auditor's report must be provided to all nearby sensitive receptors within 14 days of the report being produced and not less than 30 days prior to operations commencing in the vicinity of the sensitive receptor(s). If modelling predicts that particular operations will exceed, or if monitoring establishes that particular operations do exceed, the noise limit determined in accordance with the *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (EPA Publication 1826.4) for a particular operating time period within the meaning of the *Environment Protection Regulations 2021*, those operations will not be undertaken during that operating time period. The placement and configuration of overburden stockpiles will be designed so as to provide additional noise screening to nearby receptors from noisier activities Noise bunds will be constructed as early as possible, taking into consideration mine pit sequencing and the onset of impact(s) to receptors. Before the bunds are constructed, noise works that impact on receivers that will be eventually protected by the bunds will be avoided (or their intensity reduced). Contingency measures, including but not limited to temporary relocation offers, should be taken, so far as reasonably practicable, to address potential impacts due to noise that would exceed the noise limits or otherwise be unreasonable.		

MMID	Mitigation measure	Project Phase	Implementation document
MM-NV07	Minimise risk of harm from noise emissions so far as reasonably practicable – Power Plant The Project ~~shall~~ will incorporate the highest levels of noise control to minimise emissions and noise character from the power station so far as reasonably practicable including (but not necessarily limited to), placing all gensets in acoustic enclosures and containing all gensets within a generator building, use of high performance exhaust mufflers and low noise cooling radiators Risk of low frequency noise impacts from the power plant will be controlled by the highest levels of noise control including (but not necessarily limited to), placing all gensets in acoustic enclosures within a generator building, use of high performance mufflers and low noise cooling radiators. Investigate transition to renewable energy when feasibly and practically available.	Operation	Noise Management Plan within Work Plan
MM-NV08	Minimise risk of harm from noise emissions so far as reasonably practicable – Pumpstation (Kangaroo Lake) Low frequency noise impacts from the Kangaroo Lake pumping station will be minimised by the generator performance and engineered acoustic enclosure specified during the detailed design stage.	Operation	EMP under Incorporated Document
MM-NV09	A Noise Management Plan (NMP) will be developed in consultation with EPA Victoria, Earth Resources Regulator, Gannawarra Shire Council and Swan Hill Rural City Council to formally document all of the monitoring, managerial and engineering measures to be proactively implemented to control noise within and from the site, and document the contingency measures that may be required. The NMP will be based on the updated and validated noise model based on the results of the proposed noise monitoring surveys and commissioning measurements. The NMP will include a requirement to minimise risks of harm to human health and the environment so far as reasonably practicable through the selection and use of processes and plants, and to ensure that in any case that the sound power levels used in the noise model are not exceeded. It will also include a requirement to	All phases	Noise Management Plan within Work Plan and EMP under the Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document

	investigate, and adopt wherever reasonably practicable, options for further noise reduction at source (such as specialist noise reduction kits) that can be implemented proactively, or as contingency measures.
	The NMP will provide a framework for updating the noise model during Project operation to assess noise emissions from the Project, the effectiveness of mitigation measures and the need for further controls, where required. This framework will include the identification of key milestones and triggers for update of the noise model, such as significant variations in activities (including, but not limited to changes in mining areas), investigations in response to complaints or availability of noise monitoring or measurement data.
	The NMP will ensure that the risk of harm from noise is minimised so far as reasonably practicable throughout all stages of the Project, including the detailing of inspection, maintenance and continual improvement of equipment, plant and their noise mitigation measures to prevent increased noise emissions due to defective operation, ageing, or other preventable deterioration, and to consider all opportunities to further reduce noise emissions and their impacts.
	In developing the NMP, consideration ~~shall~~ will be given to:
	- noise character, and to frequency spectrum as a prescribed factor, including specifically the potential risk of problematic low frequency noise; ~~and~~
	- land use category as described in table 3.3 of the Environment Reference Standards ascribed to the areas identified below; and
	- risks of harm to human health and the environment having regard to the character and level of noise modelled and/or monitored at:
	  - noise sensitive areas within the meaning of the *Environment Protection Regulations 2021;* and
	  - Koorangie Wildlife Reserve, Yassom Swamp Flora and Fauna Reserve, Bael Bael Grassland Nature Reserve, Tutchewop Wildlife Reserve, Talgitcha Bushland Reserve, Lalbert Recreation Reserve, Mystic Park Bushland		

MMID	Mitigation measure	Project Phase	Implementation document
	Reserve, and the reserves known as Forest Plantation East Road and Adj. Kangaroo Lake and Murray Valley Highway. If any non-conformance or unanticipated additional noise sources are identified, they will be evaluated and options for amelioration considered will be implemented to ensure the Project meets its obligations in relation to noise emissions. The NMP must address the requirements set out in the row titled 'Noise management plan' in Table 21-7.		
MM-NV10	Minimise noise emissions so far as reasonably practicable – Product transport Ore movement offsite by road trucks will not be scheduled at night. Ore movement in the evening period (as defined in regulation 116 of the EP Regulations) will be minimised, so far as reasonably practicable, and subject to justification that transport in this period has a net benefit in terms of risks to human health and the environment. The TMP will require trucks to meet High Productivity Freight Vehicle (HPFV) Performance Based Standards to minimise noise emissions, including but not limited to, road-friendly suspension, antilock braking systems on all axles and low impact tyres (pavement loading and contact area). The TMP will require a code of practice for truck driver behaviour to be developed and implemented to limit impacts from trucks passing residences with consideration to matters including but not limited to noisy accelerations/decelerations, engine brake noise and tailgate rattling. The TMP will also include actions to verify the code of practice is well-adhered to, and actions to promote conforming to the code. The TMP will be prepared in consultation with the operator of the intermodal terminal station to identify any practicable measures which may be included in the TMP for consistency with the intermodal terminal station operator's practices and procedures to minimise risks of harm from noise.	Operation	Noise Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
Air Quality:			
Evaluation objective: ***To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.***			
MM-AQ01	Minimise risk of harm from dust emissions so far as reasonably practicable – General practice All staff ~~to~~ will receive a site induction including details of the various ways dust can be generated, methods to minimise dust generation, requirement for speed restrictions across the site and on public unsealed roads particularly for road truck (e.g. below the posted speed limit when necessary) and their responsibility to minimise and report observed dust generation. An Air Quality Management Plan will be prepared ahead of Project construction. It must have regard to any additional measures proposed pursuant to MM -AQ08 and will include a Dust Environmental Management and Monitoring Plan (DEMMP). The DEMMP will capture all project activities with the potential to generate dust, controls, management practices and will detail a dust monitoring program, which at a minimum, will address the requirements set out in MP-AQ01 - MP-AQ07. The DEMMP will require that if inspections or monitoring results indicate that performance requirements are not being achieved, a report will be made to the appropriate regulator, in accordance with section 21.9.2 of this EMF. The DEMMP will be supported by evidence that it is actively being implemented across specific areas of the site. Observations and monitoring will be recorded to improve future performance, and outline any corrective actions that will be implemented to minimise the risk of harm from dust. The DEMMP will be prepared in accordance with: - EPA Publication 1961 Guideline for assessing and minimising air pollution in Victoria. - EPA Publication 1823.1 Mining and quarrying - guide to preventing harm to people and the environment	All phases	Air Quality Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	- EPA Victoria website How to control dust from your business		

MM-AQ02	Minimise risk of harm from dust emissions so far as reasonably practicable – Mine planning
	Employ best practice across all aspects of mining operations to minimise dust emissions so far as reasonably practicable, that will include as a minimum:
	- Consideration of weather conditions into weekly and daily mine plans
	- Utilising water spray and misting systems to suppress dust emissions in live active working areas
	- Water spray systems will be utilised where dust from mobile plant material movements and stockpiles cannot otherwise be practically contained
	- Excavator and loader operators will minimise the height from which material is dropped into trucks
	- Trucks carrying uncovered loads of dry material on internal roads, if cannot be avoided, to be loaded below 300 mm of the freeboard
	- Ensuring mobile fleet reduce speed as much as practical when and where necessary such that observed wheel generated dust is avoided or minimised so far as reasonably practicable and specifically during the following:
	  - during hot and dry conditions; and
	  - where/when excessive wheel generated dust is observed; and
	  - when mine haulage roads are within 500 m of a downwind sensitive receptor
	- Preparing and maintaining level and well finished haul road surfaces to minimise dust emission from rolling wheeled vehicles
	- Constructing the surface of internal haul roads with soil with a silt content of less than 10 per cent unless otherwise approved by ERR
		Construction
		Operation
			Air Quality Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	- Regular grading and gravelling of heavy traffic areas such as intersections as required with regular resurfacing of high traffic areas such as intersections to reduce silt build up - Attentive monitoring and application of suppressants as surface dries out to avoid and minimise emissions so far as reasonably practicable - Progressive consolidation of and/or re-vegetation of exposed areas - Compaction of stockpile batters (where viability of top-soils for rehabilitation is not impacted) will reduce the amount of loose material that can be eroded by wind - Sustainable mulches or emulsions and polymers applied to stockpile surface on a periodic (nominally yearly) basis to reduce wind erosion		
MM-AQ03	Minimise risk of harm from dust emissions so far as reasonably practicable – Process plant - All trafficable areas within the process plant footprint will be sealed and would be kept clean through sweeping - Product stockpiles ~~to~~ will be located within roofed and three-sided shelters to minimise wind erosion, with their doors positioned away from the prevailing wind and door (the fourth side) must be closed unless vehicles, plant or workers are moving in or out of the shelters.	Operation	Air Quality Management Plan within Work Plan
MM-AQ04	Minimise risk of harm from dust emissions so far as reasonably practicable – Public roads Road trucks travelling to and from the Project site on unsealed public roads will travel at reduced speeds such that observed wheel generated dust is avoided or minimised so far as reasonably practicable. Training of employees and contractors will be undertaken to ensure that drivers are advised to reduce speeds when dusty conditions are observed.	All phases	Traffic Management Plan part of EMP under Incorporated Document
MM-AQ05	Minimise risk of harm from air emissions so far as reasonably practicable – General Practice	All phases	Air Quality Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	Employ best practice across all aspects to minimise air emissions so far as reasonably practicable, such as: - turning off plant, equipment and vehicles when not in use for an extended period - all equipment/vehicles to be operated and maintained to manufacturer's specifications in order to minimise exhaust emissions - Requirement under VHM policies to use low emission or solar powered equipment as much as possible to reduce air emissions		
MM-AQ06	Minimise risk of harm from air emissions so far as reasonably practicable - Equipment and Plant Exhaust Emissions: Select diesel generators employing emission reduction technology such as selective catalytic reduction (SCR; e.g. AdBlue) or use LNG/LPG. Use low emission or solar powered equipment so far as reasonably practicable to reduce risk of harm from air emissions. Investigate transition to renewable energy when feasibly and practically available.	Operation	Air Quality Management Plan within Work Plan
MM-AQ07	A sampling program of rainwater tanks will be offered to all residents of dwellings within 1km of the MIN boundary. At a minimum, testing is to be offered once prior to the commencement of construction of the Project to establish a baseline, and where a baseline is established, bi-annually during the first year of operations and thereafter annually with the potential to decrease frequency if no exceedances of the Australian Drinking Water Guidelines (ADWG) are reported. The sampling will test for the chemicals and metals listed at Table 69 of Technical Report G and will include speciation testing for Chromium III and Chromium VI. VHM will offer to install first-flush downpipe diverters at all rainwater tanks within 1km of the Mining Licence Area boundary. If testing indicates that it is appropriate, VHM will offer for tanks to be cleaned and, where not already installed, offer to pay for the installation of first-flush downpipe diverters as recommended by the Department of Health. If the ADWG are exceeded, the testing area will be extended by one kilometre.	All phases	Air Quality Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	The data collected during sampling will be recorded and, if any exceedances of the ADWG are identified, they will be evaluated and options to minimise the risk of harm so far as reasonably practicable will be implemented.		
MM-AQ08	The Air Quality Impact Assessment (EES Technical report G) must be updated to include air emissions for activities downstream of the processing plant. Mitigation measures must be developed and implemented through the Air Quality Management Plan (required by AQ01) consistent with the updated assessment. The mitigation measures must include, but not be limited to: - Use of a scrubber to prevent air emission of particulates from the kiln; - Dust extraction baghouses to prevent any particulate emissions from the drying of product in the gas fired kiln; - Sealed, bottom silo loadout of kiln dried product into covered trailers for transport off-site; and - No open air stockpiling of kiln dried product.	Pre-construction	Air Quality Management Plan within Work Plan
Surface Water (including Mine Site Surface Water): **Evaluation objective:** ***To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Kerang Wetlands Ramsar site) over the short and long-term.***			
MM-SW01	Development of a Surface Water Management Plan (SWMP) for construction, operation and closure activities. The SWMP will be updated during the life of the Project to reflect changes to site layout and risk profile and in response to statutory requirements, monitoring results, community complaints and audit findings. The SWMP must outline a framework to avoid and minimise impacts of the Project on surface waters so far as reasonably practicable. Any SWMP will include as a minimum the following:	All phases	Surface Water Management Plan within Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document

	- Mechanisms which ensure segregation of Process Plant run-off from the rest of mine operations, with any run-off from Process Plant area directed to Process Water Pond (PWP).
	- Specification of chemical treatments, if any, which are to be utilised in the surface water management process.
	- Spill containment and treatment measures, such as:
	  - Minimising chemical and fuel storage on-site where possible and storing hazardous materials and dangerous goods in accordance with AS1940 Storage of flammable and combustible liquids and EPA Publication 1698 Liquid storage and handling guidelines.
	  - Avoiding the storage of liquid material within 50 m of waterways.
	  - The design of first flush systems or gross pollutant traps.
	  - Requirement for a level control and alarm to be installed at the process water pond.
	  - Response procedures in the event of a spill, including the availability of spill kits.
	  - Spill management/responses that are part of a site wide Trigger Action Response Plan (TARP).
	- Frequency of internal mine site water quality monitoring that will be conducted. The frequency must be developed having regard to the need to verify the effectiveness of the avoidance and mitigation measures, including but not limited to surface water chemistry and water storage levels
	- Contingency measures and corrective actions that will be implemented if water quality objectives are not met (or if water management infrastructure fail), and a process for notifying EPA in these circumstances (refer to Section 21.9 of this EMF)
	- Erosion and sediment controls, including in regard to geotechnical stability
	- Overland Flow and Run-Off Monitoring and Management Plans		

MMID	Mitigation measure	Project Phase	Implementation document
	- A requirement for a Trigger Action Response Plan to manage water storage levels in the PWP - A program to investigate and implement ways to improve the environmental performance of the Project over time and including specific requirements to align with any relevant soil and land mitigation and monitoring measures. The construction environmental management plan (CEMP) will be developed in accordance with EPA Victoria Publication 1834 – *Civil construction, building and demolition guide*. The sediment, erosion and water quality management plan would address the requirements of the Environment Reference Standard and EPA Victoria Publication 275: Construction Techniques for Sediment Pollution Control. Erosion and Sediment Control Plans (ESCP) will be developed for works and structures that are in accordance with International Erosion Control Association (IECA) best practice guidelines and comply with local and state requirements. The environmental management plan (EMP) will be developed to address the requirements of the Environment Reference Standard and will include an adequate monitoring program to ensure vegetation coverage is established as quickly as possible and is maintained. A survey of the mine site will be undertaken prior to construction works commencing, which will identify key topographical features to ensure that any decommissioned channels do not become a conduit for runoff or contamination from the site. The surface water modelling will be routinely updated and reviewed over the life of the Project and prior to entering into each new mining block. Any future investigations which may lead to the optimisation of the Project activities and further mitigate impacts or risks of harm will be integrated into the modelling and management plan updates.		
MM-SW02	Final design of mine site water storages and drainage infrastructure to ensure they can accommodate nominated storm events and will maintain at least 0.5 m	Construction Operation	Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	freeboard at all times. This includes mitigation of overtopping/losses risk from following: - Wave action - Incident rainfall - Seepage (liner specification) - Unforeseen events The on-site process water pond (PWP) will be lined with a low permeability high density polyethylene (HDPE) liner, or with other comparable materials, in accordance with EPA Publication 1588.1 (Section 6.1.1). Internal drainage infrastructure will be designed with capacity to prevent overflow. Bunds of sufficient height will be designed to prevent surface water intrusion from disturbed catchments.		
MM-SW03	Revegetate disturbed areas as quickly as practicable on completion of construction and/or mining as part of progressive rehabilitation to minimise erosion and impacts to surface water quality and restoration of surface water flows to pre-development levels.	All phases	Surface Water Management Plan within Work Plan EMP under Incorporated Document
MM-SW04	Implement appropriate spill control and bunding measures to control and contain spills. All hydrocarbons and hazardous substances are to be stored in facilities designed in accordance with EPA Victoria Publication 1698 – Liquid storage and handling guidelines and AS 1940:2004 – The storage and handling of flammable and combustible liquids. Design the pump station and associated works area so that stormwater runoff and/or spills from surfaces are not discharged directly into Kangaroo Lake or the No. 47 channel.	All phases	Surface Water Management Plan within Work Plan EMP under Incorporated Document

MMID	Mitigation measure	Project Phase	Implementation document
MM-SW05	Include appropriately sized culverts on drainage lines crossed by access roads with the capacity to accommodate surface water run-off, as stipulated in works on waterways permits.	Construction	EMP under Incorporated Document
MM-SW06	Ensure that any surface water diversions, that are implemented, discharge into the natural downstream discharge point or the same discharge point as prior to works commencement. Online monitoring systems will be implemented to monitor any potential changes/risks to water quality and flow impacts. If any impacts are detected, corrective actions and contingency measures will be taken to minimise the risk of harm so far as reasonably practicable consistent with the Surface Water Management Plan (MM-SW01).	Construction	Surface Water Management Plan within Work Plan EMP under Incorporated Document
MM-SW07	Ensure any Project installed infrastructure within the 1% AEP flood extent (e.g Pipeline) is to be designed to withstand potential flooding and would be subject to compliance with the specific requirements of the North Central and Mallee CMAs' floodplain works approval process.	Construction	Surface Water Management Plan within Work Plan EMP under Incorporated Document
MM-SW08	At all times during operations, the mine void will be designed and constructed to ensure capacity to capture run-off generated from active areas in rainfall events up to the 1% AEP 72-hour design storm event (including allowance for climate change) and at least 0.5 m freeboard.	All phases	Work Plan
Groundwater: **Evaluation objective:** ***To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Kerang Wetlands Ramsar site) over the short and long-term.***			
MM-GW01	Tailings water recovery will be ~~optimised~~ maximised so far as reasonably practicable to minimise risk of harm from seepage to underlying Loxton Parilla Sand (LPS) aquifer and documented in the Tailings Management Plan. The ~~t~~Tailings Management Plan will link to Groundwater Management Plan (MM-GW04), and as a minimum specify the following:	All Phases	Groundwater Management Plan within Work Plan Tailings Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	- Initial Spigot design - Initial Flocculant application rates - Embankment under drain design - Trigger Action Response Plan (TARP) - Ongoing sampling and analysis of recovered tailings water and process water pond (PWP) water. Sampling of recovered water will be undertaken to verify baseline laboratory testing and demonstrate risks posed by seepage water quality remain minimised during tailings deposition. A thickener and a flocculant dosing system will be used in the primary stage of dewatering to allow the fines to be thickened. Fines will report to the thickener underflow and will be combined (homogenised) with sand tailings and pumped back to the mine void. Clean water overflow from the thickener will be transferred to a process water pond (PWP). The use of flocculants will be optimised to ensure maximum clean water recovery whilst minimising the amount used, so far as reasonably practicable. The flocculants will be used in the process at very low concentrations in line with ~~standard~~ best practice within the mineral sands industry. Secondary dewatering will occur at the mine void tails discharge outlet. This will involve adding further polymer flocculant to the slurry exiting the pipe head. The clean water will separate from the tailings beach and will report to a decant sump. The recovered water will be recycled to the process water pond (PWP). This process will be periodically reviewed and enhanced to maximise water recovery, so far as reasonably practicable. Tailings water quality must be periodically reviewed throughout the life of the project. Review of the tailings water quality must occur when adverse or unexpected tailings monitoring results are encountered and by other triggers to be developed as part of the Tailings Management Plan. Tests conducted as part of the review of tailings water quality and tailings leachate quality must be conducted using Kangaroo Lake water and must include:		

MMID	Mitigation measure	Project Phase	Implementation document
	- Assessment of the chemical stability and inertness of tailings; - Assessment of the hydrochemical properties of the seepage from the tailings waste; - Assessment of the hydrochemical properties of rainfall infiltration through the tailings waste; Outcomes of any reviews must inform mitigation and management measures to be implemented as part of the Tailings Management Plan. Review of the Tailings Management Plan must be undertaken periodically, or triggered by monitoring results, development of new technologies or by other relevant triggers, to ensure best practice is implemented and risks to human harm and the environment from tailings pollution and waste are minimised so far as reasonably practicable.		
MM-GW02	Obtain the necessary permits and licences that relate to groundwater activities prior to commencement of operations. As a minimum this will include: - Take and Use Licence from GWM Water - Groundwater will be extracted from the mounded LPS aquifer in accordance with the conditions, timings, and limits detailed in a licence issued by GWM Water. - A18 Permit from EPA – Tailings will be deposited in-pit in accordance with the conditions, timing and limits detailed in an A18 permit issued by EPA.	Operation	Groundwater Extraction Licence from GWM Water and A18 Permit from EPA
MM-GW03	Risks to groundwater will be minimised so far as reasonably practicable with specification as minimum of the following: - Hazardous waste (as defined by EPA) will be removed from site as soon as practicable by a licensed contractor for treatment or disposal in an approved facility in accordance with licence and regulatory requirements to minimise risk to groundwater - Any hazardous materials, such as laboratory chemicals, will be stored in designated areas in accordance with their safety data sheets.	All phases	Risk Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	- Spills of fuels or chemicals would be managed in accordance with Part 3.4 of the EP Act 2017 and requirements set out in the Spill Management Plan (CP-SW01). This may include restoration of the affected area (soil and groundwater) to its pre-spill state so far as reasonably practicable		
MM-GW04	A Groundwater Management Plan (GMP) will be prepared to manage and further mitigate potential risks (if required) to groundwater and establish a framework for the management and monitoring of groundwater. The GMP must be informed by all groundwater mitigation measures (MM GW01-GW06 inclusive) and relevant groundwater monitoring and contingency measures at Table 21-7. The GMP ~~will include~~ must be informed by the outcomes of the Baseline Groundwater Monitoring (MP-GW01 Table 21-7) and the requirements of any A18 permit issued by EPA for the Project. The GMP must be revised based on the results of groundwater monitoring where appropriate ~~against which construction, operation and closure will be assessed~~. The GMP ~~would~~ must capture ~~high~~ risk to groundwater ~~activities~~, present relevant controls and management measures, detail contaminants of concern (indicators), and flocculants and their degradation products the objectives for the appropriate assessment of groundwater, and would detail the groundwater monitoring to be undertaken throughout the life of the Project and ~~would~~ provide trigger levels and contingency actions in the event of trigger exceedances. Trigger levels and contingency actions will be developed based on the Environmental Reference Standard and ~~Australian Drinking Water Guidelines, as well as any~~ other relevant guidelines. Trigger levels must include staged levels (highlighting a trajectory to harm occurring) or temporal triggers (such as where a change is occurring quicker than expected). The exact scope of the contingency action will depend on the nature and extent of any unacceptable impact or risk if it was to occur. However, as a minimum, the type of contingencies must include:	All phases	Groundwater Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	- Actions to intercept, extract or contain impacted groundwater, and/or modify tailings management, triggered where monitoring suggests the environment is, or may be detrimentally impacted by changes in groundwater quality; - Actions triggered where monitoring suggests a groundwater user is detrimentally impacted by changes in groundwater quality from tailings leachate seepage ~~to be considered will be targeted interception and/or pumping of groundwater via a network of bores to stop and draw back groundwater where the quality or elevation has been assessed through the development of a trigger to pose an unacceptable risk in either the short or long term. In addition, a contingency measure will be included in the GMP so that if it is found that~~ If a user of groundwater is detrimentally impacted by the change in groundwater quality from tailings leachate seepage, then a comparable alternative source of water will be offered by the Project to the groundwater user. The GMP will be developed in consultation with relevant stakeholders and must be subject to approval by the relevant Authority. The GMP will include the requirement to conduct ongoing groundwater monitoring (MP-GW02 Table 21-7) and completion of an updated groundwater model (MP-GW02 Table 21-7). Once operations commence, data from groundwater monitoring will be reviewed on a quarterly basis and, where those data indicate a requirement to update modelling, modelling will be updated. Any future investigations or groundwater data which may lead to the optimisation of the Project activities and further mitigate impacts or risks of harm will be integrated into modelling and management plan updates.		
MM-GW04A	~~The application for a permit under the Environment Protection Act 2017 to discharge or deposit waste to an aquifer will include groundwater~~ Groundwater modelling must be prepared in accordance with the Australian Groundwater Modelling Guidelines (Barnett et al 2012) and consistent with the Groundwater Impact Assessment and must be ~~that is~~ updated to:	Pre-construction	A18 permit application

MMID	Mitigation measure	Project Phase	Implementation document
	- incorporate the results of pumping tests; - inform the suitability of tailings and groundwater management plans; - refine predictions on potential extent of groundwater quality and levels changes during and post operations; - review (and ~~potentially~~ update) the groundwater monitoring regime if modelling indicates risks of harm beyond the predicted modelled extent; and - ~~estimate~~ establish the nature and extent of natural attenuation process and provide prediction on groundwater quality changes during and post operations. - Data from groundwater monitoring undertaken as part of the groundwater monitoring program (MP-GW02) will be reviewed on a quarterly basis and, where those data indicate a requirement to update modelling, modelling will be updated. Any future investigations or groundwater data which may lead to the optimisation of the Project activities and further mitigate impacts or risks of harm will be integrated into modelling and groundwater management plan updates.		
MM-GW05	Throughout the life of the Project, the proponent will re-assess the risks of harm to human health and the environment in the context of groundwater impacts. The risk assessment must be updated prior to preparing the GMP and when new information attained through groundwater monitoring data or updated modelling information suggests the risks of harm to human health and the environment may have changed. ~~Prior to preparing the GMP, the proponent will re-assess the groundwater risk assessment undertaken in March 2024. The re-assessment must:~~ ~~- Demonstrate a conservative approach which accounts for the uncertainties and assumptions with regards to the likelihood and consequence classifications of the risk assessment;~~ ~~- Outline controls to be implemented in order to eliminate or minimise the risks of harm so far as reasonably practicable; and~~ ~~- Evaluate:~~ ~~- The likelihood and consequence of risks of harm to future users; and~~	Pre-construction	Condition of the mining licence

MMID	Mitigation measure	Project Phase	Implementation document
	- ~~The likelihood and consequence of risks of harm to groundwater as a receptor.~~		
Soils and land resource **Evaluation objective:** ***Effects on land stability, erosion and soil productivity associated with the construction and operation of the project, including progressive rehabilitation works.***			

MM-SLR01	Minimise effects on native soils – Mine Site
	A Soil Management Plan will be prepared, with input from an agronomist with experience in mallee soils, and will include~~ing~~ the following management and mitigation strategies:
	- Prior to stripping disturbance areas:
	  - Investigate soil conditions through a combination of soil sampling at a suitable scale, EM38 and NDVI images to identify the variation and distribution of soil types and characteristics of topsoil and subsoil to be stripped
	  - Soil samples should be analysed for analytes provided in Table 1 of Expert Witness Statement of James Branston Shovelton, 7 March 2024 (D26).
	  - Soil samples from zones currently exhibiting no obvious restrictions to rooting depth of 1 metre to be sampled to 2 metres at 20 centimetre intervals. Such samples should be analysed for salinity and boron as a minimum.
	  - Establish the number and depths of topsoil and subsoil stripping horizons based on the soil condition investigations and the outcome of any soil reinstatement trials carried out under the Rehabilitation Plan (**MM-RH01**)
	  - Informed by further soil analysis, the soil surface would have an indicative 5 to 10 tonnes per hectare of natural gypsum applied
	- Soil ~~would~~ will be stripped in a slightly moist to moist condition wherever possible. This occurs when soil is pliable while hand texturing (15-30% soil moisture).
		Construction
		Operation
		Closure
			Risk Management Plan within Work Plan
			and
			Rehabilitation Plan under Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	Material would not be stripped in either excessively dry, powdery or very friable conditions (i.e . <15% moisture, or >30% moisture). - Prior to placement of overburden on an overburden stockpile location, strip topsoil and subsoil to the depths established based on the soil conditions investigations. - Prior to placement of subsoils on a subsoil stockpile location, strip the subsoil to the depth established based on the soil conditions investigations. - Preference given to using equipment which can scrape, grade or push soil into windrows. - Topsoil and subsoil stockpiles ~~would~~ will be stored separately and clearly signposted, including with segregation of subsoil in accordance with identified soil zones where necessary. The location of stockpiles ~~would~~ will be recorded using GPS, along with data relating to the soil type and volume. An inventory of available soil ~~would~~ will be maintained and updated regularly to ensure adequate topsoil and subsoil materials are available for planned activities - Maximum stockpile heights of two metres (top soil and subsoil) and 35 metres (overburden) will be maintained, other than where the characteristics of subsoil will not be affected by greater maximum stockpile heights. - The surface of soil stockpiles ~~would~~ will be left in as coarsely structured condition as possible, to promote rainfall infiltration and minimise erosion, prior to cover vegetation becoming established. - Stockpile storage time ~~would~~ will be minimised, where possible. If long-term stockpiling is planned (greater than three months), such as those stockpiles which will be formed during the initial pit and infrastructure development, stockpiles would be bunded and either seeded with an annual cover crop species or hydro mulched, as appropriate. - Where possible, freshly stripped subsoil and topsoil ~~would~~ will be re-spread directly onto rehabilitation areas and to depths according to target requirements. Topsoil ~~would~~ will be spread, treated with fertiliser and seeded in one consecutive operation.		

MMID	Mitigation measure	Project Phase	Implementation document
	- Stockpiles ~~would~~ will not be disturbed until required for rehabilitation, weed management, erosion control or for seeding and fertilising purposes. - The surface of all stockpiles ~~would~~ will be treated with ameliorants such as gypsum and a complete fertiliser (such as Granulock 15, Granulock Z or equivalent) to create the most suitable growth medium for chosen rehabilitation crop species. - Appropriate erosion and sediment control measures ~~would~~ will also be applied, as per a site-specific Erosion & Sediment Control Plan required in accordance with MM-SW01, particularly when the timing of stockpiling is not conducive to cover crop germination. - Include gypsum requirement test and gypsum purity testing. Gypsum requirements to consider sensitivities of a range of crops including lentils. Gypsum application method to consider need for gypsum in the subsoils. Indicative gypsum rates of 10 tonnes per hectare are recommended where exchangeable sodium percentage (ESP) is greater than 14 (i.e. strongly sodic). The gypsum sourced would have a minimum 19% calcium and 15% sulfur. - All employees and contractors engaged in stripping, stockpiling (including management of stockpiles) and reinstatement of soils will receive training, induction and toolbox talks.		
MM-SLR02	Minimise effects on native soils – Pipeline Prior to trenching ~~of vegetated land~~, investigate soil conditions to identify the variation and distribution of soil types, and establish the stripping depth based on the outcome of those investigations. Topsoil will be stripped to a depth determined on the basis of the soil conditions investigations prior to any trenching activities. The trench would be progressively backfilled to minimise the duration of time that the more dispersive subsoil is exposed to rainfall. The subsoil would be backfilled first, followed by topsoil and ameliorant application (including gypsum application to the surface of in-filled material).	Construction	EMP under Incorporated document

MMID	Mitigation measure	Project Phase	Implementation document
MM-SLR03	Minimise effects on land resource Mine pit faces ~~would~~ will be as steep as recommended in the geotechnical assessment (a maximum of 32 degrees for pits up to 42 m deep and 31 degrees for pits up to 47 m deep), in order to minimise the surface area of exposed subsoil layers during the mining process. Progressive rehabilitation ~~would~~ will be undertaken as the mine advances to minimise the duration of time that subsoils are exposed to potential rainfall events.	Construction Operation	Risk Management Plan within Work Plan and Rehabilitation Plan under Work Plan
MM-SLR04	Minimise effects on native soils During closure, if rehabilitation is delayed, the exposed subsoil will be treated with gypsum and appropriate erosion and sediment control measures would be applied in accordance with MM-SW01.	Operation Closure	Risk Management Plan and Rehabilitation Plan within Work Plan
MM-SLR05	Minimise effects on native soils Weed control will be undertaken in areas yet to be mined in order to prevent seed set prior to topsoil stripping. During stockpiling, weeds will be monitored continually and controlled as required to ensure that they do not reach the seeding phase and spread and stockpiles will be seeded with cover crop to provide competition for weed species.	Operation	Risk Management Plan within Work Plan
MM-SLR06	Spills and Leaks Spills and leaks ~~would~~ will be managed in accordance with MM-SW01 and MM-GW03.	All phases	Risk Management Plan within Work Plan
Agriculture **Evaluation objective:** ***To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure***			
MM-AG01	Minimise potential adverse land rehabilitation effects Reinstate ~~of a~~ the soil profile based on the number and depth of stripping layers established under SLR01, and test replaced topsoils and subsoils to establish that the	Closure	Rehabilitation Plan under Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	soil characteristics are comparable to pre-mining conditions and, if not, apply appropriate ameliorants or fertilizers. Topsoil and subsoil will be ameliorated as required during stripping and stockpiling activities to ensure pre-disturbance agricultural productivity is attained or improved. Wherever possible topsoil and subsoil will be respread directly onto active rehabilitation areas rather than stockpiling to minimise handling and possible structure decline. Reinstated topsoils ~~are to~~ will be assessed for water repellency and treated if present, prior to sowing. Reinstate soils at a time enabling immediate sowing where practicable and, where not practicable, apply measures for moisture retention and erosion protection such as hydraulic soil binders. In the first year after reinstatement of the soil profile, areas ~~should~~ will be sown to a legume cereal mix, such as vetch and oats, or other crops as appropriate if seasonal conditions are unsuitable to a legume cereal mix. Undertake grain yield mapping where practicable from adjacent non-mined paddocks and paddocks to be mined in the future to establish whether comparable yields are being obtained from rehabilitated mine areas. Set yield targets for rehabilitated land having regard to any yield mapping and in consultation with stakeholders including landholders and local agronomists.		Community Engagement Plan (CEP) under Work Plan
MM-AG02	Minimise potential adverse land use effects Adjacent landholders will be consulted prior to, and during the development of each mining stage as to the requirement for alternative entry points and additional fencing, gates or grids. Development of a Traffic Management Plan (MM-TP02) ~~to~~ will: - avoid or, where avoidance is not possible, limit the duration of temporary road closures associated with construction of the Project or upgrade or maintenance of roads during harvest periods;	All phases	Community Engagement Plan (CEP) under Work Plan EMP under Incorporated document

MMID	Mitigation measure	Project Phase	Implementation document
	- require advance notice to and consultation with owners of land adjacent to roads in respect of proposed temporary road closures; - allow adjacent landowners continued access during temporary road closures and diversion.		
MM-AG03	Minimise potential adverse biosecurity effects Weed control will be continued on areas which are not under current agricultural production. Disturbance areas, soil stockpiles and rehabilitation areas will be monitored for weed growth, with control measures undertaken as necessary. Weeds will be monitored continually and controlled as required to ensure that they do not reach the seeding phase and spread and stockpiles will be seeded with cover crop to provide competition for weed species. ~~Control of weeds must be undertaken biannually (both summer and winter weed species control) on stockpiles during autumn/winter and spring/summer.~~ Herbicide resistant species will be identified at each site and herbicide control options will be developed based on resistant species present. Herbicide resistant species will be controlled during stockpiling to prevent issues following reinstatement. Any import of equipment or machinery from interstate or overseas will follow the standard procurement safeguards and quarantine procedures as per Victorian and Australian requirements from the Biosecurity Act 2015.	All phases	Risk Management Plan within Work Plan
Radiation **Evaluation objective:** ***To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.***			
R-ENG01	Project to be operated in accordance with a management licence addressing radiation safety in accordance with the provisions of the Radiation Regulations, including likely conditions such as compliance with the Radiation Protection Series No. 9 and preparation of a radiation sub-plan for all operations. The plan would	All phases	Radiation Management Plan

MMID	Mitigation measure	Project Phase	Implementation document
	account for any special conditions or exemptions from specific provisions of the Radiation Regulations that might apply to the project.		
R-ENG02	Minimise radiation effects: Engineering design - A wheel wash and vehicle washdown bay ~~would~~ will be established to minimise the spread of potential contamination around the site and off the site - The processing facility will be constructed with spillage containment. This includes all tanks having concrete bunds, as secondary containment, to store at least the volume of the tank [Vic EPA 2018]. - Provision for hose down facilities and sumps, access ways and sufficient room for bobcats for clean up under conveyors - Tailings pipelines will be fitted with a leak detection system that will turn off pumps if a pipe failure is detected– with a schedule of preventative maintenance and inspection to be established for pipelines carrying radioactive process materials - Dust minimisation and suppression system within process plant - with a schedule of preventative maintenance and inspection to be established for areas with radioactive process materials	Construction Operation	Risk Management Plan within Work Plan and Radiation Management Plan
R-ENG03	Minimise radiation effects: Product packing All product packing will occur within building, including the use of a packing booth for REMC. Packaging must be fully sealed and selected to ensure there will be no leaks. Shipping containers must be sealed and must not leak.	Operation	Radiation Management Plan
R-ADM01	Minimise risk of harm from radiation effects so far as reasonably practicable: Administrative Safe operating procedures outlined in RMP to ensure the safe and environmentally responsible operation of the Project	Construction Operation	Radiation Management Plan

MMID	Mitigation measure	Project Phase	Implementation document
	RMP ~~to~~ will specify that all employees and contractors ~~would~~ will receive training in the radiological aspects of the Project and be provided instruction on prevention of contamination release from the Project. A qualified and experienced Radiation Safety Officer will be available to undertake radiation monitoring, advise management on measures to reduce radiation, exposures and regulatory reporting. Site access controls will be implemented to ensure that: - unauthorised access is restricted - intentional or inadvertent removal of radioactive material from the operation is prevented		
R-ADM02	Minimise risk of harm from radiation effects so far as reasonably practicable: Rehabilitation Radiological input to the Rehabilitation/Closure Plan will occur, based on approved radiological closure criteria of return to pre-operational radiological conditions, with monitoring to confirm compliance.	Closure	Radiation Environment Management Plan and Rehabilitation Plan under Work Plan
R-ADM03	Reassessment of radiation impact assessment Additional baseline sampling must be undertaken to account for the natural variability in the soils. Sampling of local crops, local livestock and indigenous foods is to be considered. The radiation impact assessment may be revised at any time and must be revised if: - subsequent data, including but not limited to data informing the Tailings Management Plan, indicates the in-pit tailings will not be homogenous, will not be chemically stable and will release any metals or that the radionuclides in tailings are soluble; - the dust emissions are greater than those modelled in the Air Quality Impact Assessment prepared for the Environment Effects Statement (refer to Table 21-7); - engineering controls are unable to fully contain radioactive materials; or	All phases	Radiation Environment Management Plan

MMID	Mitigation measure	Project Phase	Implementation document
	- there is significant variation from the data used to inform the Radiation Impact Assessment prepared for the Environment Effects Statement (refer to Table 21-7).		
Social and land use			
Evaluation objective*: To minimise potential adverse social and land use effects, including on agriculture and transport infrastructure*			
MM-SC01	Workforce Accommodation Strategy: A draft strategy has been developed and will be updated in consultation with relevant stakeholders, including local Gannawarra Shire Council and Swan Hill Rural City Council, prior to commencement of construction. Once finalised, the proponent will implement the strategy. As part of the update of the draft strategy, it will be amended to include measures to manage the influx of permanent employees during construction and operations, including: - A commitment to agree with local authorities on a maximum influx of permanent workers who would be able to seek to accommodate in the local housing market (rental and/or for purchase) in Years 1 to 3, by location, with any residual housing demands being met through the use of the short stay accommodation developed and enhanced as part of the Workforce Accommodation Strategy. - A process for reporting to the Gannawarra Shire Council and Swan Hill Rural City Council over a minimum 5-year period the number of workers who are recruited from outside the region and the accommodation solution utilised in each case.	All phases	Workforce Accommodation Strategy to be prepared and implemented as a condition of the mining licence
MM-SC02	Neighbour Agreement. Owners of existing dwellings within 3.5 kilometres of the proposed mining licence boundary (MIN) will be given the option to enter into a Neighbour Agreement with VHM for the duration of the Project. The agreement is offered in recognition that the rural amenity within this area will be altered by the Project, and that this may affect residential satisfaction among those affected. The agreement will provide a sliding scale annual payment that becomes payable once construction works commence at the mine site and will then be paid annually during the life of the mining operation.	All phases	Individual Agreements with landowners The requirement to offer the Neighbour Agreement for the duration of the Project will be reflected in the Community Engagement

MMID	Mitigation measure	Project Phase	Implementation document
	The payment will be based on the distance of the existing dwelling from the MIN according to the following zones: - $25,000 if the dwelling is within 1km of the MIN; - $10,000 if the dwelling is between 1km to 2km of the MIN; and - $5,000 if the dwelling is between 2km to 3.5km of the MIN. The location of each zone and the associated financial offer will be publicly available and thus disclosed to all participants, to ensure transparency. If an owner of a dwelling chooses to sign a neighbour agreement, this will not preclude them from ~~making a submission at the EES hearing or~~ making a claim for compensation for any unacceptable impact that occurs as a result of the Project (including any claim under Part 8 of the MRSD Act). Dwelling owners within the designated zones will be able to sign on to the neighbour agreement at any time during the life of the Project.		Plan within the Work Plan, noting that the Neighbour Agreement will not apply retrospectively.
MM-SC03	Code of Conduct The proponent will develop and implement a code of conduct for its workforce. Training of employees and contractors will be undertaken to ensure they are aware of their obligations under the code of conduct (as amended or replaced from time to time).	All phases	Code of Conduct VHM suggests that compliance with MM-SC03 be required as a condition of the mining licence
MM-SC04	Employment Policy The proponent will develop and implement a policy to encourage the employment of local workers while minimising the potential effects of this on other businesses. who live within commuting range of the Project.	All phases	Employment Policy VHM suggests that compliance with MM-SC04 be required as a condition of the mining licence
MM-SC05	Farmer wellbeing The proponent will provide information to the community in relation to existing resources relevant to managing mental health and wellbeing. Further the proponent	All phases	Project website

MMID	Mitigation measure	Project Phase	Implementation document
	will engage with the National Centre for Farmer Health to provide the community with additional resources/tools to manage stress and anxiety.		
MM-LU01	Bushfire Management Plan A Bushfire Management Plan will be prepared to ensure that construction outside of the mining licence area is undertaken and any infrastructure maintained in consultation with the relevant authorities such as the Country Fire Authority and relevant asset owners.	All phases	EMP under Incorporated document
Geotechnical stability **Evaluation objective: *Manage landform and slope stability***			
MM-GS01	Mining activities will be operated in accordance with a Ground Control Management Plan (GCMP) that covers construction, operation and closure activities within the proposed MIN. The CGMP will be updated during the life of the Project to reflect changes to site layout and risk profile, and cover as a minimum the following: - pit slopes - stockpiles - in-pit tailings embankments. The CGMP will: - incorporate comprehensive geotechnical design methodology and review using conservative elastic parameters and incorporate sensitivity assessments - implement the pit and stockpile buffer zones from sensitive receptors set out in the EES Project description - require mine operation planning to be integrated with ground and surface water monitoring to ensure mine pit floor is above groundwater table and surface flows are directed to minimise interaction with exposed slopes to avoid water altering material properties. The GCMP will be an overarching document to inform subsequent specific operating procedures.	All phases	Ground Control Management Plan within Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
Rehabilitation and closure			
Evaluation objective: ***The description of rehabilitation and closure should canvass changes in topography, groundwater conditions, drainage and vegetation cover during mining operations and at the end of the mine life. Rehabilitation and closure planning in the EES should be informed by the outcomes and adopted recommendations of the specialist studies within the EES (e.g. water, soils, landscape and visual, social, biodiversity, cultural heritage, etc.).***			
MM-RH01	Project ~~to~~ will be rehabilitated and closed in accordance with the finalised Rehabilitation Plan and in accordance with the provisions of the MRSDMI Regulations, including likely conditions such as compliance with the specific provisions of the Radiation Regulations that might apply to the project. As required under the MRSDMI Regulations, the Rehabilitation Plan will be informed by a detailed risk assessment that incorporates post-closure rehabilitation risks, including potential risks that the rehabilitated land may pose to the environment, to any member of the public or to land, property or infrastructure in the vicinity of the rehabilitated land as required under the new duty proposed to be included in the MRSD Act pursuant to the *Mineral Resources (Sustainable Development) Amendment Act 2023.* The Rehabilitation Plan will include a monitoring and review process to monitor rehabilitation performance, identify emerging risks and enable early intervention in accordance with monitoring and contingency measures outlined in Table 21-7 of the EMF. The Rehabilitation Plan will include a program for monitoring settlement of the tailings and the final surface to identify areas of differential settlement.	Closure	Rehabilitation Plan under Work Plan
MM-RH02	Unplanned closure – Staged and progressive rehabilitation and backfilling of pits ~~to~~ will be undertaken, which limits the amount of land needing rehabilitation at any given time and will limit any legacy rehabilitation issues in the event of unplanned closure.	Operation Closure	Rehabilitation Plan under Work Plan
MM-RH03	Unplanned closure – Rehabilitation bond ~~to~~ will be adequate to address safety risks and site restoration in the event of default by miner.	Closure	Rehabilitation Plan under Work Plan

MMID	Mitigation measure	Project Phase	Implementation document

MM-RH04	Quality assurance and adaptive management
	The Rehabilitation Plan must include:
	- a detailed Soil Management Plan including details of appropriate erosion and sediment control measures to be implemented consistent with SLR01 and SLR04.
	- completion criteria consistent with the restoration of disturbed land to equivalent or better agricultural land capability to enable a variety of productive agricultural uses
	- a quality assurance plan to ensure the requirements of the Plan are being implemented, which must include a requirement for periodic auditing and address:
	  - soils consultant support;
	  - training;
	  - inductions and toolbox talks;
	  - inventory reconciliation;
	  - stockpile management;
	  - testing;
	  - records and reporting, and
	- an adaptive management strategy, which is to include a Trigger Action Response Plan, that sets out required management actions in the event of impacts to rehabilitation or where rehabilitation outcomes are not achieved within the timeframes set out in the Rehabilitation Plan
	- the Trigger Action Response Plan (TARP) is to address all foreseeable soil constraints which may be encountered as part of rehabilitation. The TARP is to be a live document updated from monitoring data in accordance with adaptive management.
		Construction
		Operation
		Closure
			Rehabilitation Plan under Work Plan and EMP under the Incorporated Document

MM-RH05	Soil Reinstatement Trial plots Establish soil reinstatement trial ~~rehabilitation~~ sites, as soon as practicable following issue of a Mining Licence and other necessary approvals.	Construction Operation	Rehabilitation Plan under Work Plan

MMID	Mitigation measure	Project Phase	Implementation document
	The number and location of soil reinstatement trial sites will be determined based on the outcomes of further soil analysis. The purpose is for soil reinstatement site locations to cover the range of constraints likely to be encountered across the mining area. Soil reinstatement trails are to adopt ~~, with application of~~ soil investigation, stripping, stockpiling, reinstatement and post-reinstatement measures consistent with the Soil Management Plan and Rehabilitation Plan and to inform activities in respect of mined areas. Individual soil reinstatement trial sites are to be monitored for 5 to 7 years, and include at least one season of below average rainfall without stored water (where such conditions are not experienced in 5 to 7 years, the trail should be extended until such a season).		

21.7 Baseline environmental conditions

The baseline environmental conditions that are summarised in the EES Chapters and technical reports, with key references shown in **Table 21-6**, will be incorporated into relevant risk treatment plans and/or management plans and used to evaluate any residual environmental effects of the project. Where more detailed information is proposed to be obtained through further investigations, baseline environmental conditions will be updated accordingly.

Table 21-6 Baseline conditions

Environmental Aspect	EES Chapter and Technical Report
Biodiversity	- EES Chapter 07 Terrestrial ecology. - Technical Report A: Flora ecology. - Technical Report B: Fauna ecology.
Heritage	- EES Chapter 08 Cultural Heritage. - Technical Report C: Cultural Heritage.
Landscape and Visual	- EES Chapter 09 Landscape and Visual. - Technical Report D: Landscape and Visual.
Traffic and transport	- EES Chapter 10 Traffic and transport. - Technical Report E: Traffic and transport. - Technical Note 06 provided by VHM during the EES Hearing as D268)
Noise and vibration	- EES Chapter 11 Noise and vibration. - Technical Report F: Noise and vibration.
Air quality	- EES Chapter 12 Air quality. - Technical Report G: Air quality.
Surface water	- EES Chapter 13 Surface water. - Technical Report H1 Regional Surface water. - Technical Report H2 Mine site surface water.
Groundwater	- EES Chapter 14 Groundwater. - Technical Report I Groundwater.
Geotechnical	- Technical Report J Geotechnical.
Land use planning	- EES Chapter 15 – Land use planning. - Technical Report K: Land use planning.
Agriculture and soils	- EES Chapter 16 – Agriculture and soils. - Technical Report L: Agriculture. - Technical Report M: Soils and land resource. - Any updated baseline conditions established by further investigations required by the EMF.
Radiation	- EES Chapter 17 – Radiation. - Technical Report N: Radiation.

Socio-economic	- EES Chapter 18 – Socio-economics. - Technical Report O: Social impacts. - EES Attachment IV Economics.
Rehabilitation	- EES Chapter 19 – Rehabilitation and closure. - Technical Report P: Rehabilitation and closure.

21.8 Monitoring

Monitoring ~~would~~ will be conducted to measure project performance during construction, operations and closure (including rehabilitation and post-closure). **Table 21-7** describes the monitoring programs ~~proposed to~~ that will be implemented for the project for each environmental aspect.

Monitoring programs ~~would~~ will be refined and implemented as part of the management plans as identified in **Section 21.3**. Compliance with the EMF and all environmental plans ~~would~~ will be monitored by VHM and each of the contractors (as appropriate for each contractor's Project activities). Monitoring frequency and monitoring parameters ~~would~~ will be informed by regulatory requirements and scale of environmental risk. Monitoring may include periodic inspections of construction work areas and the operation of Project elements constructed.

Contractors ~~would~~ will be required to implement monitoring programs in accordance with environmental documentation to verify that:

- The monitoring frequency is sufficient to identify non-conformance(s) with the mitigation measures, statutory approvals conditions, management documents and applicable legislation.
- The range of parameters being monitored is adequate.
- Changes to approved construction and operational activities are adequately covered by the monitoring programs.

Any proposed changes to a monitoring program ~~would~~ will be subject to assessment and approval from the relevant authority before implementation.

Table 21-7 Monitoring and contingency measures relevant to the Project

Environmental aspect (as detailed in the respective Technical Report)	Monitoring program / measure	Project Phase	Implementation
Biodiversity and habitat			
Impacts to roadside vegetation	- Daily monitoring during construction to ensure vegetation / fauna habitat removal is within the approved areas. - During construction weekly audits to ensure no damage along transport route, construction vehicles confined to road surface, no vehicles parking in tree protection zone, TPZ barriers in place and maintained.	Construction Operation	EMP under Incorporated Document

	- During operations monthly audits of onsite and remanent roadside vegetation / fauna habitat for dust and damage by vehicles - Monitoring every 2nd year by an arborist of trees identified as 'assumed lost' due impacts to the Tree Protection Zone. - Monitoring of understorey / ground layer if trees 'assumed lost' senesce at higher rate than expected.		
Changes to the Ecological Character of Kangaroo Lake as an artefact of water extraction	Water extraction rates and lake water levels to be monitored as per licence requirements and reported monthly as part of VHM Ltd water extractions licence.	Construction Operation	Water Licence from GMW
Fauna salvage (water pipeline intake)	- Inspection of angled fish screen within 2 years of commencement of operation to determine fit-for-purpose: specifically, to assess risk of trapping/drowning freshwater turtles. - If pump inlet fish screen is unable to adequately exclude fish larvae, limit water offtake so far as reasonably practicable during periods when relevant larvae are expected to be present.	Operation	EMP under Incorporated Document MM-FE04
Vehicle / wildlife collisions	- Vehicle speeds –random monitoring of mine vehicle speeds within the transport routes. - Process for vehicle / wildlife collision occurs included in inductions and toolbox meetings at least annually. - Monitoring of vehicle / wildlife collisions – collisions are recorded in incident register and rate collisions monitored annually.	All phases of mine life	Traffic Management Plan under Incorporated Document. Risk Management Plan within Work Plan
Fauna salvage (pipeline)	- Bunting erected in no-go zones. - Salvage permits are obtained. - Installation of 30cm damp course plastic fauna exclusion fence sealed at ground level for trenching of pipeline. - Project personnel check trench each morning and at completion of days' work and reports to environmental supervisor to implement fauna recovery protocol.	Construction	EMP under Incorporated Document
Noise from vehicles and mine operations impacting on	- Noise levels, noise character and frequency spectrum are monitored as part of mobilisation of new mobile plant and equipment.	All phases	Noise Management Plan within Work Plan

behaviour of wildlife	- Noise monitoring and measurement as per the program developed and implemented under the Noise Management Plan.		
Indirect impact: Fuel and oil spillages egresses into fauna habitat / roadside native vegetation	- Daily pre-starts of vehicles for visible leaks. - Audits of fuel and chemical storage areas.	All phases	EMP under Incorporated Document
Indirect impact: Lights from vehicles and mine operations impacting on behaviour of wildlife	- Monthly lighting checks	Construction Operation	Biodiversity Management Plan within Work Plan
Indirect impact: Dust degrading fauna habitat	- Dust monitoring as per Dust Environmental Management and Monitoring Plan (DEMMP)	All phases	Air Quality Management Plan within Work Plan
Indirect impact: Fauna accessing processed water pond and in pit tailings	- Site induction will include the protocols for recording fauna interactions / observations and the relevant contact person. - Any fauna fatalities will be reported in the company's incident database and reported as part of regulatory requirements. - Where multiple fatalities occur, these will be investigated, as required by the Project ecologist, to determine cause of death. Results will be included in companies' incident report. Adaptive management and contingency measures are to be implemented where necessary. - The surface decant water in the tailing pits and process pond will be monitored to ensure it is within expected range and will review against appropriate standards to minimise the risk to staff and the environment.	Operation	Biodiversity Management Plan within Work Plan
Cultural Heritage			
Aboriginal Cultural Heritage	Aboriginal Heritage: - Preparation and delivery of a CHMP induction, including cultural awareness induction. - Use of a compliance checklist throughout the construction phase.	All phases	CHMP

	- The requirement for appropriate contractor induction to communicate the protections, requirements, and the Unexpected Finds Protocol.		
Non-Aboriginal Heritage	Non-Aboriginal Heritage: - Maintain records of appropriate contractor induction to communicate the protections, requirements, and the Unexpected Finds Protocol.	All phases of mine life	Risk Management Plan within Work Plan
Traffic and transport			
Dilapidation surveys	Dilapidation surveys of the road network would be completed as part of the pre-construction phase and at regular intervals during the operation phase are proposed to monitor the transport impacts associated with the project. These surveys are specified in **Table 21-5** and are outlined in the following measures: MM-T01 Stakeholder Engagement Plan. MM-T02 Traffic Management Plan.	All phases	Traffic Management Plan under Incorporated Document
Noise and vibration			
Noise Management Plan	The Noise Management Plan required under MM-NV09 must include the noise survey and modelling commitments listed below: Commissioning noise surveys will be completed for all major fixed plant components e.g. power station, processing plant, pumping station etc. to ensure they achieve their respective noise emission requirements. If any non-conformance or unanticipated additional noise sources are identified, they will be evaluated and options for amelioration considered and implemented to ensure the Project meets its obligations in relation to noise emissions. As the mine cells and operations will change through the duration of the Project a program of noise monitoring surveys to be conducted promptly after each significant variation in activities (including, but not limited to, changes in mining areas) will be developed and implemented. This program will also define other triggers for noise monitoring and measurement, for example updates to the noise model or investigations in response to complaints. Monitoring will be completed at the nearest affected receptors as well as at appropriately justified reference locations. Noise monitoring data will inform the periodic	All phases	Noise Management Plan within Work Plan

	update of the noise model to allow for continuous improvement. Monitors will be used that hold National Association of Testing Authorities (NATA) accredited calibration and are compliant with the relevant Australian Standards and EPA guidelines (e.g. publications 1996 and 1997). Monitoring will be conducted by a suitably qualified person in accordance with EPA guidelines (e.g. publications 1996 and 1997). The Noise Management Plan will be proactively prepared and implemented within the Work Plan.		
Procurement of mining fleet	The Procurement of subcontracted mining fleet will include a requirement to provide the quietest available equipment where required to minimise risks of harm to human health and the environment so far as reasonably practicable, including risks of harm from low-frequency noise and to ensure no plant or equipment ~~which in any case does not~~ exceeds the SWL used in the noise model. Noise checks on mining equipment will be conducted during commissioning and at regular intervals as part of the maintenance program to ensure noise levels, including any audible characteristics, continue to be minimised so far as reasonably practicable.	Construction Operation	Noise Management Plan within Work Plan
Procurement of fixed plant equipment	Procurement of noise generating fixed-plant will include a noise emission requirement to ensure that all fixed plant meet or better that which has been assumed in the noise model and to ensure fixed-plant is selected to minimise risks of harm to human health and the environment so far as reasonably practicable, including risks of harm from low-frequency noise. During commissioning a programme of noise commissioning checks will be undertaken to determine if fixed plant comply with the sound power level specification and do not present an unexpected risk of tonal, impulsive or intermittent character or of excessive sound energy in the low frequency range.	Construction Operation	Noise Management Plan within Work Plan
Noise survey	Workplace OH&S noise surveys will be undertaken in noisy areas frequently accessed by personnel. It is anticipated that this will	Construction Operation	Noise Management Plan within Work Plan

	include areas such as the power station and the processing plant.		
Mobile mining plant noise suppression	After market noise suppression options will be investigated for mining equipment to further reduce noise emissions where practicable, having regard to the sound levels, the noise character and the frequency spectrum. The addition of noise suppression kits to typical mobile plant such as excavators, scrapers, haul trucks and dozers would typically result in an overall reduction of approximately 5 dBA from the standard model.	All phases	Noise Management Plan within Work Plan
Air quality			
Project specific air quality monitoring plan MP-AQ01	The DEMMP will, at a minimum: Set out monitoring responsibilities of staff and contractors. Identify air quality indicators to be monitored. Establish monitoring criteria for the air quality indicators. Set out appropriate air quality monitoring methods, schedules and reporting requirements. (See below).	All phases	Air Quality Management Plan within Work Plan MM-AQ01
Continuous air quality monitoring MP-AQ02	Compliance continuous PM10 and PM2.5 monitoring will be conducted in accordance with relevant Australian Standards at a location representative of where a sensitive receptor(s) is likely to experience the highest particulate concentrations during the operational stage of the Project to demonstrate that dust emissions are being controlled adequately to meet relevant Air Pollution Assessment Criteria (APACs). The monitoring will be undertaken in accordance with a schedule approved in the Air Quality Management Plan (MM-AQ01), using monitors that are compliant with the relevant Australian Standards. The monitoring program must be developed by a suitably qualified person such that it is aligned with the requirements of EPA Publication 1961 "Guideline for Assessing and minimising air pollution". The siting, maintenance and calibration of the instrument and analysis of data is to be completed by a suitably qualified person with National Association of Testing Authorities (NATA) accreditation for the method used. The intent of the monitoring is to characterise the relevant risks and impacts associated with the Project.	All phases	Air Quality Management Plan within Work Plan

	Monitoring will be reported on a quarterly frequency (or less if results necessitate more frequent reporting). The data will be reported to the regulators. The information from the data will be communicated to community members and other stakeholders during the construction, operation and closure (including rehabilitation and post-closure) phases of the project in accordance with the Community Engagement Plan.		
Compliance monitoring of RCS MP-AQ03	Compliance monitoring of RCS (as PM2.5) and heavy metals (as PM10) will be conducted monthly in accordance with relevant Australian Standards at a location representative of where a sensitive receptor(s) is likely to experience the highest particulate concentrations during the operational stage of the Project to demonstrate that dust emissions are being controlled adequately to meet relevant APACs. Monitors will be used that are compliant with the relevant Australian Standards. Monitoring will be conducted by a suitably qualified person and reported on a quarterly frequency (or less if results necessitate more frequent reporting). The data will be reported to the regulators. The information from the data will be communicated to community members and other stakeholders during the construction, operation and closure (including rehabilitation and post-closure) phases of the project in accordance with the Community Engagement Plan.	All phases	Air Quality Management Plan within Work Plan
Monitoring of PM10 MP-AQ04	Indicative continuous PM10 monitoring will be conducted to provide near real-time feedback to site management with regard to potential dust emission across the site boundaries. Short-term average concentration trigger levels will be used so that site management are alerted (e.g. via SMS) to elevated concentrations such that additional management controls can be actioned to reduce dust levels to below the trigger level as defined by the applicable Trigger Action Response Plan (TARP).	All phases	Air Quality Management Plan within Work Plan

Fugitive dust generation monitoring MP-AQ05	A Dust Environmental Management and Monitoring Plan (DEMMP) will be prepared. Visual assessment of both fugitive dust generation, especially that leaving the site boundary, and dust deposition on the vegetation surrounding the site would be detailed as part of the DEMMP. Fugitive dust generation monitoring will be undertaken routinely by all site personnel and reported to the site manager. The site manager will record, investigate and implement contingency measures (e.g. increased haul road watering and/or further reduced speed limits for road trucks on unsealed site and public roads).	All phases	Air Quality Management Plan within Work Plan
Deposition to rainwater tanks MP-AQ06	A sampling program of rainwater tanks will be offered to all residents of dwellings within 1 km of the MIN boundary in accordance with MM-AQ07. If testing indicates that it is appropriate, VHM will offer to undertake the contingency measures required by MM-AQ07.	All phases	Air Quality Management Plan within Work Plan MM-AQ07
Surface water			
Clean up of spills CP-SW01	Implement contingency plan(s) to clean up and manage spills.	All phases	Surface Water Management Plan within Work Plan MM-SW01
Water quality monitoring program MP-SW01	Develop and maintain a water quality monitoring program that will comply with applicable legislation and guidelines. The SWMP will define the exact monitoring locations, frequency and parameters. Water quality sampling external to the mine site will be undertaken in conjunction with the internal mine site water quality monitoring program, noting that the external sampling will be event-based, given the lack of permanent streams or flow paths impacted by the Project. The potential water sampling locations are shown in Figure 8-5 of Technical Report H1 Surface Water Impact Assessment. In the design and pre-construction phase, water quality monitoring will also be carried out in accordance with the recommendations at section 7.1 of the Phase 1 Desktop Aquatic Ecology Assessment of Kangaroo Lake (Aquatica Environment, 2023).	All phases	Surface Water Management Plan within Work Plan EMP under Incorporated Document MM-SW01

	The water quality indicators to be included in the monitoring corresponds to the environmental quality indicators and objectives for rivers and streams as outlined in the ERS 2021.		
Diversions monitoring MP-SW02	Ecological and water quantity monitoring of any surface water diversions to ensure they have no impact on downstream ecosystems. If change is detected, remedial actions will be implemented to rectify the problem immediately to avoid irreversible damage to downstream ecosystems.	All phases	Surface Water Management Plan within Work Plan MM-SW06
Process water pond MP-SW03	Process water pond levels will be routinely monitored to confirm at least 0.5 metres of freeboard are maintained. If desired levels are not achieved, corrective actions and contingency measures will be carried out.	Operation	Surface Water Management Plan within Work Plan MM-SW02
Groundwater			
Baseline groundwater monitoring MP – GW01	Purpose: Further inform baseline conditions to develop a baseline groundwater level and quality database against which changes to groundwater can be monitored. Data collected will inform strategies to m~~M~~inimise risk of harm to groundwater during construction. Indicators and objectives: Groundwater quality and levels as set out in the GMP (MM-GW04) and in accordance with the ERS. Groundwater monitoring conducted prior to construction and during construction ~~would~~ will further inform baseline conditions and identify potential departure from background conditions. Parameters: Groundwater parameters and chemicals of concern to include, as a minimum, the suite listed in Table 8-11, 8-12, 8-13 and 8-14 of Groundwater Impact Assessment (CDM Smith, 2023). The suite of analytes will also include considerations of speciation of chemicals of potential concern, and flocculant degradation products at a minimum. The monitoring will be undertaken in accordance with EPA's *Groundwater Sampling Guidelines* (EPA Publication 669.1). Locations: ~~As a minimum, t~~The groundwater bores listed in Table 8-10 of Groundwater Impact Assessment (CDM Smith, 2023) will be reviewed based on guidance in EPA Publication 668.1 and the recommendations of the Inquiry and Advisory Committee (except for	Pre-Construction	Groundwater Management Plan within Work Plan MM-GW01

	recommendations not accepted by the Minister for Planning) to ensure the number and location of monitoring bores are fit for purpose. Frequency: Groundwater monitoring ~~would~~ will be conducted at a frequency that supports hydrogeological conceptualisation in accordance with EPA Publication 668.1 and data reviewed at least quarterly. ~~biannually (in accordance with EPA Publication 669.1) for a period of two years prior to commencement of construction~~		
Operational phase groundwater monitoring MP-GW02	Groundwater monitoring: Parameters: Groundwater parameters and chemicals of concern as set out for the Baseline groundwater monitoring (MP-GW01), with consideration of any outcomes of review and changes deemed appropriate based on ongoing monitoring results. The suite of analytes will also include considerations of speciation of chemicals of potential concern, and flocculant degradation products at a minimum. The monitoring will be undertaken in accordance with EPA's *Groundwater Sampling Guidelines* (EPA Publication 669.1). Locations: Groundwater monitoring locations will be specified in the GMP and at a minimum, will include the locations set out for the Baseline groundwater monitoring (MP-GW01), additional bores to be installed down-hydraulic gradient of mining pits, and an additional bore located up-hydraulic gradient of Area 1 in addition to continuous review and improvement to the network based on the results of monitoring and guidance in EPA Publication 668.1. Frequency: Groundwater monitoring ~~would~~ will be conducted at a frequency that supports the hydrogeological conceptualisation in accordance with ~~biannually (in accordance with~~ EPA Publication 6689.1~~)~~ and in accordance with the GMP and based on an ability to determine trends and changes prior to causing an impact on sensitive receptors.	Operation	Groundwater Management Plan within Work Plan MM-GW04
Operational phase groundwater review CP-GW01	If water level or water quality change outside predicted is detected over the life of operations undertake review of groundwater data and mining practices that have occurred to determine the nature and cause of the impact.	Operation	Groundwater Management Plan within Work Plan MM-GW04

	Review modelling results with observed data to update and inform a revaluation of impact assessment. Detailed trigger levels and contingency actions will be specified in the GMP as required by MM-~~AQ~~GW04.		
Rehabilitation / closure phase groundwater monitoring MP-GW03	Purpose: Minimise risk of harm to groundwater following rehabilitation and mine closure. Indicators and objectives: Groundwater quality and levels as set out in the GMP (MM-GW04) and in accordance with the ERS. Parameters: Groundwater parameters and chemicals of concern as set out for the Baseline groundwater monitoring (MP-GW01), with consideration of any outcomes of review and changes deemed appropriate based on ongoing monitoring results. The suite of analytes will also include considerations of speciation of chemicals of potential concern, and flocculant degradation products at a minimum. The monitoring will be undertaken in accordance with EPA's *Groundwater Sampling Guidelines* (EPA Publication 669.1). Locations: Groundwater monitoring locations will be specified in the GMP and at a minimum, will include the locations set out for the Operational phase groundwater monitoring (MP-GW02), with appropriate changes where required based on the purpose of the monitoring (in accordance with EPA Publication 668.1). The monitoring network may evolve over the closure/post-closure phase. Frequency: Groundwater monitoring ~~would~~ will be conducted at a frequency that supports hydrogeological conceptualisation in accordance with EPA Publication 668.1 and data reviewed ~~biannually (in accordance with EPA Publication 669.1)~~ and in accordance with the GMP (MM-GW04) and based on an ability to determine trends and changes prior to causing an impact at sensitive receptors. Cessation of monitoring: Following the completion of operations, the monitoring plan must establish groundwater mounding and groundwater quality triggers by which cessation of monitoring may occur.	Closure	Groundwater Management Plan within Work Plan MM-GW04
Rehabilitation/closure phase groundwater review	If groundwater level or quality change outside predictions are detected during the closure/post closure monitoring, undertake review of the groundwater data to determine	Closure	Groundwater Management Plan within Work Plan

CP-GW02	the nature and cause of any impact. Review modelling results with observed data to update and inform a revaluation of impact assessment. Detailed trigger levels and contingency actions will be specified in the GMP to manage post closure risks (MM-GW04).		MM-GW04
Land use planning			
There are no specific land use planning monitoring measures proposed to mitigate potential land use planning impacts. Relevant monitoring measures are set out in other specialist technical studies. It is anticipated that these measures would be implemented through the regulatory documents and management plans such as the Work Plan, Incorporated Document, CEMP, TMP, BMP, and REMP.			N/A
Agriculture and soils			
Agriculture and soils and land resource	Visual monitoring of stockpiles will be undertaken regularly, particularly after significant rainfall events. The following characteristics would form part of the checklist in both a site-specific Soil Stockpile Management Plan and an Erosion & Sediment Control Plan, which will include action triggers and contingency actions to be implemented: - Integrity of sediment control. - Effectiveness of drainage. - Integrity of erosion and sediment control measures. - Pasture growth. - Weed infestation. - Pest animal infestation. Samples will also be collected down slope or next to stockpiles to detect whether any mobilisation of solutes or solids is occurring. Sampling of topsoil stockpiles will occur prior to respreading with testing undertaken for agricultural nutrients. ~~Undertake grain yield mapping from adjacent non-mined paddocks and paddocks to be mined in the future to establish whether comparable yields are being obtained from rehabilitated mine areas.~~	All phases	Soil Stockpile Management Plan within Work Plan Erosion & Sediment Control Plan within Work Plan
Agriculture	Undertake grain yield mapping from adjacent non-mined paddocks and paddocks to be mined in the future to establish whether comparable yields are being obtained from rehabilitated mine areas (reference sites). Productivity variation of rehabilitated areas to be monitored by NDVI imagery during the		Rehabilitation Plan under the Work Plan

	growing season and causes investigated where significant variations are observed compared with reference sites. Plant tissue tests to be taken to monitor the nutritional status of the crop, to identify any underlying nutritional issues. Initial crops grown should be harvested with yield monitor to map actual and relative yield variation across crops. Monthly monitoring to take place at all locations with crops sown to ensure issues such as weeds, nutrient issues (deficiencies and toxicities) diseases and pests are not compromising crop production. Crop monitoring will be undertaken for at least five years and include biannual in-crop biomass assessments and tissue tests, and grain yield and quality for reinstated areas and reference sites. If comparable production is not achieved within five years, further remediation should be undertaken.		
Groundwater and surface water	Frequent inspections of the chemicals and hazardous waste storage areas will be conducted to ensure wastes are being stored appropriately, consistent with the requirements of MM-GW03 and MM-SW04.		Waste Management Plan within Work Plan MM-SW01
Radiation			
Direct (external) gamma	Handheld environmental gamma monitor, OSLD Annual survey and passive detectors at environmental monitoring locations, to include (but not be limited to) Ultima township.	All phases	Radiation Management Plan(s) required under Radiation Licence.
Rn-220 and Rn-222 Concentrations	Long term passive monitors Placed at the environmental monitoring locations and changed quarterly	All phases	
Dispersion of dust containing long-lived, alpha-emitting radionuclides	Dust deposition gauges sampling at off-site environmental monitoring locations. Samples composited for one year then analysed for radionuclides	All phases	
Dispersion of dust containing long-lived, alpha-emitting radionuclides	HiVol sampling Analysis of routine air quality samples for radionuclides as part of the Air Quality Management Plan	All phases	

Seepage of contaminated water	Groundwater sampling from monitoring bores. Sampling from monitoring bores and analyses for radionuclides.	All phases	
Run off contaminated water	Surface water sampling. Opportunistic surface water sampling will occur following significant rainfall events	All phases	
Radionuclides in potable water supplies	Sampling and radiometric analysis annually	All phases	
Radionuclides in crops	Offers to undertake sampling and radiometric analysis of representative crops on an annual basis for the first 3 years of construction and operations, and thereafter at a frequency to be determined having regard to the results obtained during the first 3 years of monitoring	All phases	
Social			
A comprehensive environmental monitoring regime and complaints process will be established for the Project. The complaints management process for the Project will be established in-line with that required by ERR. The complaints management process, will include the following: - Provision of a visible and user-friendly system for providing feedback. - Information on how and where to provide feedback would be published on the VHM website and discussed during community engagement activities. - Detailed feedback register. - Clear accountabilities and procedures for staff to investigate and respond to community feedback. - Commitment to respond promptly, fairly and confidentially to feedback received. VHM will target a response timeframe of less than 48 hours. - An internal monitoring and auditing system to ensure effectiveness of the complaint management process, and to identify recurrent themes and appropriate management responses - VHM will undertake~~s~~ direct contact with the complainant to determine the nature and extent of any impact. All complaints ~~are to~~ will be recorded in the company communication database and reported to the appropriate regulators. Community will be provided quarterly summaries of the any reportable incidents. VHM will continue to liaise with the complainant to assist in alleviating any concerns or potential ongoing issues. ~~In addition, the proposed~~ The Workforce Accommodation Strategy will include monitoring and contingency measures. ~~As such, no further monitoring and contingency measures are recommended.~~		Community Engagement Plan within Work Plan Workforce Accommodation Strategy
Rehabilitation and closure			
Rehabilitation monitoring	VHM will implement a formalised rehabilitation monitoring and review process to monitor rehabilitation performance, identify emerging risks and enable early intervention. Rehabilitation monitoring would include	Operation Closure	Rehabilitation Plan within Work Plan

surveys to be undertaken routinely within each discrete rehabilitation area. The recommended frequency of survey would vary depending on the stage of rehabilitation and progress towards completion, but also depending on the presence or otherwise of active rehabilitation threats. A typical monitoring frequency might include:

- Monthly for the first three months during initial vegetation establishment, then.
- Quarterly for the first year following commencement of rehabilitation, then.
- Annually until completion and achievement of closure criteria.

Rehabilitation monitoring will continue until the rehabilitation objectives have been met and are substantially trending towards the completion criteria such that active intervention is no longer required and the area is assessed as stable.

Rehabilitation surveys will record key details of rehabilitation progress, including identification of any emerging risks (including but not limited to weeds, diseases and pests), activation of triggers for mitigation controls, and noting any corrective actions that may be required. Any identified deficiencies or failures shall be noted and follow-up actions identified. Success factors would be noted for future reference and to assist in continuing improvement.

21.9 Environmental incidents and emergencies

All environmental incidents and 'near misses' will be recorded in an incident database. The database ~~would~~ will be maintained and reviewed regularly by VHM to identify any trends and assess the effectiveness of preventative measures.

Reportable incidents as defined by the Earth Resources Regulation Guidance Note on Reportable Events for Mineral and Extractive Operations, would be reported to the appropriate regulator at the time of the incident (refer to **Section 21.9.5**). Pollution events that cause or threaten to cause material harm to the environment or human health and any other emergencies would be reported to relevant agencies as required, including to EPA under Section 40 of the EP Act ("Duty to Notify"), if required. All incidents ~~would~~ will be investigated to facilitate efficient and effective responses. A notifiable incident includes an incident:

- Resulting in actual adverse effect on human health or the environment, that is not negligible, or~~.~~
- Resulting in an actual adverse effect to an area of high conservation value or of special importance, or~~.~~

- Where the costs of preventing or minimising the harm, or restoring the environment, is likely to be more than $10,000.

21.9.1 Inspections

Site inspections ~~would~~ will be conducted on a regular basis to verify that management commitments and mitigation actions are being implemented, and to evaluate environmental performance of the Project. Site inspections ~~would~~ will include but not be limited to:

- Regular inspections to review the actual area of vegetation cleared against the area approved to be cleared.
- Visual inspections around stockpiles and areas of ground disturbance and vegetation clearing to detect erosion and any new weed infestations including pests, pathogens and feral animals.
- Routine inspections of on-site water management infrastructure systems to determine maintenance requirements, so that they remain effective.
- Inspection of mining areas and surrounds for evidence of slope instability, ground subsidence or deformation following an earthquake event.
- Inspection for leaks and spills as part of regular maintenance of mobile plant and vehicles in accordance with manufacturers specifications.

21.9.2 Non-conformance and corrective actions

Incidents ~~would~~ will be recorded by the person who causes, or identifies, the incident as soon as practicable. Incidents and 'near misses' ~~would~~ will be investigated and appropriate measures implemented to prevent reoccurrence. Where applicable, environmental incidents reoccurrence will be reported to the relevant government agency. VHM will be responsible for determining the cause of the incident and implementation of appropriate remedial and/or preventative actions.

In the event of an incident, or if inspections or monitoring results indicate that performance requirements are not being achieved, corrective actions ~~would~~ will be enacted and may include any or all of the following:

- Immediately stop work where required.
- Complete incident report and investigations.
- Report to regulatory authorities as required (with notice of proposed corrective actions where relevant).
- Investigate cause of exceedance or issue, including review of relevant monitoring data and effectiveness of implemented corrective actions (if any).
- Implement corrective actions as appropriate to prevent recurrence.
- Undertake maintenance as required.
- Notify regulatory authorities and community of corrective actions implemented and outcome, as applicable.

VHM ~~is required to~~ will clean up any spill or correct any environmental impact as soon as practicable, to restore the affected area to the state it was before the incident occurred.

VHM will be responsible for investigating non-conformances with environmental procedures and will be responsible for reporting environmental incidents to the appropriate regulator(s). The actions required for initiating and completing corrective and preventative actions ~~would~~ will be established in the relevant management plans and sub-plans. Corrective actions to prevent reoccurrence of an incident, reduce risk and improve the effectiveness of environmental

procedure ~~would~~ will be recorded in a register and reported to community, as applicable. Corrective actions may result from:

- Continuous improvement initiatives.
- Management compliance audits.
- Environmental audit non-conformances and observations.
- Incident investigations.
- Near-miss incidents.
- Breaches of the compliance schedule.
- Information distributed at meetings.
- Results of regulatory audits.
- Hazard identification.

Monitoring results ~~would~~ will be reviewed ~~at an appropriate temporal scale~~ and collated at least monthly by VHM ~~as per existing site procedures~~. This ~~would~~ will enable early detection of potential non-conformances associated with environmental management. This regular internal review of monitoring results will inform~~s~~ an adaptive management approach to help identify whether corrective actions are required. This may include additional or modified monitoring activities to address environmental risks.

21.9.3 Auditing

Auditing ~~would~~ will be completed in accordance with the EMP, TMP, REMP, Development licence and any specific auditing requirements included in this EMF.

VHM will establish an audit process. An audit schedule ~~would~~ will be developed for each calendar year, prioritising areas of highest environmental risk.

Internal audits ~~would~~ will be scheduled upon appointment of Project Auditor during construction to ensure works are complying with the relevant management plans. The audit ~~would~~ will also review site material, assess the knowledge of staff undertaking work and review the construction phase weekly checklists. The first internal audit ~~would~~ will be scheduled within 6 months of the start of a new phase of construction.

A suitably qualified and independent professional (Project Auditor) ~~would~~ will conduct audits to monitor compliance with the mitigation measures, management system obligations, statutory approvals conditions and relevant legislation and guidelines throughout all phases of the Project. Specific details of the audit schedule ~~would~~ will be included in the relevant project management plans. Audit regimes ~~would~~ will be informed by the regulatory approval requirements applying to the Project. Audits ~~would~~ will assess:

- Compliance with all relevant mitigation measures contained in management plans.
- Compliance with statutory approvals conditions issued for the Project.
- Conformance with any other relevant environmental management documentation.
- Responses to non-conformances, complaints, and incidents.
- Compliance with safety requirements.
- Implementation of monitoring programs.

21.9.4 Environmental Reporting

VHM will be responsible for reporting compliance with mitigation measures and statutory approval~~s~~ conditions to regulators. Reporting and external notification requirements ~~would~~ will be

outlined in detail within the relevant management plans, including which matters require reporting, to which party and the timeframe within which the reporting will occur. Reporting ~~would~~ will depend upon the terms of the statutory approvals but may include but not be limited to:

- Monitoring results.
- Compliance with requirements.
- Non-conformances and corrective actions.
- Stakeholder engagement including complaints.
- Notifications if a potential Aboriginal site or heritage artefact is discovered.
- Incident notifications.

21.9.5 Mandatory ERR Reporting

All Reportable incidents, as defined by the Earth Resources Regulation Guidance Note on Reportable Events for Mineral and Extractive Operations, and subsequent investigations ~~are~~ will be reported to the appropriate regulators at the time of the incident. All reportable incidents, subsequent investigations and outlier results (for example, water quality results outside of historical results for that monitoring point) ~~are~~ will be reported in the Operations Monthly report that is distributed within VHM.

The monthly data will be compiled into the Environment Report prior to distribution to the appropriate regulators (EPA, and Goulburn Murray Water). The report ~~is~~ will then reviewed by the regulators, Council representatives, community representatives and VHM personnel at the quarterly company ERC meetings.

21.9.6 Record control

Records of compliance and inspection forms will be maintained digitally, with observations recorded spatially where relevant. Project activities ~~would be~~ will also be incorporated into the site's existing auding, reporting and recording procedures.

21.10 Community Engagement Plan and complaints management

VHM is committed to maintaining open communication with community members and other stakeholders and to providing up to date and transparent information on the Project. Community engagement during the construction, operations and closure (including rehabilitation and post-closure) phases of the project ~~would~~ will be conducted in accordance with the Community Engagement Plan (CEP) ~~as outlined in EES Attachment I: Draft Work Plan~~. The CEP ~~would~~ will ensure that relevant stakeholders ~~have been~~ are consulted regarding the mining program, and potential issues raised by stakeholders are identified at an early stage. VHM is committed to establishing long-term stakeholder and community relationships. VHM values input from the community and is keen to identify and address any concerns a member of the public may have regarding the implementation of the Goschen Project.

Throughout the Project, engagement monitoring ~~would~~ will be carried out to ensure that engagement activities are meeting the goals of this plan. Engagement outcomes monitoring ~~would~~ will include the establishment of performance measures. Monitoring ~~would~~ will include:

- Regular review of the engagement log to ensure stakeholders are being provided with appropriate and timely responses.

- Stakeholder surveys and feedback on effectiveness and timeliness of engagement activities.
- Community surveys to gauge awareness of the Project, community issues and the suitability of consultation methods and information publicly provided.

As a significant partner within the regional community, VHM recognises the potential to support, enable or generate diverse and sustainable opportunities across the community including business development, skills development, direct and indirect employment, contracting, and the supply of goods, materials, and services. VHM ~~would~~ will:

- Invite local/regional businesses to tender and ensure equal opportunity for participation in our business under consistent terms, standards, and conditions for all tenderers.
- Work with local government, industry advocates (ICN) and businesses to provide commercial or other feedback to assist the development of local businesses.
- Provide transparent information to local businesses as early as possible about potential procurement, supply or service opportunities, and tendering requirements.
- Promote and support opportunities for the participation of indigenous workers, indigenous businesses, and indigenous community groups.
- Consider the capability of local businesses in the development of procurement strategies and contract work scopes to identify and support opportunities to increase local content.
- Give preference to tenderers who are able to demonstrate the capacity to develop local capability and increase local content in labour or materials, where comparative bids may be determined as acceptable based on safety, commercial, and technical requirements.

Any community concerns or complaints are currently responded to according to the VHM Community Engagement Plan (CEP). VHM ~~would~~ will implement a complaint management process, which will include~~s~~ the following:

- Provision of a visible and user-friendly system for providing feedback.
- Information on how and where to provide feedback would be published on the VHM website and discussed during community engagement activities.
- Detailed feedback register.
- Clear accountabilities and procedures for staff to investigate and respond to community feedback.
- Commitment to respond promptly, fairly and confidentially to feedback received. VHM will aim to target a response timeframe of less than 48 hours.
- An internal monitoring and auditing system to ensure effectiveness of the complaint management process, and to identify recurrent themes and appropriate management responses.

VHM will undertake~~s~~ direct contact with the complainant to determine the nature and extent of any impact. All complaints ~~are~~ will be recorded into the company communication database and reported to the appropriate regulator(s) and community at the time of the incident. VHM will continue~~s~~ to liaise with the complainant to assist in alleviating any concerns or potential ongoing issues.

The Project ~~would also~~ will provide a dedicated 24-hour a day, 7 day a week 1800 free call number and target a 48hr response.

21.11 Competence, training and awareness

All personnel, including VHM employees and contractors, ~~would~~ will be required to complete induction training prior to commencing work on the Mine site, including detailed training on any specific mitigation measures.

Specific management sub-plans may include requirements for further induction/training. The site-specific induction ~~would~~ will include information on potential environmental impacts and hazards, and the monitoring activities employees may be required to undertake. Proof of induction completion ~~would~~ will be recorded, and such records maintained throughout the project life.

21.11.1 Toolbox meetings

There will be a requirement for 'Toolbox' meetings to be conducted at the start of each shift to provide up to date information to personnel including any environmental issues, environmental awareness topics or complaints encountered during the previous shift.

21.11.2 Operator Training

VHM will ensure all operators of all machinery/equipment are appropriately trained and certified/competent to use the particular piece of machinery and are informed of the location and protection requirements for any environmentally or heritage significant sites located in the vicinity of their work area.

VHM will ensure training for relevant personnel in statutory requirements and procedures for the safe handling, transport, storage and disposal of hazardous materials and follow through and ensure contractors implement appropriate procedures for the safe handling, transport, storage and disposal of hazardous materials.

Personnel ~~would~~ will also be trained in spill prevention and response procedures, and contractors ~~would~~ will be trained to ensure they understand appropriate spill prevention and response procedures.

21.11.3 Environmental Monitoring Training

Personnel required to undertake monitoring of rehabilitation or vegetation ~~would~~ will be provided with appropriate training from a person experienced in identifying flora and rehabilitation/vegetation monitoring methodologies.

Appendix F IAC recommended Incorporated Document

The following incorporated document includes the IAC's recommended changes based on the Proponent's Final Day version (D272).

Tracked Added

~~Tracked Deleted~~

Day 3 - Without prejudice working draft

GOSCHEN RARE EARTHS AND MINERAL SANDS PROJECT

PROJECT INFRASTRUCTURE

Incorporated Document September 2023 [Day 3 Draft]

Incorporated Document in the Gannawarra Planning Scheme and Swan Hill Planning Scheme pursuant to section 6(2)(j) of the Planning and Environment Act 1987 (Vic).

1.0 INTRODUCTION

1.1 This document is an Incorporated Document in the Gannawarra and Swan Hill Planning Schemes (**the Planning Schemes**) pursuant to section 6(2)(j) of the *Planning and Environment Act 1987.*

1.2 This Incorporated Document facilitates the development and use of infrastructure (**the Project Infrastructure**) required to support the Goschen Mineral Sands and Rare Earth Project (**the Project**) by providing a specific control for the purpose of Clause 45.12 of the Planning Schemes.

1.3 The control in this Incorporated Document prevails over any contrary or inconsistent provision in the Planning Schemes.

1.4 The control in this Incorporated Document does not apply to the use and development of the Project Infrastructure Land (as defined in Clause 3.1) for purposes other than the Project Infrastructure. Use and development of the Project Infrastructure Land for purposes other than the Project Infrastructure must be in accordance with the Planning Schemes.

1.5 For the avoidance of doubt, the control in this Incorporated Document does not apply to the carrying out of mining on land covered by a mining licence and for which a permit is not required pursuant to section 42(7) of the *Mineral Resources (Sustainable Development) Act 1990.*

2.0 PURPOSE

2.1 The purpose of the control is to provide specific controls for the Project Infrastructure on the Project Infrastructure Land, as defined in Clause 3.1, in accordance with Clause 4.0.

3.0 LAND TO WHICH THIS DOCUMENT APPLIES

3.1 The control in this Incorporated Document applies to the land shown as SCOX on the Planning Scheme maps forming part of the Planning Schemes (the **Project Infrastructure Land**), and as shown as the 'Area to which Incorporated Document Applies' in Appendix A of this Incorporated Document.

4.0 CONTROL

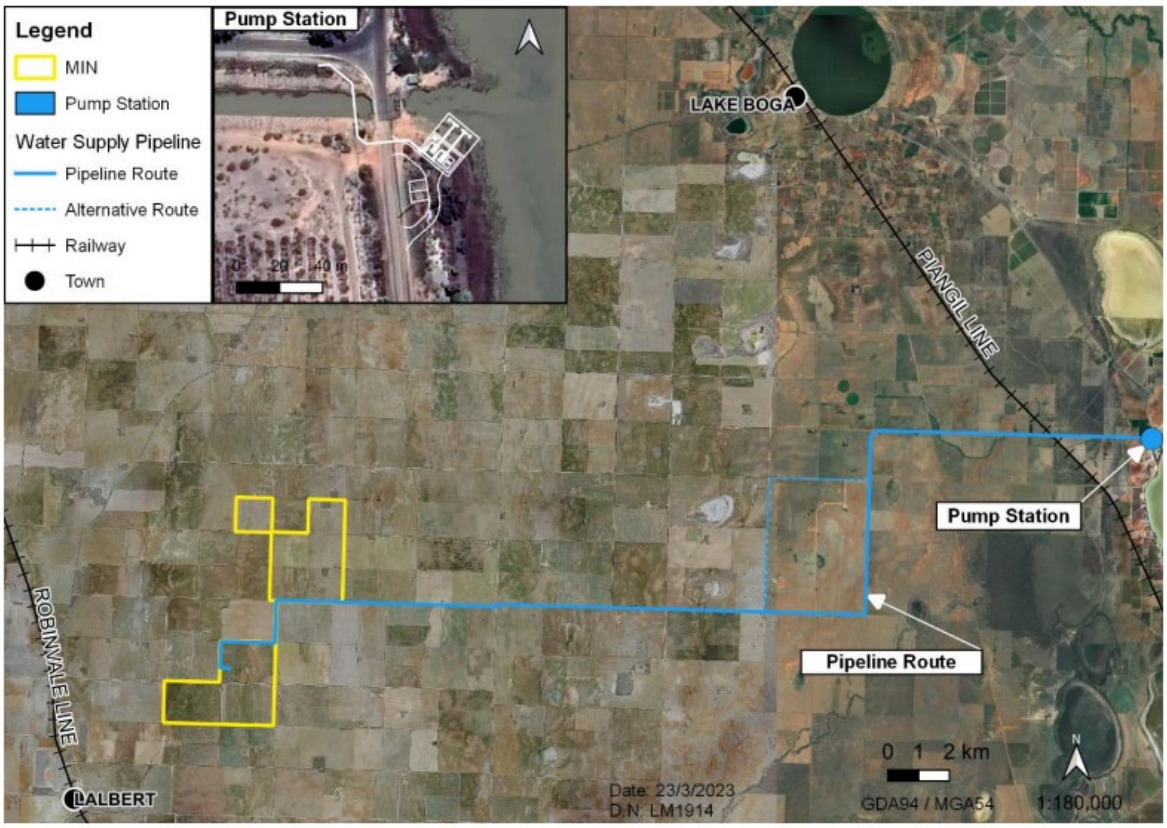
4.1 EXEMPTION FROM PLANNING SCHEME REQUIREMENTS

4.1.1 Despite any provision in the Planning Schemes to the contrary or any inconsistent provision in the Planning Schemes, no planning permit is required for, and no provision in the Planning Schemes operate to prohibit, restrict, or regulate, the use or development of the Project Infrastructure Land for the purpose of, or related to, the Project Infrastructure.

4.1.2 The use and development of the Project Infrastructure Land for the purpose of, or related to, the Project Infrastructure includes:

a. A new water intake pump station at Kangaroo Lake, including, but not limited to, pumps, electric motors, generators, and other associated buildings and works.

b. A new water supply pipeline connecting the water intake pump station at Kangaroo Lake to the Project following the 'Pipeline Route' or 'Alternative Route' as described on the map below:



c. Roads and road works including:

i. Creation or alteration of access to a road in a Transport Zone 2.

ii. Road widening and re-surfacing.

iii. Creation of acceleration, deceleration and turning lanes.

iv. Expanding intersections for increased turning circles and to improve the safety aspects of those intersections.

v. Installing appropriate signage and road markings.

d. Removing, destroying and lopping of trees and vegetation, including native vegetation and dead vegetation.

e. Ancillary, preparatory and enabling works and activities, including but not limited to:

vi. Developing and using lay down areas and depots for construction purposes.

vii. Temporary stockpiling of excavation material for construction purposes.

viii. Constructing and using temporary site workshops and storage, administration, and amenities buildings.

ix. Constructing and using temporary access roads, diversion roads, staff and vehicle parking areas, loading, and unloading areas, access paths and pedestrian walkways.

x. Demolishing and removing buildings, structures, infrastructure and works.

xi. Relocating, modifying, protecting, and upgrading services and utilities.

xii. Constructing fences, temporary site barriers and site security.

xiii. Constructing or carrying out works to create or alter roads, car parking areas, bunds, mounds, landscaping, excavate land, salvage artefacts, and alter drainage.

xiv. Earthworks including cutting, stockpiling and removal of spoil, and formation of drainage works.

xv. Constructing, putting up for display, and displaying signs in relation to the Project Infrastructure.

xvi. Carrying out works to alter watercourses,

f. The creation, variation and removal of easements.

4.2 CONDITIONS

4.2.1 The use and development permitted by this Incorporated Document must be undertaken in accordance with the conditions set out below:

4.2.2 Addressing the Minister's Assessment and the environmental management framework

a. Any plan required by the conditions of this Incorporated Document must:

i. be generally in accordance with the Minister's assessment of the environmental effects of the Goschen Rare Earths and Mineral Sands Project dated [INSERT] under the *Environment Effects Act 1978* (**Minister's Assessment**); and

ii. address and be consistent with the requirements of the environmental management framework dated [insert] ~~tabled before~~ recommended by the Inquiry and Advisory Committee for the Goschen mineral sands and rare earths project (**EMF**),

unless otherwise approved by the responsible authority.

b. To the extent of any inconsistency between the Minister's Assessment and the EMF, the Minister's Assessment prevails.

4.2.3 Development Plan

a. A Development Plan must be prepared to the satisfaction of the relevant responsible authority.

b. The Development Plan may be prepared and approved in stages or in respect of any of the individual Project Infrastructure components listed in Clause 4.1.2, but the Development Plan for each stage or component must be approved before the commencement of development for that stage or component.

c. The Development Plan may be amended to the satisfaction of the relevant responsible authority.

d. The Development Plan must show:

i. The location and boundaries of the Project Infrastructure Land.

ii. The location and layout of proposed structures, works and proposed activities within the Project Infrastructure Land;

iii. If the Development Plan is to be approved in stages or in respect of individual components of the Project Infrastructure, a plan for each stage of development or component for which approval is currently being sought; and

iv. For the new water supply pipeline, the Development Plan must show: -

- whether the new water supply pipeline will follow the 'Pipeline Route' or 'Alternative Route'

- how impacts to the EPBC listed Natural Grasslands of the Murray Valley Plains community have been avoided entirely by the chosen pipeline route or pipeline construction methods.

e. The use or development as shown on the Development Plan must not be altered without the written consent of the relevant responsible authority.

4.2.4 Environmental Management Plan

a. An Environmental Management Plan (**EMP**) must be prepared in consultation with Gannawarra Shire Council and Swan Hill Rural City Council, submitted to and approved by the Minister for Planning.

b. The EMP must include:

i. A description of the environmental mitigation measures that ~~generally~~ achieve the desired environmental outcomes specified in the Minister's assessment dated [insert] under the Environment Effects Act 1978.

ii. The process and timing for the preparation of Construction Environment Management Plans and other plans required by mitigation measures that apply to infrastructure works required to support the Project Infrastructure on the Project Infrastructure Land.

iii. Performance monitoring and reporting processes, including auditing to ensure environmental and amenity effects are managed in accordance with mitigation measures during construction and operation of infrastructure works required to support the Project Infrastructure on the Project Infrastructure Land.

c. The use and development of the Project Infrastructure Land under the controls in this Incorporated Document must be carried out in accordance with the approved EMP to the satisfaction of the responsible authority and in accordance with all plans required by this Incorporated Document.

4.2.5 Native Vegetation

a. Prior to the removal, destruction and/or lopping of native vegetation as set out in Clause 4.1, excluding preparatory works listed in Clause 4.3, details of the proposed removal of native vegetation necessary for the construction and delivery of infrastructure required to support the Project Infrastructure on the Project Infrastructure Land must be prepared in accordance with the application requirements in the *Guidelines for removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning (DELWP), December 2017) (**Guidelines**) to the satisfaction of the Secretary to the Department of Energy, Environment and Climate Action (DEECA).

b. Prior to the removal, destruction and/or lopping of native vegetation as set out in Clause 4.1, excluding preparatory works listed in Clause 4.3, the biodiversity impacts from the proposed removal of that native vegetation must be offset in accordance with the Guidelines and an offset management plan prepared in consultation with the Gannawarra Shire Council and the Swan Hill Rural City Council, and to the satisfaction of DEECA. The offset must include any native vegetation removed under Clause 4.3. Evidence that the required offset has been secured must be provided to the satisfaction of the Secretary to the Department of Energy, Environment and Climate Action.

c. In exceptional circumstances, the Secretary to the DEECA may vary the timing of the offset requirement, and Gannawarra Shire Council or Swan Hill Rural City Council (as relevant) must be notified as soon as written notification is received of the Secretary's decision to vary an offset.

d. The offset(s) secured for the Project Infrastructure may be reconciled in accordance with the *Assessor's handbook – Applications to remove, destroy or lop native vegetation* (DELWP, October 2018).

e. The requirements of this Clause may be satisfied in separate components or stages of a development, but each requirement must be satisfied before the removal of native vegetation for that component or stage.

4.2.6 Traffic Management Plan

a) Prior to the commencement of building and works, excluding preparatory works listed in clause 4.3, a Traffic Management Plan (**TMP**) must be prepared by a suitably qualified traffic engineer in consultation with Gannawarra Shire Council and the Swan Hill Rural City Council in so far as it is relevant to council controlled roads under their respective control, and approved by the Head of Transport for Victoria, the Gannawarra Shire Council and the Swan Hill Rural City Council. The TMP must include, but not be limited to:

i. Any creation or alteration to access to a road in a Transport 2 Zone.

ii. Identification and assessment of local roads and associated infrastructure at risk from damage arising from the construction and operation of the Project, including:

A. A program of regular inspection works to be carried out during construction to identify road safety hazards and works to reduce those hazards as a result of construction traffic;

B. A program to rehabilitate damage caused by Project traffic to existing local roads and infrastructure to a safe and usable condition during construction, operation and during and at the conclusion of decommissioning of the Project;

C. Measures to be taken to manage traffic impacts associated with construction and ongoing operation of the Project on surrounding local roads, including a review and recommendation of speed limits;

D. A requirement to enter into agreements with the relevant road authority regarding ongoing pavement maintenance to local (non-arterial) roads prior to the commencement of the operation of the Project; and

E. All inspections, road upgrades and maintenance of roads along the haulage and commuter routes are to be at the cost of the proponent.

iii. Details of road widening and road upgrades required to accommodate additional traffic or oversize vehicles;

iv. The provision of turning lanes at the intersection of Donald-Swan Hill Road and Lake Boga-Ultima Road; and

v. The intersection design between David Street, Ultima North Road and Sea Lake-Swan Hill Road.

b) The TMP may be amended from time to time in consultation with Gannawarra Shire Council and Swan Hill Rural City Council in so far as it is relevant to the council controlled roads under their respective control, and approved by the Head Transport for Victoria.

c) The TMP may be prepared in stages or in respect of any elements of the Project listed in Clause 4, but the TMP for any stage of development or component must be approved before the commencement of development for that stage or component.

4.2.7 Flood Management

a) Where, but for this Incorporated Document, a planning permit would be required under the Planning Schemes for buildings and works within the Floodway Overlay, Land Subject to Inundation Overlay or Floodway Zone, the relevant buildings and works must be undertaken to the satisfaction of the relevant floodplain management authority.

4.2.8 Easements

a) Where, but for this Incorporated Document, a planning permit would be required under the Planning Schemes to create, vary, or remove an easement, the

instruments and documentation required to create, vary or remove an easement and register the creation, variation or removal of the easement must be prepared to the satisfaction of, and approved by, the Minister for Planning prior to the creation, variation, or removal of the easement.

b) The creation, variation or removal of easements must be undertaken generally in accordance with the approved plans and documents.

4.2.9 Other Conditions

a) Unless otherwise stated, the plans and other documents listed in Clause 4.2 must be prepared and approved to the satisfaction of the relevant responsible authority prior to the use or development of land or creation of easements.

b) Plans and other documents may be prepared and approved by the Minister for Planning or the relevant responsible authority for separate components or stages of the Project Infrastructure, including for the construction and operational stages, but each plan or other document must be approved before commencement for that component or stage, excluding the preparatory works set out in Clause 4.3.

4.3 PREPARATORY BUILDING AND WORKS

4.3.1 The following preparatory buildings and works may be undertaken, and the Project Infrastructure Land may be used in the following manner before the requirements specified in Clause 4.2 are satisfied. Preparatory buildings and works may include, but are not limited to:

a) Works, including vegetation removal, where but for this Incorporated Document, a planning permit would not be required under the provisions of the Planning Schemes.

b. Investigating, testing and preparatory works to determine the suitability of land, and property condition surveys.

c. Creation and use of construction access points and working platforms.

d. Site establishment works including temporary site fencing and hoarding and hardstand and laydown areas.

e. Construction, protection, modification, removal or relocation of utility services, and associated infrastructure.

f. Establishment of environment and traffic controls, including designation of ‘no-go’ zones.

g. Demolition to the minimum extent necessary, to enable preparatory works.

4.3.2 Removal of vegetation associated with preparatory works may be undertaken before the requirements specified in Clause 4.2 are satisfied, limited to the following:

a. The removal of native vegetation to the minimum extent necessary to enable preparatory works.

b. The removal of vegetation within an Environmental Significance Overlay and Vegetation Protection Overlay to the minimum extent necessary to enable preparatory works.

4.3.3 Before the removal of native vegetation under Clause 4.3.2, associated with preparatory works, ~~information~~ details about the native vegetation to be removed must be provided to the satisfaction of the Secretary to the Department of Energy, Environment and Climate Action in accordance with the application requirements in the Guidelines.

4.3.4 The biodiversity impacts from the removal of native vegetation under Clause 4.3 must be included in the total biodiversity impacts when determining offset(s) in accordance with Clause 4.2.5~~2~~.

4.4 EXPIRY

4.4.1 The specific controls contained in this Incorporated Document will expire if:

a) The development of the Project Infrastructure Land authorised by these controls is not:

   a. started within four years of the approval date; and

   b. completed within four years of the commencement of development.

b) The use of the Project Infrastructure Land authorised by these controls is not started within 2 years after of the completion of development.

If the use and development is not completed within 25 years, any use and development of the Project Infrastructure Land for purposes related to the Project Infrastructure must cease other than decommissioning works undertaken in accordance with the EMP.

4.4.2 The Minister for Planning may extend any period referred to in this condition if a request is made in writing before these controls expire or within three months afterwards.

Appendix A AREA TO WHICH INCORPORATED DOCUMENT APPLIES