

Planning Panels Victoria

Fingerboards Mineral Sands Project

Inquiry and Advisory Committee Report

Volume 1 – Main Report

Environment Effects Act 1978

Planning and Environment Act 1987

30 September 2021

Environment Effects Act 1978

Inquiry Report under section 9(1)

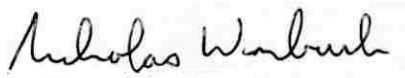
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Advisory Committee Report under section 151

Fingerboards Mineral Sands Project

Volume 1 – Main Report

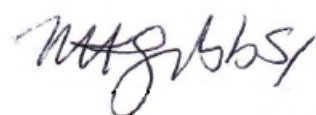
30 September 2021



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Glossary and abbreviations

AIA	Agricultural Impact Assessment
Amendment	Draft Planning Scheme Amendment East Gippsland C156egip
AEP	Annual Exceedance Probability
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASC NEPM	<i>National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013</i>
ASR	Aquifer storage and recovery
Ausenco	Ausenco Pty Ltd
BDEC	Bendigo and District Environment Council
BOM	Bureau of Meteorology
CFA	Country Fire Authority
CHIA	Cultural Heritage Impact Assessment
CHMP	Cultural Heritage Management Plan
CMA	Catchment Management Authority
COPC	chemicals of potential concern
Council	East Gippsland Shire Council
DAF	Dissolved Air Flotation
DAWE	Commonwealth Department of Agriculture, Water and Environment (previously Department of Environment and Energy)
DELWP	Department of Environment, Land, Water and Planning
DELWP-FFR	DELWP Forest, Fire and Regions Group
DJPR	Department of Jobs, Precincts and Regions
DLA	Development Licence Application (previously a Works Approval Application)
DOH	Department of Health
DOT	Department of Transport

EE Act	<i>Environment Effects Act 1978</i>
EES	Environment Effects Statement
EIA	Economic Impact Assessment prepared by BAEconomics (Appendix A018); also referred to as BAEconomics Assessment
EMF	Environmental Management Framework
EPA	Environment Protection Authority
EP Act	<i>Environment Protection Act 2017</i>
EP Regulations	<i>Environment Protection Regulations 2021</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ERR	Earth Resources Regulation (the mining regulator, part of the Department of Jobs, Precincts and Regions)
ERS	Environment Reference Standards
EVC	Ecological Vegetation Class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
GDE	Groundwater Dependent Ecosystems
GED	General Environmental Duty (under the EP Act)
GHG	Greenhouse gas
GHU	General Habitat Unit
GL	gigalitres
GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation
HARPS	Harmonised Australian Retailer Produce Scheme
HHRA	Human Health Risk Assessment
HI	Hazard Index
HIA	Horticultural Impact Assessment
HMC	Heavy Minerals Concentrate
IAC	Inquiry and Advisory Committee
Infrastructure Area	The area where the SCO will be applied and be subject to the Incorporated Document under the East Gippsland Planning Scheme.
ITR	Independent Technical Reviewer
JORC	Joint Ore Reserves Committee
LVIA	Landscape and Visual Impact Assessment
MDA	Marshall Day Acoustics Pty Ltd
MFG	Mine Free Glenaladale

ML	megalitres
MNES	Matters of National Environmental Significance
MPS	Municipal Planning Strategy
MRSD Act	<i>Mineral Resource (Sustainable Development) Act 1990</i>
MSS	Municipal Strategic Statement
MUP	Mining Unit Plant
NCB	Net Community Benefit
NGER	National Greenhouse and Energy Reporting
NIRV	Noise from Industry in Regional Victoria
Noise Protocol	<i>Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (EPA Publication 1826.2)</i>
Offset Strategy	Biodiversity Offset Strategy
PAM	polyacrylamide (flocculant)
PEM	Protocol for Environmental Management – Mining and Extractive Industries
PE Act	<i>Planning and Environment Act 1987</i>
PM	particulate matter
PPF	Planning Policy Framework
PPV	Peak Particle Velocity
Project	Fingerboards Mineral Sands Project
Project Area	The area covered by the Mining Licence which will be subject to the Work Plan under the MRSD Act
Proponent	Kalbar Operations Pty Ltd
RAP	Registered Aboriginal Party
REP	Radiation Environment Plan
RFI	Request for Information
RMP	Radiation Management Plan
RWMP	Radioactive Waste Management Plan
SES	State Emergency Service
SCO	Specific Controls Overlay
SEIA	Social and Economic Impact Assessment
SRW	Southern Rural Water

TN#	Technical Note (number)
TSF	Tailings Storage Facility
TSP	Total Suspended Particulates
TTIA	Traffic and Transport Impact Assessment
TTMP	Traffic and Transport Management Plan
VFF	Victorian Farmers Federation
Water Act	<i>Water Act 1989</i>
WAA	Works Approval Application, now a Development Licence under the new EP Act
WCP	Wet Concentrator Plant

Executive summary

(i) Background

The Fingerboards Mineral Sands Project (the Project) is a mineral sand mine proposed to be developed by Kalbar Operations Pty Ltd (the Proponent) at the Fingerboards in the Glenaladale deposit, approximately 25 kilometres west of Bairnsdale in East Gippsland.

The Project area in the exhibited Environment Effects Statement (EES) is 1,675 hectares, of which 1,350 hectares would be disturbed by mining or infrastructure. The mine life of approximately 20 years includes two years of commissioning, and 15 years of mining followed by decommissioning, rehabilitation, and post-closure activities.

The resource would be mined using machinery to remove topsoil and overburden then ore before progressive rehabilitation. The operation would run 24 hours a day, 365 days a year.

Approximately 8 million tonnes of heavy mineral concentrates (HMC) would be separated from tailings on site, before being transported to port for export and further processing overseas. The preferred method of transport to port is via rail from a new rail siding to be constructed near the Project area in Fernbank East.

Tailings would be returned to the mine void after dewatering. The exhibited EES proposed dewatering fine tailings using a temporary Tailings Storage Facility (TSF). Post exhibition the Proponent proposed using centrifuges for fine tailings dewatering.

Water supply for the Project is proposed to be from a winterfill allocation from the Mitchell River, groundwater and process water recovery on site.

(ii) Exhibition and submissions

The Minister for Planning determined under the *Environment Effects Act 1978* (EE Act) on 18 December 2016 that an EES was required for the Project. The EES was exhibited in September and October 2020.

Draft East Gippsland Shire Planning Scheme Amendment C156egip (the Amendment) was exhibited concurrently. The Amendment facilitates the provision of infrastructure elements of the Project (including transport, power supply and water infrastructure) outside the mining license area by including a Specific Controls Overlay (SCO) and associated Incorporated Document in the Planning Scheme.

A Development Licence Application¹ for water treatment and discharge from the Dissolved Air Flotation (DAF) plant under the *Environment Protection Act 2017* (EP Act) was exhibited at the same time.

Exhibition of the EES attracted 910 submissions, of which approximately 900 opposed the Project. Forty seven of these submitters lodged an additional submission in relation to centrifuges.

¹ At the time, a Works Approval Application under the now repealed *Environment Protection Act 1970* (Vic).

(iii) The Inquiry and Advisory Committee

The Minister for Planning appointed a four-member Inquiry and Advisory Committee (IAC) on 30 August 2020 under section 9 of the EE Act (the Inquiry) and section 151 of the *Planning and Environment Act 1987* (the Advisory Committee) to inquire into and report on the Project.

The IAC was provided with Terms of Reference (dated 19 July 2020), that required the IAC to:

- Hold an inquiry into the environmental effects of the Project and report its findings and recommendations to the Minister for Planning.
- Review the draft Amendment and report its findings and recommendations to the Minister for Planning.
- Provide advice to inform the Environment Protection Authority's (EPA) consideration of the Development Licence (previously Works Approval Application).
- Provide advice to the Minister for Planning in relation to Matters of National Environmental Significance (MNES) pursuant to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The public Hearing was held on 36 days over 10 weeks from May to July 2021 via videoconference, with some limited in person submitter attendance due to COVID-19 restrictions. Approximately 119 submitters spoke at the Hearing, and 29 expert witnesses were called.

The IAC undertook several accompanied and unaccompanied site inspections of the site and surrounding areas including visiting key infrastructure locations and viewing the Project area from surrounding properties.

The IAC report is provided in two volumes:

- Volume 1 – Main Report, including:
 - key considerations
 - findings
 - recommendations.
- Volume 2 - Appendices, including
 - list of submitters
 - parties to the Hearing
 - document list
 - recommended Incorporated Document

(iv) Overall findings

On balance, and after careful consideration of the adverse and beneficial impacts, the IAC considers the environment effects of the Project cannot be managed to an acceptable level and the Project should not proceed.

The detail of the conclusions around individual issues is discussed in the various issues chapters in Volume 1, but the finding is based primarily on:

- The extremely high risk of impact to the State strategic horticultural area of the Lindenow Valley (particularly from air quality) and the lack of confidence the impacts could be reduced to a level to protect that industry.
- The uncertainty around water availability and allocation and the advisability of introducing a high water demand use into an area of constrained resource in a drying climate.

- Very significant native vegetation removal including over 700 large old trees including uncertainty as to whether vegetation removal has been avoided or minimised and whether offsets can be provided.
- A significant social impact in a relatively densely settled rural area with a mix of farms, and rural residential uses, including high numbers of farm workers in the environment.

The IAC considers there are many and significant risks to the local and regional environment that have not been assessed to a degree that would give comfort to a decision maker to a level that would warrant Project approval.

(v) Key issues

The key issues that informed the position of the IAC are outlined below.

EES process

- There have been significant changes to the Project through the assessment process which made it difficult for the IAC and stakeholders to properly engage with consideration of environment effects.
- However, the IAC understands the potential environment effects to a sufficient level to draw its primary conclusions.
- There is a high level of ongoing uncertainty around many Project elements and potential environment effects that, even if decision maker(s) wish to approve the Project, the IAC considers the level of risk involved will require significant and substantial further investigative and assessment work.

Biodiversity

- The Project would result in very significant losses of native vegetation including over 700 large old trees and would be one of the most significant vegetation clearances in recent years in Victoria.
- The IAC is not persuaded that attempts to minimise habitat loss have been maximised.
- The proposed 200 hectare revegetation project is welcomed and should be considered regardless of whether the Project proceeds or not.

Water

- The IAC is concerned that even after exhibition of the EES, there is considerable uncertainty about the water needs of the Project; this is problematic for a major potential water user in a water constrained environment.
- Project development and success is heavily dependent on water availability, and this is yet to be proven.
- Impacts on significant surface water environments around the Project will require further investigation if the Project proceeds.
- Impacts on groundwater from both extraction and the potential for pollutant seepage from tailings areas require further assessment, analysis and Project design before any consideration of approvals could be countenanced.

Air quality

- The IAC is not convinced that dust impacts on surrounding land use (particularly horticulture) can be managed to an acceptable level.

- With no effective buffer to high value horticulture areas, the IAC considers the risk to this adjacent industry is extreme.
- Risk mitigation is reliant on high levels of active dust suppression and other management controls which have not been proven in this environmental context with the soils and subsoils on site.

Noise and vibration

- The IAC considers noise and vibration should be able to be managed within acceptable limits; additional work to address the new general environmental duty would be required.
- The residual impact of noise, particularly night-time noise, is likely to cause significant negative impacts on the local community.

Radiation

- Radiation levels from mining, processing and transport should be able to be managed within acceptable levels, but this is highly contingent on further assessment and analysis.
- The radiation conclusions are highly contingent on conclusions in relation to dust and air quality.

Roads, traffic and transport

- A rail option from a new Fernbank East Siding is preferred by the Proponent and supported by the IAC among the options presented, if the Project were to proceed.
- The management of road deviations and full restitution and repair of roads will be critical if the Project were to proceed.
- During the Hearing, the Proponent proposed a new port (Geelong) and method for exporting HMC (transfer to bulk transport at port); neither of these options were assessed for their environment effects.

Land use planning

- The planning and legislative framework does not favour mining or agriculture but is context dependent.
- In this case the IAC considers the land use considerations weigh against the Project because of its short, medium and potentially long term negative consequences for recognised high value horticulture use, agriculture and tourism in the local and regional area.

Landscape and visual

- Whilst not identified as a high value landscape in planning, the area has significant landscape values as an attractive area and high value landscape entrance to the Mitchell River National Park.
- The landscape assessment downplays the landscape values and provides over simplistic, unhelpful images of a post mining landscape.
- The impact on landscape will be extreme in the medium-long term and will take many generations to return to a large old tree dominated landscape, assuming the landscape and form can be stabilised post-mining.

Agriculture and horticulture

- The State significant horticultural values of the area and Lindenow Valley are not in dispute; they are a resource arguably even more constrained than mineral sands and are likely to become more valuable as climate change impacts increase in effect and frequency.
- The existing horticultural and agricultural industries are growing strongly with significant local and regional employment; to put these existing industries at risk would not be sound long-term decision making.
- The IAC considers the Project presents an unacceptable risk to this high value horticultural (and agricultural) resource.

Cultural heritage

- The statutory approvals under the *Aboriginal Heritage Act 2006* should be able to be obtained for the Project.
- Given the significant extent of area to be disturbed, impacts on tangible and non-tangible Aboriginal heritage cannot be avoided and some Aboriginal cultural heritage will be lost.

Social impact

- The local community has a strong and deeply held 'sense of place' for the Fingerboards which will (and has already) experience an extremely high adverse impact; with little evidence to suggest there have been meaningful attempts to address this impact.
- The extremely high level of opposition in submissions from local, regional and further afield submitters is unusual and testament to the depth of feelings in the community.
- If the Project proceeds, it is difficult to see how the Proponent would be able to mitigate this impact given the depth and breadth of ill-feeling apparent to the IAC at the Hearing.

Economic impact

- The Project will result in economic benefits accruing locally, at the state level, and significant benefits offshore.
- The IAC considers there has been little genuine attempt to assess these benefits in relation to the existing economic benefits in the region from horticulture, agriculture and tourism; and the risk the Project may pose to these existing industries.
- The Proponent did not demonstrate with any certainty the overall economic benefits of the Project would outweigh the economic disbenefits to existing local industries, either during the mine life or over the much longer term when mining has finished.

Human health

- The Project's impact on human health is not clear and the human health risk assessment will need to be reviewed and revised to consider significant additional baseline data collection that is required.
- Mental health was not addressed in the health risk assessment, and in a region affected by fire, drought and COVID-19, the mental health concerns apparent in the local community require considerable attention and resources.

Soils and rehabilitation

- Rehabilitation planning and trials appear to be at an early stage and require significant investment and research.

- Considerable uncertainties remain in relation to final landform stability, subsoil manufacturing and working with the dispersive soils on site. These uncertainties would need to be resolved before any Project approvals should be granted.

(vi) Recommendation in chief

Based on the reasons set out in this Report, the Panel recommends:

- 1. The environment effects of the Fingerboards Mineral Sands Project cannot be managed to an acceptable level and the Project approvals should not be granted.**

(vii) Further recommendations

The IAC is strongly of the view the Project should not proceed for the detailed reasons outlined in this report.

If the decision maker takes a different view, the following recommendations are made to assist in identifying the substantial and significant additional work the IAC considers would need to be undertaken prior to any Project approvals being issued.

Biodiversity

- 2. Determine through further assessment if groundwater dependent ecosystems are present on the Project site and surrounding environments and, if present, if there is an impact from the Project and how this impact can be managed.**
- 3. Implement a management plan for the Giant Burrowing Frog in the event the species is found within the Project or Infrastructure Area.**
- 4. Assess flora and fauna in areas to be impacted which have not been assessed in the Environment Effects Statement and subsequent assessments, including the property at 2705 Bairnsdale - Dargo Road and the mining licence extension area.**
- 5. Include a condition in the Rehabilitation and Closure Plan requiring the Proponent to enter into an agreement or other legally enforceable measure that is registered on title and binds future owners of the land in perpetuity to maintain and resource the Grassy Woodlands Restoration Project, to the satisfaction of the Department of Environment, Land, Water, and Planning.**

Groundwater

- 6. Undertake a full-scale trial of the ability of the centrifuges to recover water at the rates predicted/used in the water balance modelling.**
- 7. Rerun the water balance model based on a proven water recovery rate from the full-scale trial.**
- 8. Undertake further groundwater pumping tests and update groundwater modelling to demonstrate impacts from pumping will not adversely impact existing groundwater users, and the long-term viability of water supply from the borefield.**
- 9. Develop a contingency plan to obtain another source of water in the event sufficient groundwater cannot be sourced from the Latrobe Group aquifer.**
- 10. Include assessment of the quantity and type of flocculant required in processing tailings during the full-scale centrifuge and design an appropriate system to recover seepage.**

11. **Monitor the Woodglen Aquifer Storage and Recovery site to assess and mitigate potential risks on groundwater storage.**
12. **Map the distribution of dune sands in and nearby to the Project Area and compare to the location of the spring-fed dams and the perennial sections of Moulin/Stoney Creek, to assess impacts from removal of dune sand in the Project Area.**
13. **Require the Proponent to compensate land owners for the loss of water from any dams outside the Project Area shown to be impacted through loss of perched water supply.**

Surface water

14. **Conduct water quality monitoring of the Mitchell and Perry Rivers at sites both up and downstream of the mine including against the monitoring parameters identified by the Environment Protection Authority.**
15. **Use background water quality parameters as the relevant water quality objectives where those levels are better than the levels specified in the Environmental Reference Standards.**
16. **Design water management dams with sufficient capacity to prevent spills being less than 1 per cent as recommended by the Environment Protection Authority.**
17. **Collect site based rainfall and runoff data during an east coast low and apply the data to flood and dam capacity modelling.**
18. **Develop a contingency plan to manage the risk of untreated mine contact water entering watercourses when the dissolved air floatation plant is offline.**
19. **Develop and adopt water quality management measures for times of low river flow or drought to ensure the water quality of the discharge into the Mitchell River is to Environment Protection Authority acceptable criteria.**
20. **Monitor the Chain of Ponds system during groundwater test pumping to assess impacts.**

Air quality and greenhouse gas

21. **Review the air quality modelling to include all sources of dust generation, and additional baseline data including the results from the exploration pit and sensitivity testing related to the meteorology data inputs.**

Noise and vibration

22. **Assess the vibration characteristics of the centrifuges during on-site trials to determine if any mitigation measures are required.**

Radiation

23. **Undertake additional detailed radiation assessment studies and agricultural and horticultural data collection that will be required by the Department of Health for approval purposes to validate projections and modelling to demonstrate the radiation risk issues to the external environment and human health can be managed.**

24. **Include dose trigger points in the Radiation Management Plan well below current maximum dose levels to activate early intervention and assessment if radiation doses trend upward.**
25. **Store stockpiles of heavy mineral concentrate in a totally closed system capable of preventing water ingress and containing and treating any water runoff and ensuring that heavy mineral concentrate can not be spread through wind or other mechanisms.**
26. **Undertake a comprehensive risk assessment of transporting heavy mineral concentrate through central Melbourne by rail.**
27. **Ensure all stages of the export of heavy mineral concentrate, including at port, are via closed systems to minimise risks for radiation exposure or loss of heavy mineral concentrate to the environment.**

Roads, traffic and transport

28. **Update the Traffic and Transport Impact Assessment with current traffic counts, as required by the Department of Transport.**
29. **Assess and confirm the feasibility for heavy mineral concentrate freight by rail to the Port of Geelong.**
30. **Assess and resolve the feasibility and desirability of new roundabouts on the Princes Highway at Lindenow - Glenaladale Road intersection and Racecourse Road.**
31. **Retain the site access at the proposed new Fingerboards roundabout.**
32. **Grade-separate the private haul road at the Fernbank - Glenaladale Road intersection.**
33. **Implement legally binding agreements (including bonds if necessary) to cover the full cost of repairing and reinstating state and local roads including the Bairnsdale - Dargo Road and other impacted roads to their final/original reservation.**
34. **Develop a Traffic and Transport Management Plan to the satisfaction of the Responsible Authority and the Head Transport for Victoria.**

Landscape and visual

35. **Include in the Work Plan or Visual Amenity Management Plan (as appropriate):**
 - a) **a requirement that sufficiently mature screening native vegetation is established at sensitive receptors (with the owner's consent)**
 - b) **detailed plans including locations for early implementation of visual screen planting prior to mining commencing to mitigate visual impact**
 - c) **management measures (including consultation with adjoining residents) to ensure the proposed visual bunds are appropriately designed and located to reduce negative visual impacts of the Project.**

Agriculture and horticulture

36. **Encourage the Minister for Agriculture to liaise with Council and the Victorian Farmers Federation in partnership with existing businesses in the Lindenow Valley to develop an effective reporting framework to comprehensively describe the true value of the horticulture sector and the associated value adding processing and distribution businesses that depend on it.**

Cultural heritage

- 37. Investigate and record tangible and intangible values through the Cultural Heritage Management Plan process such as the songlines and travel routes of the area, Skull Creek massacre and the existence of marker trees.**

Economic impact

- 38. Ensure public availability of all pre-mining baseline data for issues with potential offsite impacts to provide a baseline for landowner and regulator enforcement and/or compensation if necessary.**

Human health

- 39. Review and revise the Human Health Risk Assessment to include additional baseline data and revised inputs from other Environment Effects Statement specialist technical experts including:**
 - **A review of toxicants and screening levels for emissions to ensure they are in accordance with the National Environment Protection Measure (Assessment of Site Contamination) and that all toxicants present in the topsoil, overburden and ore are addressed.**
 - **Consultation with stakeholders, including the local community, to ensure the method and results are clearly communicated and understood, and opportunities for feedback provided.**
 - **Allowance for sensitivity around the likely feasibility and effectiveness of mitigation measures.**
 - **Measures to ensure that issues raised in the Human Health Risk Assessment are fed back to influence detailed Project design.**
 - **Consideration of other physiological health impacts, including noise.**
 - **Consideration of mental health.**
 - **Review and oversight by a suitably qualified independent health expert.**

Soils and rehabilitation

- 40. Ensure bond calculations under the *Mineral Resources (Sustainable Development) Act 1990* are adequate to account for the uncertainties in rehabilitation success and the consequent timing, management, and removal of dams on site.**

Draft planning scheme amendment

- 41. Apply the Incorporated Document as shown in Appendix E to the Project.**

Environmental management framework

- 42. Review and revise the Environmental Management Framework and Mitigation measures based on the last versions with comments tabled in the Inquiry and Advisory Committee Hearings; incorporate the additional assessments and investigations recommended in this report.**

Matters of National Environmental Significance

- 43. Before proceeding to consider approval under the *Environment Protection and Biodiversity Conservation Act 1999*, the Commonwealth Minister for the Environment should require further assessment of:**

- a) surface water and groundwater quality impacts on the Mitchell and Perry Rivers, and the Gippsland Lakes Ramsar site, under normal operating conditions and in the event of catastrophic dam failure.**
- b) the extent to which Matters of National Environmental Significance on the property at 2705 Bairnsdale – Dargo Road, Glenaladale, and any additional area of the mining licence area not surveyed, may be impacted and the existing ecological impact assessments reviewed and updated accordingly.**
- c) the impacts on the environment of the storage of heavy mineral concentrate stockpiles once their size, location and management has been clarified.**

1 Background

1.1 The Proponent and the Project

The Proponent for the Fingerboards Mineral Sands Project (the Project) is Kalbar Operations Pty Ltd (the Proponent). This section provides an overview of the key elements of the Project drawn from the Environment Effects Statement (EES) documentation, particularly, EES Chapter 3 and the updated project description in Document 122. It includes elements from the project overview requested by the Inquiry and Advisory Committee (IAC) and shown in Technical Note 39 (TN39).²

1.1.1 Overview

The Project proposes to mine mineral sands from the Fingerboards resource within the Glenaladale deposit 25 kilometres west of Bairnsdale in East Gippsland. Mining will extract enriched grades of mineral sands in a 24-hour/365 days a year operation using a dry strip method.

The Project area in the exhibited EES is 1,675 hectares, of which 1,350 hectares is proposed to be directly disturbed by mining or infrastructure over the life of the project. As a progressive mining method is proposed, the maximum area of disturbance would be approximately 360 hectares at any one time.

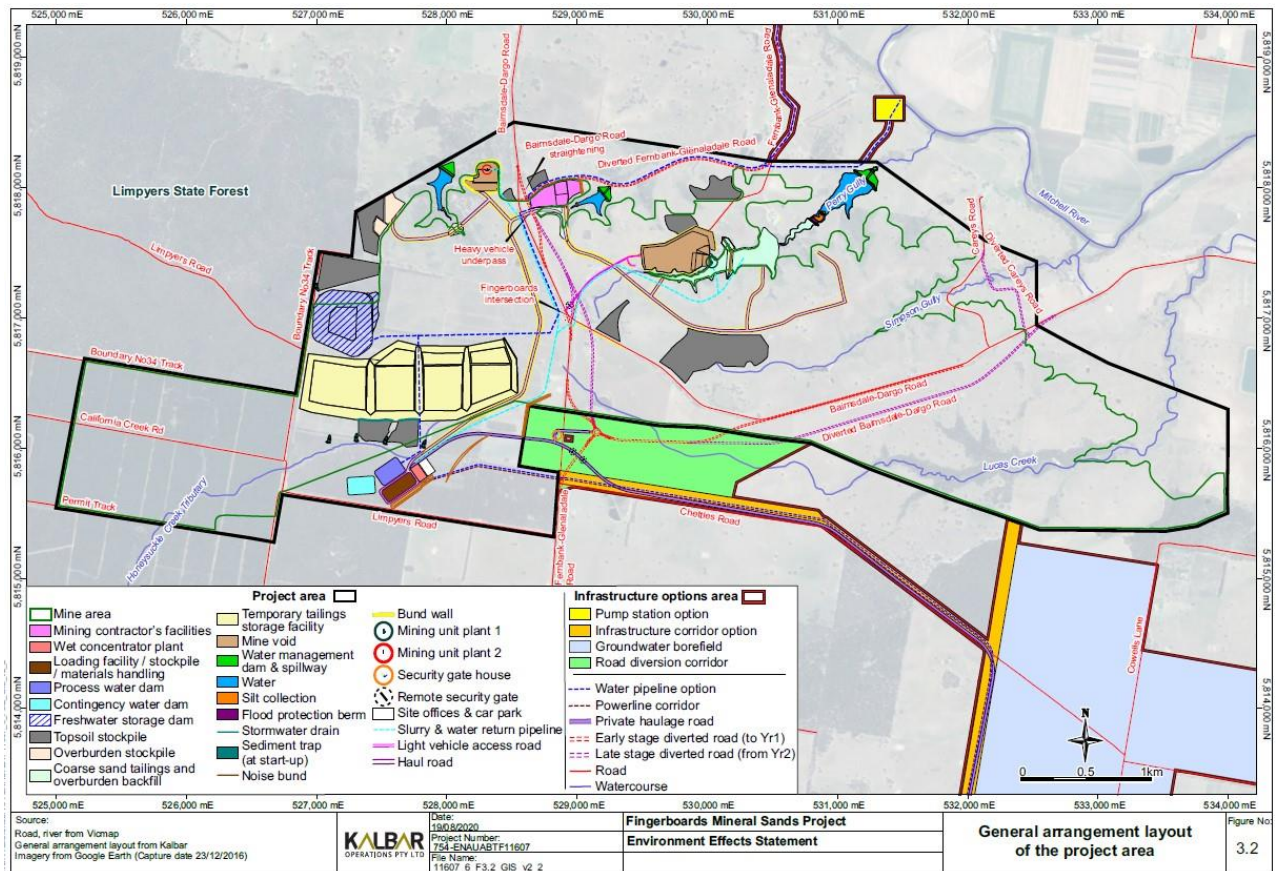
Heavy minerals are proposed to be concentrated on site through primary processing. Overburden and tailings from primary processing are to be returned to the mine void during the rehabilitation process.

The mine life includes approximately two years for construction and commissioning, 15 years of production at full capacity followed by decommissioning, rehabilitation, and post-closure activities. Eight million tonnes of magnetic and non-magnetic HMC from 170 million tonnes of ore is expected to be mined and processed over the mine's life of 20 years. Final closure of the mine may require an additional five years of management.

The general layout of the project area is shown in Figure 1.

² Document 537.

Figure 1 Project area³



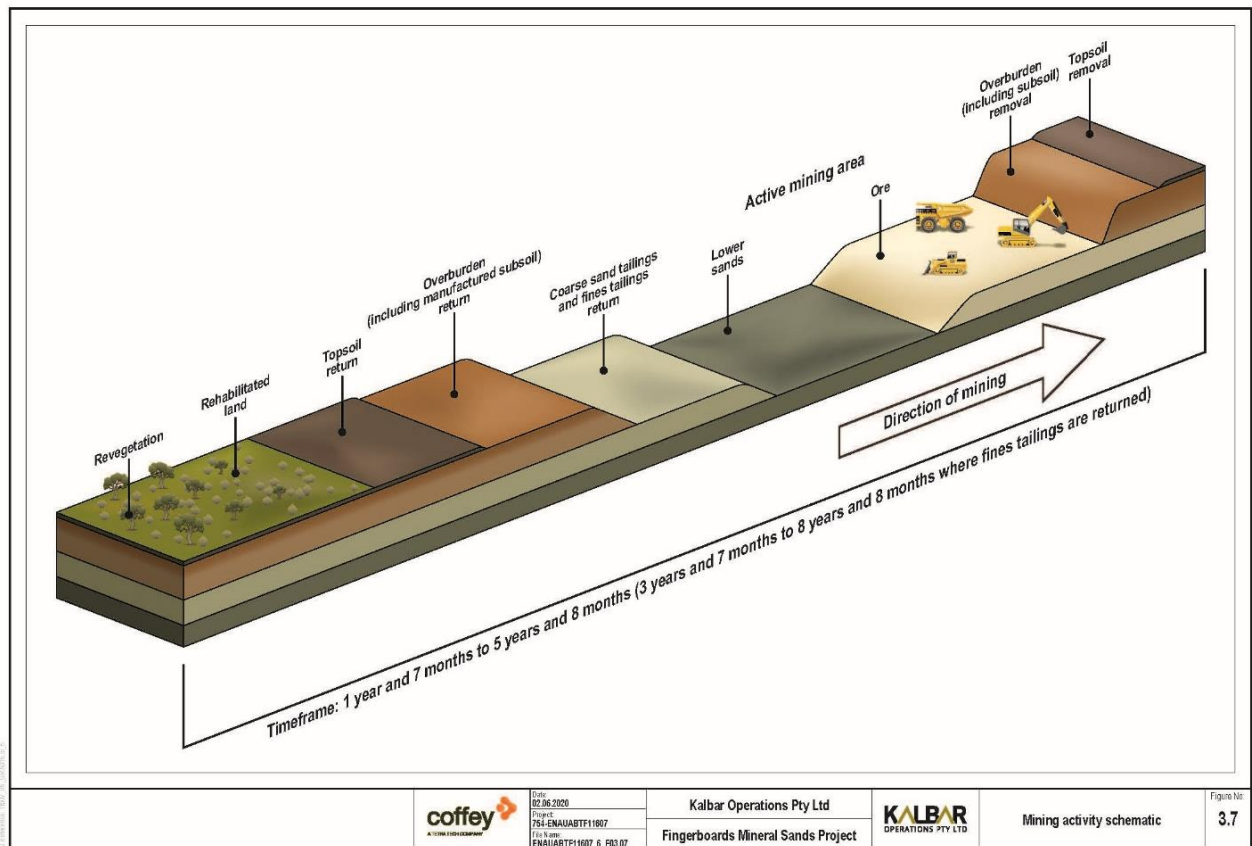
1.1.2 The resource

The Glenaladale deposit sits largely within two retention licences and several exploration licences and exploration applications held by the Proponent. The Fingerboards resource is primarily within the Glenaladale deposit and contains zircon, rutile, ilmenite, and rare-earth minerals including monazite and xenotime. A reserve has been defined within the Fingerboards resource compliant with the Joint Ore Reserves Committee (JORC) 2012, containing an estimated 170 million tonnes of ore at in-situ grades of 1.24 per cent zircon, 1.9 per cent titanium dioxide and 0.11 per cent total rare-earth oxides.

1.1.3 Mining

The proposed mining sequence (Figure 2 below) includes site preparation through removal of topsoil and overburden, mining of the ore with conventional earthmoving equipment, replacements of tailings, overburden (non-economic sands, silts and clay) and topsoil followed by surface replanting.

³ EES Chapter 3, page 4.

Figure 2 Mining activity schematic⁴

Topsoil stripping to establishment of revegetation ranges from 19 to 68 months and when fine tailings are returned to the void, this can require an additional 36 months.

Topsoil will be stripped and stored separately from overburden either onsite or moved to nearby rehabilitation facilities. Approximately 30 million tonnes of overburden will be moved annually. In the mine's initial stages, overburden is to be stockpiled adjacent to the mine until the mine void is large enough for direct return of overburden.

The active mining area will advance 2.5 kilometres per year. The mine is expected to have two 60 hectare mine voids at any one time. The mine cells will be 300 metres wide and 1,000 metres long with an average depth of 29 metres and a maximum depth of 50 metres. Each mine void will use 10 hectares for tailings disposal.

Rehabilitation of the site aims to restore the land to at least its pre-mining land capability and land use, or alternative agreed end land use. Infrastructure is to be decommissioned and removed for closure.

1.1.4 Processing

Ore processing is described in the EES as the point where the ore enters the mining unit plants (MUP), through to the separation into magnetic and non-magnetic HMC's that are ready for transport and export.

⁴ EES Chapter 3, page 12.

Two MUP's are proposed to be constructed and operating, with one MUP for each mine void. The MUP's will be skid mounted so they can move as the mine void progresses. MUP's will remove oversize material that will fall into the mine void. Water will be mixed with ore in the MUP and then pumped as a slurry to a wet concentrator plant (WCP) through a pipeline of up to 5 kilometres.

The WCP separates out the heavy minerals from the ore. A vibrating screen plant will remove material greater than 1 mm in diameter from the ore while hydrocyclones will remove material smaller than 38 µm in diameter known as overflow fines. Fines will be sent to a high-rate thickener where fines tailings are thickened to about 35 per cent solids using flocculant.

In the EES, the thickened fine tailings slurry is sent to a temporary Tailings Storage Facility (TSF). After five years, when the mine void is large enough, the fine tailings will be returned to the mine void and the area under the TSF is then able to be mined.

At the WCP gravity separators and wet screening units separate the minerals using gravity where between 3 and 10 per cent of the ore entering the gravity circuit will be HMC. The resulting coarse sand tailings will be dewatered to greater than 65 per cent solids in tailings disposal areas. The HMC is separated into magnetic and non-magnetic concentrates in stockpiles ready for export.

The EES states the TSF is to be constructed for the first five years of mining. The TSF is made up for four storage cells and located close to the WCP where fine tailings will be stored. The TSF would cover an area of up to 90 hectares with a capacity of 6,600,000 cubic metres of fine tailings.

1.1.5 Water

The project will require 3 gigalitres of water annually for ore processing, dust suppression, rehabilitation, wash down and onsite drinking water. Ore processing and dust suppression are the two main uses of water. Three hundred thousand litres per hour of water is expected to be lost from tailings, with approximately 65 per cent of water in tailings recovered. Approximately 400 megalitres of water per year will be used for dust suppression using water trucks.

Surface water is proposed to be pumped from the Mitchell River subject to a winterfill licence being granted. Groundwater is proposed to be extracted from the Latrobe Group Aquifer when winterfill river water is not available. Water will be stored and managed onsite in dams for freshwater storage, process water, contingency water and water management. All water sourced from the Mitchell River is planned to be stored in the freshwater storage dam. Each dam is described in the EES as being designed with a storage allowance for a 72 hour storm event.

Rainfall into the mine voids will be removed using sump pumps. Runoff from undisturbed and rehabilitated areas is to be diverted around active mining areas and released to the downstream catchment where possible. Water that cannot be diverted to the downstream catchment will be captured and enter the process water circuit. To reduce the potential for transport of soil and sediment to downstream environments, sediment ponds are proposed to be constructed.

Where rainfall runoff entering water management dams exceeds the capacity of the process water circuit to drain the dams, mine contact water would be pumped to a water treatment plant, and then directed to the freshwater storage dam. A dissolved air flotation (DAF) treatment plant is proposed. The DAF plant would have a capacity of 24 megalitres per day and clarifies water by removing suspended solids and some chemical impurities.

1.1.6 Infrastructure

Power is proposed to be supplied to the site from the national 66 kV grid through the infrastructure corridor. A 66 kV sub-station and transformers to lower voltage is proposed within the mine site where 22 kV powerlines would be used for reticulation of power through the project site. The MUPs and WCP have an estimated power demand of 9,000 kilovolt-ampere.

Three types of light sources are proposed to be used on site. These include fixed and permanent lights, stationary work lights and vehicle headlights. Fixed permanent lights would be used for permanent project infrastructure such as the WCP and administration complex, whereas stationary work lights would be used in the mining activity areas.

1.1.7 Access and transport

Internal haul roads and access roads will be sited so that mine traffic does not use local or public roads. Internal roads are proposed to be unsealed and constructed using overburden and local stone materials with chemical and physical dust suppressants being used as the main form of dust control. The road widths will depend on finalised equipment but are estimated to be 20 – 30 metres wide. Two heavy vehicle underpasses are proposed to be constructed beneath Bairnsdale – Dargo Road at different stages of the project. The site is proposed to be accessed via a private road adjacent to the intersection of Chettles Road and Fernbank – Glenaladale Road.

Public roads are proposed to be diverted, realigned, re-constructed and enhanced throughout various stages of the project. Public roads that will undergo works include:

- Bairnsdale – Dargo Road
- Fernbank – Glenaladale Road
- Careys Road.

It is proposed to transport the HMC to port via road and rail. The EES indicates the Project will generate approximately 40 return B-double trips per day, travelling from and returning to the mine site. HMC is proposed to be transported in containers or covered on trucks. The EES sets out a preference for a purpose-built new rail siding at Fernbank East to allow HMC to be transported by rail using freight trains on the Gippsland Line. Alternatively, the EES outlines the option of upgrading the existing rail siding in Bairnsdale.

Port Anthony and Barry Beach Marine Terminal are located 160 kilometres from the project site and are proposed to operate as the port facility for concentrates transported by road. The Port of Melbourne is the proposed export port for HMC transported by rail.

1.1.8 Waste and hazardous materials

Construction of the processing plants is proposed to occur offsite to reduce the amount of construction waste generated on site. Solid non-toxic waste will be removed from site by contractors. Hydrocarbons generated from the operation of the mining fleet and mobile plant are proposed to be stored in suitable containers for removal from the site to approved waste sites or recycling depots. A licensed contractor is proposed to regularly empty hydrocarbon from interceptor traps from runoff.

Hazardous materials to be stored on site include but are not limited to acetylene, compressed oxygen, oil and grease, and lime. The EES sets out that hazardous materials will be stored in designated areas and follow Environment Protection Authority (EPA) guidelines. Hazardous materials would be transported in accordance with relevant regulations and the EES states that in

most cases, transport of hazardous material would be the responsibility of contractors. The classification, packaging and labelling of hazardous materials will be the responsibility of the manufacturers, suppliers and transport contractors.

1.1.9 Updated project description

An updated project description was provided by the Proponent⁵ following the introduction of centrifuges. Centrifuges as a project element are discussed in Chapter 1.2. The main change is the removal of the temporary TSF as a project element and the introduction of centrifuges.

Other updates to the Project description in Chapter 3 of the EES include:

- Construction and commissioning of Project to commence in 2022 instead of 2021 should the necessary approvals be obtained.
- HMC production to commence in 2023 instead of 2022.
- The option for using the existing pump station on the Mitchell River for obtaining surface water is no longer being pursued.

After receipt of the updated Project description, the Proponent advised that the preferred export method is via bulk transport of HMC from the Port of Geelong.

1.2 Centrifuges as a project element

1.2.1 Background

In correspondence dated 18 January 2021, the Proponent formally introduced the potential use of centrifuges for tailings dewatering into the Project and assessment.⁶ The centrifuges were said to have advantages, being, in summary:

- providing certainty about water recovery from the fine tailings
- removing the need for a temporary TSF or in-pit fines TSFs as the centrifuges create a damp cake
- allowing the continuous backfilling of mine voids so the disturbed mining area is smaller, and rehabilitation can occur sooner on any particular area
- continuous mining and backfilling reduces overburden haul distance, which reduces noise and dust generation
- risk of seepage from fine tailings is removed as the cake material is fully dewatered to a state that will only retain capillary moisture that cannot seep to the environment.

The Proponent indicated the figure of 80 per cent water recovery in the EES from fine tailings using the TSF approach is incorrect and that evaporation losses would mean the water recovery is approximately 55 per cent from fine tailings. The centrifuges would bring the water recovery from fine tailings back to approximately 80 per cent.⁷

⁵ Document 122.

⁶ Document 42.

⁷ For illustration Figure 8.2 in Appendix A to Appendix A006 in the EES shows a ratio of entrainment to recovery of 1,112/4,496 ML/yr or approximately 80% water recovery *without* centrifuges (plus relatively even evaporation and rainfall figures). Figure 3.1 in Appendix A to Mr Mullers supplementary evidence statement (Document 132) shows a ratio of 1,454/5,816 ML/yr or 80% recovery *with* centrifuges.

When queried by the IAC, the Proponent confirmed the introduction of centrifuges was in place of the TSF, not an option to be considered alongside a TSF.⁸ The procedural issues around the introduction of this new project element post exhibition of the EES are discussed in Chapter 2.6.2.

1.2.2 Centrifuge description

The Proponent provided a description of the centrifuges and their operation.⁹ A summary is provided in Table 1.

Table 1 Centrifuges¹⁰

Number	8 (2 x plants of 4 centrifuges each, 6 in 24/7 operation and 2 on standby)
Centrifuge dimension	9m long
Weight	18 tonnes per unit
Building dimension	23.5m long x 13.5m wide x 11.5m high (with internal acoustic cladding)
Throughput	55 tonnes of solids per hour per unit
Location	2 plants which would move over time to be relatively close to active mining for cake disposal in the mine void

A picture of similar centrifuge unit to that proposed for the Project is shown in Figure 3

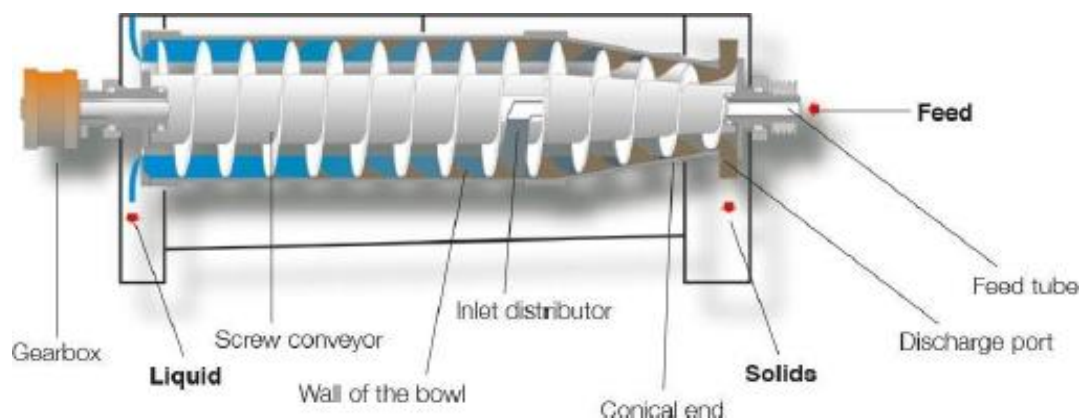
Figure 3 Centrifuge similar to the unit intended for Fingerboards¹¹



A graphic showing the in-principle operation of the centrifuge is shown Figure 4.

⁸ Document 151.
⁹ In Technical Note 1, Document 43a.
¹⁰ Summarised from Document 43a.
¹¹ Document 43a, page 5.

Figure 4 Picture showing the principle operation of a decanter centrifuge¹²



A schematic of the centrifuge building and cake stockpile is shown in Figure 5.

Figure 5 Centrifuge building and cake stockpile¹³



Using centrifuges rather than the TSF would increase power demands from the Project from 9,000 kilovolt-amperes to 14,000 kilovolt-amperes.

The centrifuge works by spinning at 1,000 to 1,800 rpm, thereby significantly increasing the gravitational forces on the fines slurry¹⁴ and separating the heavier solids from the lighter water. Comparison of the centrifuges to the TSF option is shown in Table 2.

¹² Document 348, page 5.

¹³ Document 43a, page 6.

¹⁴ By 600 to 1,800G.

Table 2 Simplified comparison of fine tailings treatment¹⁵

EES (TSF)	Centrifuges
After gravity separation a flocculant is added to the fine tailings slurry (30-35% solids)	
Slurry pumped to a TSF	Slurry with flocculants introduced to centrifuges
Initial settlement 24-72 hours (55% solids)	Centrifuge fines cake produced for disposal into temporary TSF and then directly into mine void (70% solids)
Further dewatering over 4-10 months (70-72% solids)	Liquid centrate from centrifuges reused as process water
Dewatering can be accelerated with mechanical equipment (amphirols)	
Most of the water lost to evaporation at this stage	
Water recovery 55%	Water recovery 83%

To ensure effective and efficient consolidation of solids, additional flocculant is added prior to the introduction of fine tailings slurry to the centrifuges. In response to questions from the IAC, the Proponent provided Technical Note 14 (TN14).¹⁶

The flocculant proposed is anionic polyacrylamide (PAM) which would be introduced at the rate of approximately 118kg/hour.¹⁷ Flocculant would be delivered either via container or bulk bags.

1.2.3 Evidence and submissions

The Proponent called an expert witness on the technical aspects of centrifuges, Dr Ivan Saracik and Mine Free Glenaladale (MFG) called an expert witness, Dr Conleth O’Loughlin. At the direction of the IAC, the experts met to discuss matters of agreement and disagreement.

Both experts agreed the use of bowl centrifuges for dewatering fine tailings is technically feasible and has been used successfully in mining but not mineral sands mining.

They both noted that a trial with a 200mm centrifuge¹⁸ produced centrifuge cake in the range of 60-63 per cent solids and that:¹⁹

These laboratory test programmes have delivered suitable performance figures that support the selection of decanter centrifuges for dewatering the Fingerboards tailings. Any proposal to establish a trail (sic) mining pit and larger scale centrifuge operation at the Fingerboards site is supported by the Experts.

In the individual comments in the statement, Dr O’Loughlin added:²⁰

The results from the initial sets of laboratory tests provide some level of confidence that centrifuges *should* work effectively at full scale during operation of the proposed

¹⁵ Summarised from Document 43a.

¹⁶ Document 195.

¹⁷ On a simple calculation just under 3 tonnes/day or approximately 1,000 tonnes/year.

¹⁸ Document 348 (Technical Note 23) outlines the P1 test unit with a 200mm bowl diameter, a P2 unit with a 440mm bowl diameter and a P3 unit with a 1000mm bowl diameter; the P3 being the likely production unit at the Fingerboards.

¹⁹ Document 235, section 2.1.

²⁰ Document 235, section 2.1.

Fingerboards mine. However, as centrifuges have not been used commercially on mineral sands tailings at field scale, an unacceptable level of uncertainty remains, particularly as no acceptable alternative approach has been proposed should centrifuges prove to be unworkable at the Fingerboards site. It is my recommendation that a pilot programme is conducted at the Fingerboards site using both local water and the Fingerboards tailings and using decanter centrifuges that are a step-up in scale from the decanter centrifuges used in the April 2021 laboratory trials. Results from such field trials would be an important qualifier for reducing uncertainty and establishing the likely effectiveness of decanter centrifuges for the Fingerboards tailings.

In his evidence, Dr O’Loughlin indicated some safety concerns around the use of centrifuges related to, in summary:²¹

- containment in the event of catastrophic failure
- how or whether vibration, temperature and rotation speed measurements are used in centrifuge control including threshold triggers
- foundation design to tolerate an un-balanced centrifuge
- foundation movement that could be accommodated without affecting centrifuge operation.

In the expert meeting report, Dr O’Loughlin accepted the centrifuges will not provide an unacceptable safety risk provided they are designed for containment in a catastrophic failure and include monitoring and triggers for action and shutdown in the event of operating outside their design parameters.

East Gippsland Shire Council (Council) commissioned Ausenco Pty Ltd (Ausenco) to undertake a review of the tailings dewatering using centrifuges. Ausenco’s first report was attached to Council’s supplementary submission 716 on centrifuges. Ausenco then submitted an amended report²² based on additional information becoming available (largely material that came out through the IAC process) and in relation to some concerns with the way their conclusions had been presented.²³

At a high level Ausenco considered:²⁴

The Alfa Laval P3 centrifuges are a promising technology that have the potential to increase water recovery, reduce footprint and increase the speed of rehabilitation for the Project. For these reasons they are worthy of consideration.

The Ausenco report considered in some detail the basis for their conclusions and identified further work to be done to confirm the suitability of centrifuges for the Project including, in summary:

- validating the centrifuge sizing with the vendor (Alfa Laval)
- validating the assumptions around centrifuge performance and centrifuged material properties by conducting trials
- testing the centrifuged product to confirm its materials handling and placement characteristics
- updating the water balance to validate the centrifuge fines recovery and management strategies.

²¹ Document 185, Section 4.2.

²² Document 253.

²³ The procedural issues associated with the Ausenco report are discussed in Chapter 2.6.3.

²⁴ Document 253, page 9.

MFG submitted the centrifuges did not offer the certainty suggested around water recovery.²⁵ TN22²⁶ was prepared by the Proponent in response to questions from MFG around the 70 percent solids figure suggested in TN1, when the P1 trial has produced solids in the range 60-63 percent.

TN22 calculated that using a 63 percent solids rate in the centrifuge cake rather than 73 percent would result in a reduction of water recovered of 0.83 gigalitres annually. The Proponent in TN22 indicated that such a low recovery rate was unlikely in full scale operations due to the higher percentage of clays in the real-world operation compared to the trial, and the use of hydrocyclones in operation compared to sieves in the trial.

MFG expressed concern about the introduction of centrifuges in the context where:

- they appear to have been introduced at the last minute due to a technical error in water calculations
- to the expert's knowledge they have never been used in a commercial setting for mineral sands mining anywhere in the world.
- the Proponent's own expert acknowledged the high capital and operating cost of centrifuges compared to TSF.

MFG concluded:²⁷

In circumstances where there is no precedent for the use of centrifuges for mineral sands mining at a commercial scale – in Australia or the world – an unacceptable level of uncertainty remains regarding the use of centrifuges. Moreover, in circumstances where there is no known precedent, alternatives need to be considered in the event that centrifuges prove to be unworkable.

MFG and other submitters raised the increased cost of centrifuges in the context of project viability. In response, the Proponent provided TN20 which indicated that:²⁸

- the increase in capital cost for centrifuges over TSF would be in the order of \$12.3 million
- the increase in operating cost would be approximately \$0.05 per tonne of ore, or 13 per cent on a per tonne of ore basis.

Many submitters submitted the centrifuges are likely to have significant environmental impacts or are unlikely to be successful.

Concerns about the eventual fate of flocculants is addressed in Chapter 6. Evidence and submissions on potential environment effects of centrifuges are considered in theme chapters, for example noise and vibration.

1.2.4 Discussion

The introduction of centrifuges as a new project element in early 2021 after exhibition of the EES has created considerable difficulties for the assessment of the Project. These procedural issues are discussed in Chapter 2.6.2.

It is difficult to understand why the centrifuges were introduced at this late stage, particularly as the IAC understands they were being considered in 2019, if not earlier. The IAC accepts that in theory centrifuges offer a technically superior process to the use of TSF and their benefits in terms

²⁵ Document 451, paras 105 onwards

²⁶ Document 346.

²⁷ Document 451, para 220.

²⁸ Document 327.

of water recovery and the reduction in area for fine tailings management seem clear as do reductions in risk associated with the operation and potential failure of tailings dams.

There are three significant caveats to the introduction of centrifuges. Firstly, both experts called²⁹ agree that further trials, at-scale, with the water supply to be used and with the materials to be centrifuged during production are needed to confirm the centrifuges will operate as predicted and water recovery rates will be achievable.³⁰

Secondly, until these trials are undertaken, there remains a degree of uncertainty about water recovery rates, with a consequent impact on the water balance. Until the water recovery rates can be confirmed in field scale trials, it remains unclear as to the quantum of water that may need to be sought as ground or surface water in addition to recovered water from the centrifuged fine tailings.

Thirdly, the impact on Project feasibility is unclear. Some figures were provided in TN20 but the IAC is not clear on their source or accuracy, and they were not tested in evidence. Whilst at face value the figures appear persuasive, the IAC notes the clear evidence and submissions that centrifuging of fine tailings is not done *anywhere else* at a commercial scale for mineral sands mining. As there are no apparent technical reasons for this, it is highly likely to be for economic and cost reasons.³¹ The need for increased water recovery is clear for this Project given the limited availability, but the IAC is not clear on the sensitivity of the Project to this element of cost.

1.2.5 Findings

The IAC finds:

- centrifuges are a technically superior method of water recovery from fine tailings
- their use in the Project should be considered subject to at-scale trials with the fines materials and water supply to be used during full scale production to determine if the predicted water recovery rates are achievable
- the impact on project feasibility is not clear.

1.3 Mining demonstration pit

The EES was informed by material collected from a borehole sampling program as described in EES Technical Appendix 002. The Proponent indicated in the Hearing they intended to develop a demonstration pit within the Mining Licence area. A work plan for the demonstration pit was lodged with Earth Resources Regulation (ERR)³² in November 2020 following meetings and consultation with several agencies and stakeholders.³³

The purpose of the demonstration pit as articulated in the work plan was as follows:³⁴

To obtain a representative bulk sample, a small open pit is required to get access to the ore grade sands. By default, the works provide an opportunity to obtain additional information to support the detailed design of the proposed Fingerboards Project, in particular, geotechnical and geological properties of the deposit and the mining methods best suited to accessing and recovering ore.

²⁹ And Ausenco who did not give evidence but have expertise in this area.

³⁰ This could occur in conjunction with a mining test pit if approved.

³¹ And this is articulated in Technical Note 14 and by Dr Saracik.

³² The mining regulator, part of the Department of Jobs, Precincts and Regions.

³³ Document 278 provided a timeline for the demonstration pit application.

³⁴ Document 279, page 1-1.

This exploration work plan outlines proposed work to establish an excavation approximately 90 m long x 40 m wide x 12 m deep. The demonstration pit plan is to remove approximately 1,948 bank cubic metres (BCM) of ore, 12,813 BCM of overburden and 1,140 BCM of topsoil.

The open pit would be backfilled within a relatively short timeframe following the completion of mining and would be immediately followed by rehabilitation with pasture. As such, this “demonstration pit” provides an opportunity for the community and stakeholders to see mining, processing and rehabilitation all within a short time frame.

The demonstration pit was proposed for an old quarry site on a property just off the Fernbank - Glenaladale Road north of the Fingerboards intersection.³⁵

ERR advised in late 2020 and early 2021 they could not consider the work plan application due to the EES process.³⁶

I have determined that a decision cannot be made under section 40A Mineral Resources (Sustainable Development) Act 1990, pursuant to section 8C of the EE Act, after considering the work plan application, supporting information provided by the licensee (8 January 2021) and referral agency advice.

As previously indicated, section 8C of the Environmental Effects Act 1978 (EE Act) requires that no decision can be made under an Act or law in relation to works subject to an assessment under the EE Act, until the Minister for Planning has considered that assessment.

Mr Morris QC for the Proponent provided a legal opinion that this position was wrong in law. His view was that ERR could consider and approve the work plan for the demonstration pit, essentially on the basis the work proposed in the work plan does not include the works covered by the EES determination for the broader Project.³⁷

The legal question is a matter to be resolved between ERR and the Proponent and is not a matter on which the IAC should, or needs to, form an opinion.

In passing however, the IAC notes that it is unfortunate the demonstration pit was not applied for, and if approved, developed, earlier in the EES process to better inform inputs to a range of investigations including:

- air quality
- radiation
- rehabilitation methods
- ore processing (i.e. earlier identification of the need for centrifuges and production scale trials of same).

It appears to the IAC the demonstration pit, if undertaken some years ago would have been a valuable contributor to investigations and the confidence in those investigations, into the potential environment effects of the Project and more specific management and response measures.

³⁵ The IAC visited this site on the first site inspection as the ore body is visible at the surface in an eroded area of Perry Gully nearby.

³⁶ Document 282.

³⁷ Document 498.

2 The inquiry process

2.1 The Inquiry and Advisory Committee

In response to a referral under the *Environment Effects Act 1978* (EE Act) from the Proponent, the Minister for Planning determined on 18 December 2016 that an EES was required for the Project and issued his decision with procedures and requirements for the preparation of the EES.

On 19 July 2020, the Minister for Planning issued amended procedures and requirements under section 8B(5) of the EE Act. The amendments were in response to the various constraints associated with the COVID 19 pandemic and included:

- an increase in the EES exhibition period from 30 to 40 business days
- requirements relating to the notification of the EES and the provision of EES documents to parties and submitters
- provision for the Hearings to be held via video conference if necessary
- requirements relating to the recording of Hearings and their public availability.

The Minister for Planning appointed the four-member IAC on 30 August 2020 under section 9 of the EE Act and section 151 of the *Planning and Environment Act 1987* (PE Act) to inquire into and report on the Project in accordance with a Terms of Reference.

The Minister for Planning signed the Terms of Reference for the IAC on 19 July 2020 (included in Appendix A of Volume 2).

The IAC comprised:

- Mr Nick Wimbush, Chair
- Ms Natasha Reifschneider, Deputy Chair
- Dr Meredith Gibbs
- Mr John Ginivan.

Clause 3 of the Terms of Reference provides for the IAC to seek additional specialist expert advice to assist it in undertaking its role. In this regard, the IAC retained the services of:

- Dr Kenneth Joyner– radiation.

The IAC records its thanks to all parties for what was a long challenging Hearing process, including difficulties due to COVID-19. The IAC thanks the office of Planning Panels Victoria for the enormous level of support provided in ensuring the Hearings could proceed, particularly Amy Selvaraj (Senior Project Officer), and Tom Milverton (Project Officer).

2.2 The IAC's role

2.2.1 Terms of Reference

The Terms of Reference require the IAC to:

- Hold an inquiry into the environmental effects of the Project and report its findings and recommendations to the Minister for Planning.
- Review and consider the EES and public submissions received in relation to the environmental effects of the Project and the reports and advice from the appointed Department of Environment, Land, Water and Planning (DELWP) independent peer reviewers.

- Review draft PSA C156egip and report its findings and recommendations to the Minister for Planning.
- Provide advice to inform the EPA’s consideration of the Development Licence (previously Works Approval Application (WAA)).
- Provide advice to the Minister for Planning in relation to Matters of National Environment Significance (MNES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Clause 19 notes the Project may require other approvals, including:

- A mining licence and approved work plan under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act).
- Approval under the EPBC Act.
- Cultural Heritage Management Plans under the *Aboriginal Heritage Act 2006*.
- Approvals or consents under the *Water Act 1989* for extraction of surface and/or groundwater and for works on, over or under waterways.
- Approvals under the *Radiation Act 2005*.
- A permit to remove listed flora and fauna under the *Flora and Fauna Guarantee Act 1988* (FFG Act).
- An authority to take or disturb wildlife under the *Wildlife Act 1975*.

In addition, there will be additional approvals required to realign state and local roads on site.

Clause 34 of the Terms of Reference requires the IAC to produce a written report for the Minister for Planning containing the IAC’s:

- a. 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 to acceptable environmental outcomes, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;
- d. recommendations as to any feasible modifications to the project (e.g. extent, design, alternative configurations, or environmental management) that would enable more appropriate 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 the draft work plan or conditions that might appropriately be attached to approval of a work plan if issued under the MRSD Act;
- f. recommendation on changes, including to the structure and content, that should be made to the draft PSA in order to ensure the environmental effects of the project are acceptable having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;
- g. 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;
- h. recommendations with respect to the WAA, including recommendations about conditions that might appropriately be attached to a works approval if issued; and

- i. specific findings and recommendations about the predicted impacts and residual risks for matters of national environmental significance and their acceptability, including appropriate controls and environmental management.

The IAC provides its consolidated response to the Terms of Reference in Chapter 22.

2.2.2 Scoping Requirements

Draft Scoping Requirements for this EES were on public exhibition from 13 September to 6 October 2017. After considering public submissions on the Draft Scoping Requirements, the Minister for Planning issued the final Scoping Requirements for the Fingerboards Mineral Sands Project EES in March 2018 (Scoping Requirements Report).

The Scoping Requirements set out the matters to be investigated and documented in the EES. Clause 5 of the Terms of Reference requires the IAC to:

- b. consider and report on the potential environmental effects of the project, their significance and acceptability, and in doing so have regard to the draft evaluation objectives in the EES scoping requirements and relevant policy and legislation.

The Scoping Requirements Report includes the following draft evaluation objectives that identify the ‘desired outcomes in the context of potential project effects and legislation’:

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

Biodiversity - To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory 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 Gippsland Lakes 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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

Landscape and visual - To avoid adverse effects on the landscape and recreational values of the Mitchell River National Park and minimise visual effects on the open space areas.

Cultural heritage - To avoid or minimise adverse effects on Aboriginal and non-Aboriginal cultural heritage.

Rehabilitation - To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.

Each of the draft evaluation objectives is supplemented by descriptions of key issues, priorities for characterising the existing environment, design and mitigation measures, assessment of likely effects and approach to managing performance.

The IAC discusses the draft evaluation objectives throughout this report and provides its consolidated response in Chapter 22.

2.3 Exhibition and submissions

2.3.1 Exhibition

The EES was placed on exhibition for 40 business days between 3 September and 29 October 2020. Clause 20 of the Terms of Reference provided for submissions to be lodged through the Engage Victoria website and collected by Planning Panels Victoria.

During the submission period, 910 submissions were received, with approximately 900 of these opposed to the Project. The full list of submitters is in Appendix B of Volume 2.

Council sought leave from the Minister for Planning to lodge a late submission after local government elections and the swearing in of the new Council. This leave was granted³⁸ and Council's endorsed submission was received by the IAC on 11 December 2020.³⁹

ERR sought an extension to make a submission but later advised they would not be providing one, but would assist the IAC with any written requests for information.

Through the Hearing, the IAC sought further information from ERR, the Department of Health (DOH) and other agencies as recorded in the tabled documents.

As discussed in Chapter 1.2, the Proponent advised in early 2021 they proposed a significant modification to the Project, being the introduction of centrifuges to recover water from fine tailings. The IAC provided all submitters until 26 March 2021 the opportunity to provide a supplementary submission on this new Project element; 47 supplementary submissions were received in response. Submitters who made a supplementary submission are listed in Appendix B of Volume 2.

2.3.2 Summary of submissions

A large number of submissions were received in response to the EES and the call for submissions on centrifuge introduction. While the IAC has reviewed all these submissions it does not respond directly to each one individually, but considers the EES and submissions in relation to the *issues* raised. A high level summary of submissions is provided below.

(i) Overview

Submissions were received from:

- Local councils, including East Gippsland Shire⁴⁰ and Wellington Shire
- Government agencies and Departments, including the EPA, Department of Transport (DOT), Department of Environment, Land, Water and Planning - Forest Fire and Regions Group Gippsland (DELWP -FFR), Southern Rural Water (SRW), East Gippsland Region Water Corporation, East Gippsland Catchment Management Authority (CMA) and West Gippsland CMA
- Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)
- Community / environment organisations and interest groups
- Agriculture and horticulture growers and operators

³⁸ Document 1.

³⁹ Submission 716B, Document 14.

⁴⁰ The IAC would like to acknowledge the efforts put in by Council; particularly noting the technical review of the EES commissioned from SLR Consulting.

- Commercial and business operators, including tourism
- Individuals.

Some submitters expressed concern and criticism in regard to the community engagement and stakeholder consultation process run by the Proponent. Many emphasised their concern that not all relevant information has been disclosed in the EES and the errors, inconsistencies and inaccuracies in the EES made it difficult to identify the likely impacts with certainty.

At the request of the IAC, the Proponent prepared a submissions summary.⁴¹ The submissions have been read in full by the IAC and considered irrespective of whether the submitter presented at the Hearing. Key issues raised by submitters are outlined below in summary form, but included:

- adequacy of the EES material
- introduction of a new Project component (centrifuges for tailings dewatering)
- biodiversity loss, threatened and rare native vegetation and hollow-bearing trees
- horticultural and agricultural impacts
- social impact
- visual and landscape impact
- impacts on the quality and quantity of groundwater and surface water
- soils and tailings
- land use conflicts
- radiation exposure and associated impacts on human health and the environment
- economic impacts and the financial viability of the Project
- rehabilitation of the mine
- rigour of mitigation measures
- implications of the new *Environment Protection Act 2017* (Vic) (EP Act)

(ii) Ecological effects and impacts on biodiversity

A large number of submitters were significantly concerned about the extent of native vegetation removal and the consequential adverse impacts on habitat and the loss of large old hollow bearing trees, as well as the effects on groundwater dependant ecosystems (GDE) through altered flows or potential groundwater drawdown. They noted further vegetation removal would exacerbate the losses from the recent bushfires and concern was raised in relation to the Gaping Leek Orchid and Grassy Woodland and Associated Native Grassland species.

Concerns were expressed that not all feasible options to avoid and minimise impacts on native vegetation had been explored by the Proponent and the proposed biodiversity-related mitigation measures lacked sufficient detail to demonstrate what actions would be undertaken by the Proponent. Concern was raised in relation to the viability of fauna relocation plans.

Other common concerns included the impacts of infrastructure and mining activities (noise, light, dust etc) on flora and fauna that could lead to further fragmentation of the habitat of specific wildlife species.

⁴¹ Document 25b. Note this document was updated by the Proponent in response to IAC Direction No. 64 (see Tabled Document 144) to include amendments in response to additional comments by submitters, notified to the Proponent by the IAC.

Several submissions pointed to the impacts the Project would have on aquatic biodiversity, especially in the Mitchell River and Gippsland Lakes and on turtle species, Australian grayling, platypus, Burrunan dolphin, bream breeding and bass hatcheries.

(iii) Impacts on the water quality and quantity

The impacts of the Project on water quality and quantity were a key concern. Submitters were significantly concerned the pollution, contaminated run off and discharges from the mine and associated infrastructure, including via tailings seepage or TSF dam failure would contaminate groundwater and affect the water quality in the Mitchell and Perry Rivers, and other downstream water resources, in particular the Gippsland Lakes.

Significant concern was raised over the proposed quantity of water (3 gigalitres of water) the Proponent would require and the impact this would have on other users. Many submissions considered the Proponent's demands would compete with current agricultural uses and prevent the expansion of agricultural industries, as well as affect the flows in the Mitchell River and current downstream water users.

Other common concerns included the impact groundwater extraction would have on lowering the water table affecting other groundwater users, as well as recharging of aquifers, perched aquifers and spring fed dams that supply water to farm dams and rivers.

A portion of submissions raised a concern the Project would be unable to operate safely without the required amount of water, particularly if insufficient water was available for dust suppression.

(iv) Land use conflicts

Many submitters were concerned about the significant effects the Project would have on food production within the horticultural area of the Lindenow Valley and the broader agriculture area. Submissions highlighted the two land uses cannot co-exist, particularly due to potentially contaminated dust emissions and pollution of water and the consequences if proposed mitigation measures failed. Labour competition was also raised as an issue.

Concerns were expressed about the Project's potential to effect livestock during and after operations, as well as cause interruption to existing farming practices in and around the Project area (such as disrupting stock transporting routes, severance of land parcels and properties, management of pest animals and weeds etc). They submitted this would create uncertainty and general disruption due to construction and mine operations.

(v) Impacts on human health

Air emissions and their effects on human health (through inhalation, contaminating horticultural produce and pasture or water sources such as dams, rainwater tanks and pools etc) were another notable theme of submissions. Given the dust could include contaminated or radioactive particles, respirable silica and carcinogens, submissions emphasised the need for effective dust mitigation measures.

Many submissions raised concerns in relation to radiation, including radiation waste and the transport of radioactive materials, and highlighted the need for adequate standards and monitoring. The potential bioaccumulation of radionuclides and heavy metals in waterways, soil and pasture and their effect on fish, livestock and native animals was also a concern.

Other broader concerns included the Project (including the EES process thus far) causing general impacts on health and wellbeing and long-term health effects, including but not limited to cancer, lung disease, stress and mental health issues.

(vi) Social and economic impact and impacts on heritage values

A small number of submitters supported the Project and noted it would bring economic and social benefits (local procurement and job creation) and flow on effects to the community.

Concern was raised in submissions there was no assessment of cumulative effects for social or economic impacts.

Submitters highlighted the perceived economic benefits of the Project would not outweigh the losses and impacts to the environment and would severely negatively affect community connections and the social fabric of the community. Many submitters opposed the compulsory acquisition of land, particularly outside the mining licence area.

Several submissions were concerned the Project would impact on the Region’s tourism and visitor economy as well as the local area’s “clean green” image.

Concerns were raised in relation to the adequacy of the cultural heritage investigations that were undertaken to understand the potential impacts on known and unknown Indigenous cultural heritage and values. The need for appropriate management of Aboriginal cultural heritage and historical heritage assets was noted.

Submissions focused on the Proponent’s lack of experience in the mining industry and not holding a demonstrable track record of environmental performance or in the rehabilitation of land.

Concerns were raised in relation to the Proponent’s financial capacity to undertake the Project as well as ongoing monitoring and management and the financial viability of the Project.

(vii) Rehabilitation of the mine

The risks associated with the rehabilitation of the mine were a focus for submissions, with concern being raised the proposed land rehabilitation practices were conceptual and too much reliance being placed on solutions that may be possible, or solutions that are yet to researched. The length of time mine rehabilitation may take and responsibility for post-closure monitoring were raised as concerns, as well as and the adequacy of the rehabilitation bond and compliance monitoring.

(viii) Centrifuges for tailings dewatering

It was noted in some submissions the introduction of using centrifuges for fine tailings dewatering would have positive benefits, such as:

- eliminating the risk associated with the failure of the TSF and the subsequent impacts on the Perry River catchment
- reducing the impact on groundwater quality and the demand for freshwater resources due to the increased harvesting from the centrifuge process.

However, the introduction of a new project component so late in the process raised concerns with many submitters about the long-term environmental effects of using the centrifuges and their detriment to human health, groundwater, surface water and ecological consequences of using flocculants. Concern was raised as to whether the use of the centrifuge cake would make a difference to the site’s rehabilitation.

Several submissions pointed to whether the centrifuge and revised process would perform as suggested, including the fact that centrifuges have not been used on mineral sands and the lack of trials that have been done. Many submitters questioned if the economics of using the centrifuges had been properly considered.

Other common concerns included the significant anticipated impacts during the operation of the centrifuges. In particular, many submitters were concerned about the noise and vibration caused by the centrifuges, including effects to human health and animals (native and domestic). The extra power consumption due to the use of centrifuges (along with how loads would be managed) was also raised by many submitters.

2.4 Hearings

The public Hearings for the Project were initially due to commence in December 2020 but were delayed due to the Minister for Planning providing Council an extension to lodge its endorsed submission, and, in January 2021, the introduction of the centrifuges into the Project. Hearings were held across 36 days over 10 weeks from 3 May to 22 July 2021.

Of the 36 days, 27 were held via video conference and nine were held on a managed face to face basis in Bairnsdale to accommodate COVID-19 constraints.

Twenty-nine expert witnesses were called and nine expert meetings⁴² were held prior to the Hearing commencing.

Parties to the Hearing are shown in Appendix C of Volume 2 and the list of tabled documents is at Appendix D of Volume 2.

The IAC extends its thanks to the Proponent and its contractors for assisting the facilitation of the Hearings, both online and face to face.

2.5 Site inspections

The IAC undertook formal site inspections as shown in Table 3 observing the relevant COVID-19 restrictions at the time.

Table 3 IAC site inspections

Date	Who	Summary
1 February 2021	IAC, Senior Project Officer, Proponent, Council, MFG and invited parties and submitters.	One day bus-based introduction to the Project area and surrounds. ⁴³
13-14 April 2021	IAC, Project Officer and legal representatives from the Proponent, Council and a representative from MFG.	Visits to individual properties in the Project vicinity at the invitation of landowners. ⁴⁴

⁴² Sometimes called 'conclaves' in this report. Traffic and transport (Document 233), Radiation and Human Health (Document 234), Centrifuges (Document 235), Rehabilitation x 2 (Document 236 and 237), Ecology (Document 238), Flooding and Hydraulic Assessment (Document 242), Water Balance and Water Management (Document 254), Groundwater (Document 255).

⁴³ Itinerary shown in Document 67.

⁴⁴ Redacted itinerary in Document 593.

Date	Who	Summary
14 July 2021	IAC, Project Officer and representatives from the Proponent, Council and MFG.	Visit to the Bengworden Native Plant Nursery that has been established by the Proponent.

The IAC both as a group and individually, undertook several informal unaccompanied inspections of the Project area and surrounds including to the Mitchell River Silt Jetties and the Mitchell River National Park.

2.6 Procedural matters

2.6.1 The EES process

(i) Background and submissions

The EES and information provision

The IAC has no role in approving the EES for release for exhibition. Many submissions however criticised the EES itself for, amongst other things:⁴⁵

- containing errors, inconsistencies, and inaccuracies
- its size and not enough time for people to review the documents
- inadequate risk assessments
- ambiguous and unsubstantiated information
- superficial consideration of information
- over-reliance on modelling.

MFG submitted:⁴⁶

On any view, the EES is manifestly inadequate to inform an assessment of the potential environmental effects of the Project.

The various inadequacies of the published EES are documented in the expert evidence filed on behalf of MFG, with key themes including:

- a lack of baseline monitoring for key impact areas, including for groundwater and soils;
- a lack of detailed investigation, assessment and or analysis of potential environmental effects and risks;
- a failure to assess cumulative impacts; and
- a failure to properly consider the implications of a changing climate, including factoring such changes into mine management.

MFG went on to submit the late addition of centrifuges only increased their concern:

...it is worth noting for present purposes the Proponent only advised the IAC of the potential use of centrifuges after discovering a key assumption underpinning the water balance in the exhibited EES was incorrect (an error in the order of around 3 GL/year).

And:⁴⁷

⁴⁵ There were also criticisms of the EES process itself, but the IAC has not addressed these in the report, considering they are outside its remit.

⁴⁶ Document 250, para 29 onwards.

⁴⁷ Document 250, para 34.

The published EES is insufficient for the purposes of section 3(3) of the EE Act. It is not consistent with the Scoping Requirements or the Ministerial Guidelines and, overall, is not fit for purpose. The inadequacy of the published EES has only been compounded by the late addition of new material and edits to address the use of centrifuges and new water modelling. Most critically, the exhibited EES does not allow for the transparent assessment of the environmental effects of the Project, and the evidence to date is also insufficient for that purpose.

Council drew on the Crib Point EES Minister’s Assessment in emphasising the central nature of the EES document itself for the IAC and parties.⁴⁸

They noted that in the Fingerboard’s Project however:⁴⁹

... the Project has changed shape significantly and continues to evolve in material ways, after exhibition.

And:

The proposal remains ill-defined in many important respects such that a large number of important matters are not decided, or in flux, or subject to mitigation measures which lack certainty or enforceability. For example, it is unclear where the water proposed to be used for the project will be sourced from or which entities stand to lose from any proposed allocation.

And:

It is important the adequacy of the EES is judged not by reference to the amount of work done assessed by time or dollar value, but by the certainty achieved and the level of faith the community can place in the certainty of the outcome of placing a mine in the proposed location for 20 years.

In its closing, Council noted the onus was on the Proponent to provide adequate information to allow for effective environmental assessment; it is not up to the other parties to bring that information forward.⁵⁰

Council submitted that several documents that came forward in the Hearing⁵¹ were effectively new information that could not be tested within the bounds of the Hearing process, and concluded:

....The reality is the Proponent’s approach to the EES and the hearing has adversely affected the ability of the parties to the Inquiry to assess what is proposed and to make their cases and to assist the IAC.

The Proponent in its Part C submission rejected criticism of a lack of information in the assessment process.⁵²

Both Council and the MFG take issue with the adequacy of the information before the EES. As the Proponent understands the argument, it appears to be that, by the time a project comes to be assessed, there should be sufficient information available about the project to enable a subsequent decision-maker to make a determination under its applicable statutory framework without the need for further information. Failing to provide this level of information, it is suggested, is inconsistent with the spirit, if not the letter, of the Minister’s determination to require an EES and inquiry.

It went on to outline the EE Act as providing a “*broad and flexible framework for the assessment of the environmental effects of works*” and that in recent times the EES process has been used to

⁴⁸ Document 251, para 61.

⁴⁹ Document 252, para 62.

⁵⁰ Document 748, para 21 onwards.

⁵¹ Document 748.

⁵² Document 698, para 12.

define an envelope of “*acceptable outcomes*” for major State projects. The Proponent submitted that this approach has been endorsed through project approvals such as the North East Link Assessment.

It submitted that for this Project the project design is considerably more advanced than the reference design put forward for that major road project.

Uncertainty and adaptive management

The concept of adaptive management received significant submissions in the Hearing. In the EES adaptive management is mentioned as an approach as follows:⁵³

Monitoring results would be reviewed by the operations manager at least monthly to enable early detection of potential non-conformance, non-compliance and/or other issues. This regular internal review of monitoring results informs an adaptive management approach to be implemented effectively and will also help identify whether additional or modified monitoring activities are required to address project risks.

The Proponent submitted that uncertainty is common in environmental impact assessment; and that in reference to the Ulan Coal Mines case:⁵⁴

...the fundamental question is whether there is sufficient information to make an informed judgment on the nature of those impacts and the capacity to manage them.

The Proponent submitted the appropriateness of an adaptive management approach to deal with uncertainty and that it was a common sense approach to a sensible assessment of risk.

In written submissions⁵⁵ the Proponent provided examples from other assessments where an adaptive management approach to uncertainty had been accepted including the Ombersley Quarry Advisory Committee and the Mountain View Quarry EES.

Council supported adaptive management in principle if the Project proceeds, noting that its “*role in environmental management frameworks is sound and recognised*”.⁵⁶

Council however went on to submit:⁵⁷

But adaptive management is not a salve for accounting for deficiencies in knowledge. It cannot be relied upon as a basis to conclude environmental effects will be acceptable (because they will be subject to adaptive management).

To seek to give adaptive management that role is to misunderstand its role and purpose and, critically, would be to simply defer any decision in respect of environmental effects to the Proponent itself – or, at highest, to a later decision-maker – and wholly undermine the purpose of this EES process.

Council provided definitions of adaptive management and drew on the EES for Port Phillip Bay Channel Deepening in 2005 to submit:⁵⁸

Adaptive management is a matter of “fine tuning operational environmental management, not a fundamental management procedure in itself.”

MFG adopted Council’s submissions on uncertainty and adaptive management and many other submitters expressed concern about the approach.

⁵³ EES main report Chapter 12, page 12-30.

⁵⁴ Tabled as Document 259.

⁵⁵ Document 358.

⁵⁶ Document 407, para 60.

⁵⁷ Document 407, para 61-62.

⁵⁸ Document 407, para 65.

(ii) Discussion and findings

As indicated at the outset of this chapter, the IAC has no role in approving the EES for exhibition and considers it would be outside its remit to comment on that decision. The EES was approved for exhibition and was subsequently exhibited; with a very significant number of submissions being received.

After the EES exhibition, there were many changes made including:

- the introduction of centrifuges for fine tailings treatment
- significant changes to road alignments within the Project Area
- potential significant change to the mining licence area with unknown environmental effects consequences (if any)
- changes to the transport and export arrangements around HMC (location and method)
- changes to the proposed borefield location with unknown environmental effects and consequences.

In addition to these changes there are many ongoing areas of uncertainty including:

In addition to these changes, there are many ongoing areas of uncertainty including:

- lack of validation of the effectiveness of centrifuges
- the demonstration pit which will provide significant resource data, and further validate uncertainties, has still not been undertaken
- the treatment in law of seepages from the tailings deposition areas
- significant background baseline data still to be collected in many areas
- practicality of some of the road treatments potentially required
- export approval requirements for radioactive material⁵⁹
- secure access to groundwater and surface water volumes for the life of the Project
- the flora and fauna values of the 2705 Bairnsdale – Dargo Road property, and mining licence extension area
- groundwater site specific conditions to predict potential impacts from the Project
- the presence or impacts of (GDE) from the Project
- the water balance model is unproven due to the uncertainty of centrifuges performance
- impact of water supply of dams surrounding the project site.

The IAC accepts the EES process does not require a ‘shovel ready’ project to come forward for assessment through the process. It is an iterative process that will itself influence the project outcomes. That is, after all, one of the main points of environmental impact assessment, to identify the impacts, propose mitigation for residual impacts and then determine if on balance the impacts can be managed.

This requires a project to come forward with enough information and certainty about the environment effects, how the effects can be managed, and a degree of certainty and confidence in the success of management measures.

In this case, major elements of the Project were developed after exhibition of the EES. This in turn has required the assessment of effects by experts, submitters, and the IAC in a fluid, changing

⁵⁹ The issue of radioactive material export is a matter for the Commonwealth Government but is mentioned in Chapter 10 of this report.

environment. The IAC itself had to make many requests for information to try and obtain answers to basic questions around Project design and environmental management.

The risks of this approach are many; to the Project itself, to the confidence in the EES process in the community, and ultimately to the environment itself.

Community engagement in a Project such as this requires a significant investment in time and money, and a brief review of the MFG submission⁶⁰ attests to that, as well as the hundreds of other submissions received.

The significant changes to the Project post-exhibition mean a significant portion of that effort was wasted, and all parties in the Hearing have had to pivot to consider the new approach (inherent in the use of centrifuges). It can be argued that some of the Project changes were driven by submissions, and this may be so, but it is also clear that a more thorough effort in Project design and development pre-EES exhibition may have avoided much of this wasted effort.⁶¹

Further, the introduction of significant changes and the piecemeal approach to bringing forward information about the Project meant that many Technical Notes and other tabled documents containing critical information were not able to be tested in evidence and cross-examination. This is less than ideal.⁶²

A significant amount of work to provide a reasonable degree of certainty around environmental management has been deferred to future approvals and management plans, with little information as to the likelihood of success of management. In the physical and social context of this proposed mine, a more comprehensive, cohesive approach to environmental impacts and management is required. For these reasons, the IAC considers the approach taken in the EES does not reflect best practice.

The IAC accepts and understands the concept and usefulness of adaptive management in project implementation; by definition the opposite approach would be to rigidly continue to apply a management framework even if it doesn't work to mitigate or prevent environment effects.

However, the IAC considers Council's position persuasive. Adaptive management is, or should be, as identified in the Channel Deepening EES, a fine-tuning operational improvement tool.

Environment effects identification, avoidance, management and mitigation, and confidence levels should be clearly articulated prior to adaptive management being considered or applied. The IAC does not consider this is the case for this Project with many issues still unresolved and environment effects unclear, let alone their mitigation.

The EES and post-exhibition information has the sense of a reactive approach to issues as they arose rather than a sound, comprehensive, cohesive assessment of impacts informed by adequate baseline studies over time to demonstrate with confidence the risks are well defined, and the control measures proposed will be effective.

The IAC finds:

- The changing nature of the Project and the bringing forward of significant new information post -exhibition and during the Hearing has made it very difficult for the IAC

⁶⁰ Submission 813.

⁶¹ For example Mr Wolmarans in submissions suggested centrifuges had been considered as far back as 2019.

⁶² For example, Documents 464, 467, 501, 532, 535 and 591, prepared by the Proponent's experts and technical advisors were not able to be tested under cross-examination.

and parties to gain an accurate understanding of the specific environment effects of the Project and whether they can be effectively managed.

- While a project will inevitably be refined through the assessment process, it needs to be developed to a level where impacts can be accurately identified, and management measures realistically proposed and validated prior to assessment; that in the IAC's view was not the case here.
- Adaptive management is a well-established concept in environment assessment and project implementation but must be seen as a tool for fine tuning environmental performance, not a fundamental management system.

2.6.2 The introduction of the centrifuges

(i) Can centrifuges be introduced

The IAC sought legal submissions from the Proponent as to whether this Project change could be made at this time in the assessment (in other words, did the change lead to the conclusion that a new project was being proposed which would have required re-exhibition). Further, whether the assessment should necessarily include assessment of the exhibited EES proposal (including the TSF) and the centrifuges or should proceed to assess only the latter (the Proponent's preferred position).⁶³

The IAC then sought submissions on the legal issues from other parties.⁶⁴

Having considered the submissions, the IAC ruled the Project assessment could proceed, and should only include the consideration of centrifuges, rather than the temporary TSF (as exhibited in the EES) or both. The IAC provided detailed reasons for this ruling.⁶⁵

(ii) Opportunity for further submissions

Given the admission of the centrifuges into the assessment process after exhibition of the EES, the IAC provided the opportunity for submissions and evidence on this new element. Additional time was allowed, and the Hearing deferred for further consideration of the centrifuges. Given the large number of submissions and high level of community awareness about the Project, the IAC only the opportunity for submissions to existing submitters (47 supplementary submissions were received).

The Proponent, Council and MFG provided additional evidence on centrifuges.

(iii) A future TSF

The Proponent made it clear⁶⁶ that it wished to proceed with the centrifuges and that a temporary TSF option was no longer being pursued.

There were many submissions in the Hearing concerned that a TSF option might be reconsidered in future after Project approvals are granted, and there would need to be some other form or level of assessment that may or may not involve community engagement.

MFG, in arguing for the continued assessment of the TSF put it clearly:⁶⁷

⁶³ Document 141.

⁶⁴ Including Documents 175 (MFG) and 177 (Council).

⁶⁵ Document 212.

⁶⁶ Document 151.

⁶⁷ Document 175, paras 15 and 16.

15 Further to the reasons above, MFG submit that it is prudent to consider the project in its original form and as modified by Technical Note 01 (i.e. both the tailings storage facility and the use of centrifuges) in the event the Proponent abandons the use of centrifuges for technical and or financial reasons following the Minister's Assessment. (IAC emphasis)

16 In circumstances where there is no precedent for the use of centrifuges in mineral sands applications and where 'the exact scope, detailed operating parameters that may be achieved in practice and economic implications on the Project can only be determined after detailed design and cost estimate work is completed', it is reasonable to factor in the potential abandonment of the use of centrifuges for technical and or financial reasons at a later date. (IAC emphasis)

The IAC ruled that its assessment would be confined to the inclusion of the centrifuges in the Project and would not include the TSF.

The IAC notes the concern of submitters but observes that it does not control future processes or assessments. However, in the IAC's view, the reintroduction of a temporary TSF would not be a simple matter. There has been no assessment of such an option in this assessment process. Given the size of the TSF, its likely regional scale risks and environmental impacts,⁶⁸ any proposal to reintroduce a TSF into the Project would likely require a new EES.

2.6.3 Ausenco

Council commissioned Ausenco to provide a technical review of centrifuges.⁶⁹ Council subsequently advised the IAC that Ausenco:⁷⁰

- had disclosed a distant but potential conflict of interest of which it was not previously aware
- did not agree with the characterisation of its findings by Council as denoting a material deficiency in the Project
- had provided an amended centrifuge report based on new information that had come forward in the assessment.⁷¹

The IAC has reviewed the findings of both versions of the report which both conclude:

The Alfa Laval P3 centrifuges are a promising technology that have the potential to increase water recovery, reduce footprint and increase the speed of rehabilitation for the Project. For these reasons they are worthy of consideration.

The report versions have similar, but different characterisations of technical risk and future work, the second report having a reduced 'Further work' section based on the new material viewed.

Critically, both versions in the 'Further work' section suggest the need for a trial on site (variously 'full-size' or 'sufficiently large-scale') to validate the assumptions in the work done to date to determine if the centrifuges will be effective for the Project. This accords with the two expert witnesses called on centrifuges.

The Environmental Media Foundation⁷² contended there was some illegality or impropriety in the revised report being provided but did not provide evidence to support his contentions.

⁶⁸ A significant reason why centrifuges are said to be superior.

⁶⁹ This document was attached to Council's supplementary submission 716 and was titled "*Review of centrifuges for tailings dewatering*" dated 29 March 2021.

⁷⁰ Document 252.

⁷¹ Document 253.

⁷² Submission 610.

The IAC considers that both Ausenco reports support the general conclusion that centrifuges are technically feasible but need to be demonstrated on site and at scale, using the water supply and materials to be centrifuged.

2.6.4 The EES report disclaimer

Several of the EES technical appendices were prepared by Coffey, who was the principal author of the EES. These reports contained disclaimers in the front cover including a third-party disclaimer:

It is not possible to make a proper assessment of this report without a clear understanding of the terms of engagement under which the report has been prepared, including the scope of the instructions and directions given to Coffey, and the assumptions made by the relevant Coffey consultants who prepared the report.

Several submitters sought to obtain the information above on the basis the reports should not be read without it. After requesting this information, the Proponent provided further information.⁷³

The IAC notes the material in the Coffey reports appear to be a standard set of commercial disclaimers and caveats which might be provided in a report to a client, for example. However, it caused significant consternation among submitters. The IAC suggests that in future if such disclaimers are required for documents subject to *public* review, it would be helpful if the terms of engagement or other documents that need to be relied on in understanding the report are readily available on request for transparency.

2.6.5 Hearing recording requests

A request was made on Day 13 (19 May 2021) by ABC Local Radio to record live audio from the online Hearing for use in daily news bulletins; this request was granted by the IAC.

On Day 33 (15 July 2021), a request was made by the Environmental Media Foundation to record audio and video of several individual submitters due to submit that day and the closing submissions of the main parties set down for the following week.

Following consideration of the request, the IAC ruled the recording would not be allowed. The verbal ruling was followed by written reasons.⁷⁴

2.6.6 Sensitive receptors

(i) Background

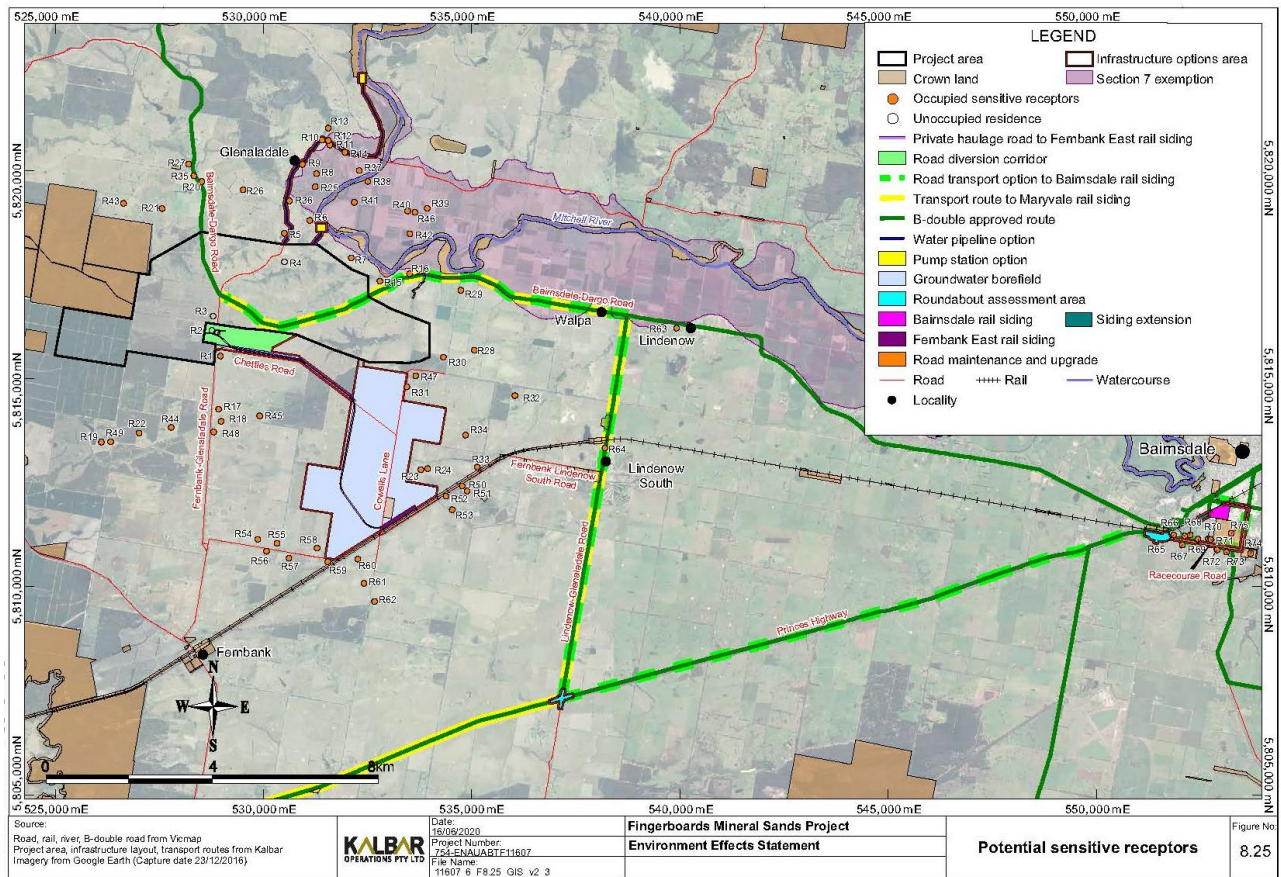
The EES technical studies were completed using a sensitive receptor map prepared by the Proponent that identified 49 sensitive receptors as shown on Figure 6 (only residences shown).⁷⁵

⁷³ Documents 343 and 375.

⁷⁴ Document 688.

⁷⁵ Figure 8.25, EES Chapter 8, page 8-106 and Table 8.33, EES Chapter 8, page 8-107. Note that TN4 at page 2 clarifies that Figure 8.25 displayed 62 potential sensitive receptors for the project area, proposed haul road and Fernbank East rail siding - some of which were beyond 2km. Figure 8.25 identified only residences, not other sensitive receptors.

Figure 6 Potential sensitive receptors⁷⁶



The EES noted that sensitive receptors can be residences, schools, hospitals, churches, or other sensitive land use.⁷⁷ Depending on the offsite impacts under consideration, the list of sensitive receptors was modified as relevant. For example, while the air quality assessment examined impacts on almost all sensitive receptors (i.e. all those other than those owned by the Proponent or that would not be occupied during the Project), the noise assessment examined potential impacts on a much narrower list of sensitive receptors.⁷⁸

(ii) Evidence and submissions

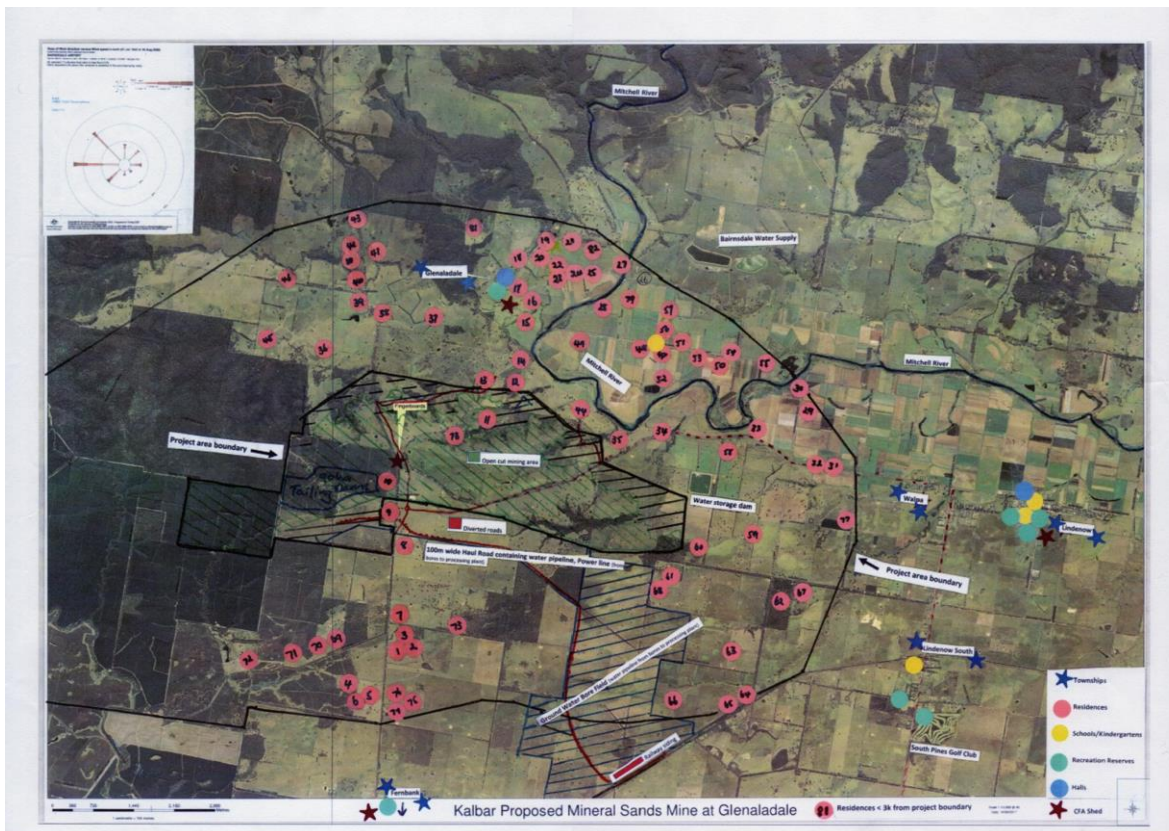
MFG submitted that 60 per cent of the sensitive receptors were not identified by the Proponent in the EES, arguing the impacts of the Project had not been effectively assessed and the EES’s conclusions the Project’s impacts on sensitive receptors would be low or acceptable are not justified.⁷⁹ MFG submitted:

The fact that so many residences are missing from their sensitive receptors maps leaves the impression that this was either carelessness or an attempt to minimise the appearance of risk with so many people living and working close to the mine project.⁸⁰

⁷⁶ EES Chapter 8, page 8-106.
⁷⁷ EES, Chapter 8, page 8-103.
⁷⁸ Refer EES Chapter 8, pages 8-103 – 8-116, and compare Tables 8.33 & 8.37.
⁷⁹ Submission 813, page 5 & 293, 304, 308, 471, 475-476.
⁸⁰ Submission 813, page 305.

MFG provided a revised sensitive receptors map with additional sensitive receptors marked, (Figure 7) based on its members' ground-truthing and local knowledge.⁸¹

Figure 7 Map of 82 sensitive receptors from MFG's survey⁸²



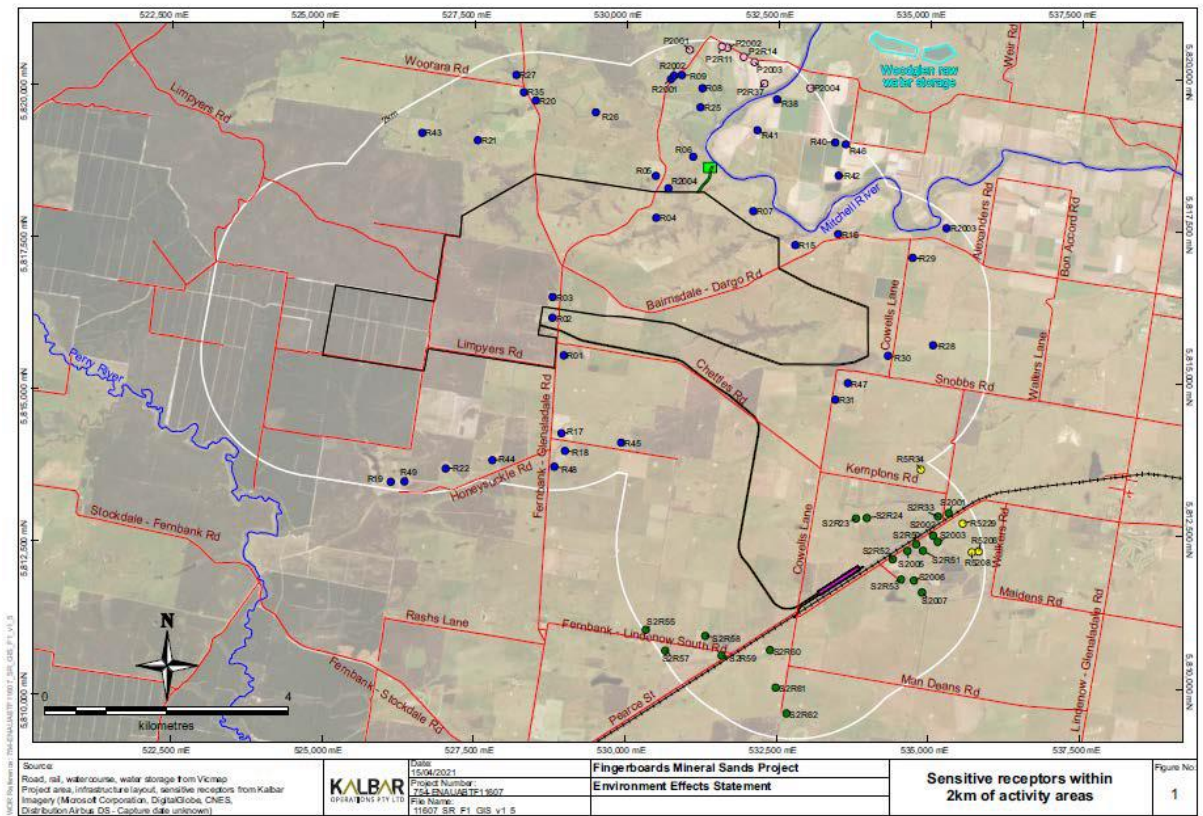
The IAC requested the Proponent produce revised maps for sensitive receptors within 2 kilometres and 5 kilometres of the Project boundary (including the proposed haul road and proposed Fernbank rail siding footprint). TN4 dated (22 February 2021) and updated on 19 April 2021 provided this information⁸³ and included the following revised maps (Figure 8 and Figure 9).

⁸¹ Submission 813, page 478.

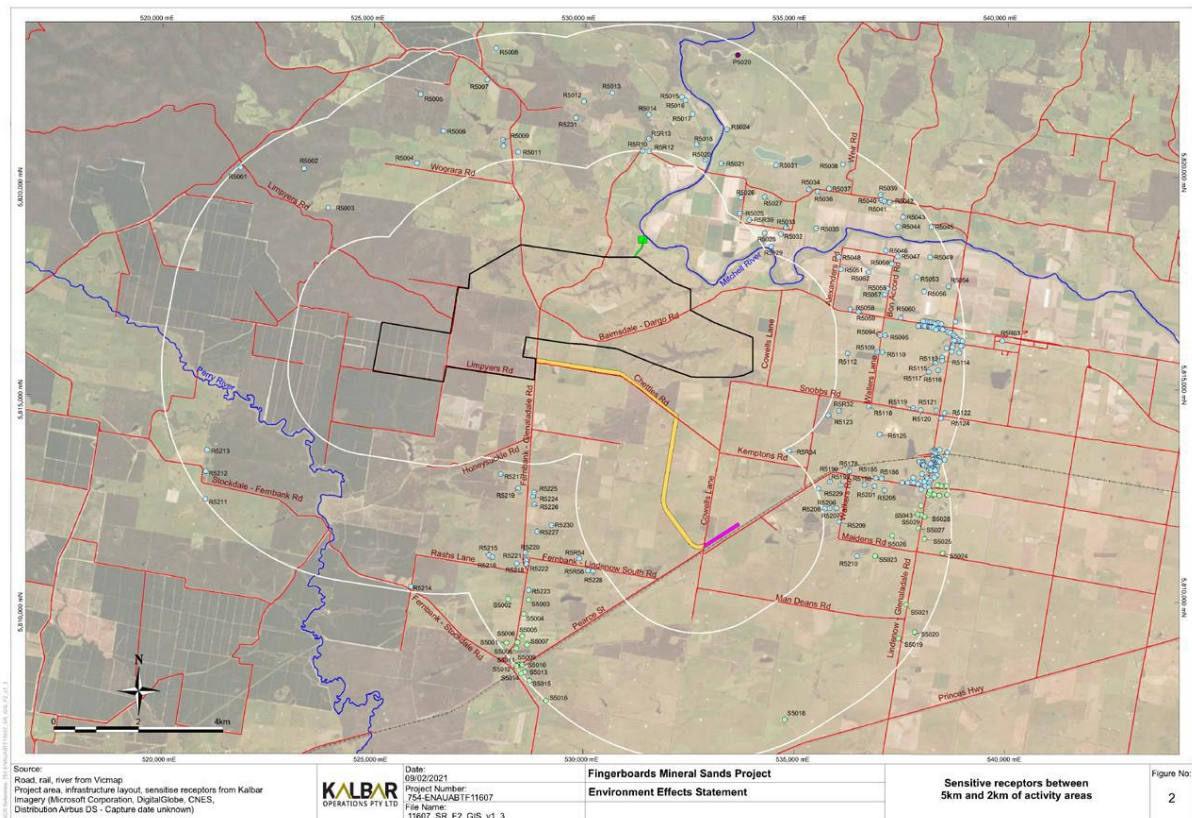
⁸² Submission 813, page 478.

⁸³ Document 145. The version dated 19 April 2021 notes: "This response was originally provided on 22 February 2021, but revised on 19 April 2021 after Kalbar discovered that the receptor maps shown in Figures 1 and 2 did not accurately reflect the concept designs for the haul road and rail siding (Tabled Documents 55-59). Figures 1 and 2 have now been updated to reflect those concept designs. The main change is that the rail siding extends 300m further north-east, which means that some additional sensitive receptors have been identified within 2km and 5km of the Project boundary. All revisions made on 19 April 2021 are shown as a 'track change'." (page 1).

Figure 8 Sensitive receptors within 2km of the Project⁸⁴



84 Document 145 TN004, page 4.

Figure 9 Sensitive receptors between 2km and 5km of the Project⁸⁵

TN4 stated the updated maps did not change the traffic and transport, agricultural, horticultural or socioeconomic impact assessments. Supplementary assessments were provided for air quality, noise and vibration, and landscape and visual impact assessments for additional receptors identified within 2 kilometres of the Project boundary. Significantly, the supplementary air quality and noise assessments confirmed that because the additional residences identified were further away from the Project Area than the receptors already assessed, the respective air quality and noise impacts of the Project on them would be comparable to, or lower than, impacts on closer receptors. TN4 stated that given the air quality conclusion, the identification of additional receptors did not change the outcomes of the human health risk impact assessment.

MFG submitted that it had advised DELWP of the inadequacies of the sensitive receptor maps prior to release of the EES. MFG raised concern the increase to the mining licence area (compared to that exhibited in the EES), which occurred during the Hearing, meant that further sensitive receptors had not been identified and impacts on them not assessed.⁸⁶

The Proponent provided an update of sensitive receptors in TN39 in response to the IAC's request for a succinct summary of the Project, given the number and extent of changes that had occurred since the EES was exhibited.⁸⁷

In closing submissions, the Proponent submitted the identification of sensitive receptors in the EES was substantially correct given its purpose and the difference between the MFG map and the EES

⁸⁵ Document 145 TN004, page 7.

⁸⁶ Document 483, page 13.

⁸⁷ Document 537, page 11.

map was that MFG had used a different methodology.⁸⁸ It explained this by providing a map that showed the MFG map overlaid on the EES map, and submitted:

Attachment 5 to TN39 includes a table reconciling each of the receptors identified in the MFG map against the receptors identified by Kalbar in TN04. As recorded in that table, some of the MFG points could not be verified as relevant receptors (including 4x located in paddocks, 2x farm dams and 1x shearing shed). Only one instance was identified where a residence was shown in the MFG map and missed in the TN04 map. This is MFG receptor 65, which was shown in Figure 13 of TN39, and is located within a cluster of other receptors (Figure 2).⁸⁹

In closing oral submissions, the Proponent submitted the additional sensitive receptors identified by MFG are further away from the Project Area than those identified in the EES and that it was reasonable to assume that if an impact, for example noise, is assessed as acceptable at 2 kilometres away it would be acceptable at 3 kilometres away.⁹⁰

In its closing submissions, MFG maintained the Proponent had not adequately addressed this issue:

MFG maintains the position that Kalbar has still not identified all the residences within 3km of the Project area which, in turn, reduces the perceived impact on the people living close to the proposed mine.⁹¹

(iii) Discussion

The issue of whether the Proponent had properly identified all relevant sensitive receptors was an underlying issue throughout the EES process. While some of the discrepancies between the sensitive receptor maps produced by the Proponent and MFG appear to have been due to a different range used (2 kilometres vs 3 kilometres), this was one of many instances where the IAC had to ask the Proponent to clarify basic information.

The IAC notes the land use maps used as the basis for the Horticultural Impact Assessment (HIA) were not accurate. These maps did not identify all horticultural land uses that would be impacted by the Project, with the result the land use maps significantly under-represented the existing horticultural industry in the Lindenow Valley (see Chapter 14).

These inaccuracies in identifying existing residences and land uses that would be impacted by the Project may be small in each case, and perhaps explained away, but led to many submitters arguing they illustrate the way the EES was said to downplay the Project's likely impacts.

The Proponent argued that failure to include all sensitive receptors on the relevant maps was not an issue because if it could demonstrate that an impact had been addressed for a closer receptor, then the impact would be addressed for one further away. The IAC accepts that this would be the case in many circumstances. However, it might not always be the case, for example if a sensitive receptor was further away but on higher ground with line of sight to the Project Area or subject to greater wind, and therefore dust, the impacts may be greater than compared to another closer to the Project Area.

However, in the IAC's view the most significant implication of failing to include all residences on the sensitive receptor maps was that it created an impression there would be less people

⁸⁸ Document 698, page 16.

⁸⁹ Document 698, page 18.

⁹⁰ Day 35, 20 July 2021.

⁹¹ Document 749, page 10.

impacted by the Project than will be the case. This is amplified because the original sensitive receptor identification was undertaken by the Proponent and provided to the various technical experts in preparing the EES technical studies.

One example suffices to make this point. The Land Use Impact Assessment states:

One aspect of the project area's location is that it is generally remote from urban settlements and individual dwellings in rural areas. Even by rural standards dwelling density is low within and around the project area.⁹²

The IAC's site visits to the Project area and surrounds demonstrated that this is not the case. The location is not remote and are a number of residents on properties living near the Project Area.

(iv) Findings

The IAC finds the EES's failure to identify all sensitive receptors created an impression there would be less people impacted by the Project than will be the case.

2.7 The IAC's approach

The IAC has undertaken the assessment of the environment effects of the Project giving due weight (not in any particular order) to:

- the draft evaluation objectives from the Scoping Guidelines and as presented in the EES used to frame discussion in issues Chapters
- the Terms of Reference
- relevant legislation and policy
- submissions, expert evidence and TNs and other information provided at the Hearing
- the IAC's own observations from multiple site visits.

The IAC report is in two volumes. The Main Report (Volume 1) includes:

- Background to the Project (Chapter 1)
- Procedural issues (Chapter 2)
- Regulatory framework (Chapter 3)
- Major issues with the potential to give rise to environment effects (Chapters 4 to 19)
- Integrated assessment, Matters of Commonwealth interest, planning and environmental framework and response to Terms of Reference (Chapters 20 to 23)

The Appendices (Volume 2) includes:

- Terms of Reference (Appendix A)
- Submitters to the Project (Appendix B)
- Parties to the Panel Hearing (Appendix C)
- Document List (Appendix D)
- Recommended version of the Incorporated Document (Appendix E)

⁹² Appendix A013, page 40 (PDF page 49).

3 Regulatory framework

3.1 Overview

The Project must comply with a complex regulatory framework. The Proponent must establish acceptability “*having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development*”.⁹³

The key approvals for the Project are set out below in Table 4.

Table 4 Key project approvals

Project activities	Relevant approval	Act
All activities	EPBC Act approval	EPBC Act (Cth) (discussed in Chapter 23)
All activities within the mining licence area	Mining licence and Work Plan	MRSD Act
Infrastructure outside the mining area	The Amendment and Incorporated Document	PE Act
Discharge of waste to surface water or groundwater	Development licence Operating licence	EP Act
All activities	CHMP	Aboriginal Heritage Act (discussed in Chapter 15)
All activities	Radiation management licence	Radiation Act (discussed in Chapter 10)
Extraction, storage and use of surface water and groundwater	Take and use licence(s) Licence to construct works	Water Act
Clearing of vegetation and habitat	Authorisation to ‘take’ protected flora and fauna	Fauna and Flora Guarantee Act Wildlife Act

3.1.1 Application of the legislative regime

(i) Submissions

The parties made various submissions about how the applicable legislative regime ought to be interpreted in the context of the Project. The Proponent submitted the MRSD Act is the key statute and that it is appropriate the IAC has regard to the purpose and provisions of the MRSD Act. In particular, the Proponent referred to the purpose of the MRSD Act:

The purpose of this Act is to encourage mineral exploration and economically viable mining and extractive industries which make the best use of, and extract the value from, resources in a way that is compatible with the economic, social and environmental objectives of the State.⁹⁴

⁹³ Terms of Reference Clause 34(b) and (c).

⁹⁴ MRSD Act, s1.

The Proponent argued the MRSD Act is about encouraging mining to get best use out of the State's mineral resources, with a focus is on how mining is to be undertaken. It noted the Act has provisions and protections to ensure that mining is compatible with economic, social and environmental objectives.⁹⁵ The Proponent took the IAC to a range of provisions of the MRSD Act in its submissions which it argued, bore this point out.⁹⁶

MFG took issue with this characterisation of the legislative regime. MFG submitted the MRSD Act poses a significant first question, that is whether the mine *should* go ahead, rather than simply *how* it should go ahead:

The MRSD Act facilitates mining, but it does not facilitate mining at all costs: the necessary corollary of the requirement to obtain a licence to mine is that mining may not be acceptable in all circumstances.⁹⁷

MFG took the IAC to provisions of the MRSD Act that emphasise environmental sustainability and feasibility.

One of the objectives of the MRSD Act is to establish a legal framework aimed at ensuring that risks posed to the environment by work being done under a mining licence are identified and are eliminated or minimised as far as reasonably practicable.

Section 2A provides that it is the intention of Parliament that in the administration of the MRSD Act (which the IAC notes would include the decision whether to grant a mining licence or approve of a work plan), regard should be given to the principles of sustainable development which include:

- integrated decision-making
- the protection and maintenance of biological diversity and ecological integrity
- the precautionary principle
- development should make a positive contribution to regional development and respect the aspirations of the community and of Indigenous peoples.⁹⁸

Council took no issue with the Proponent's submission the MRSD Act's purpose is to encourage mining which is compatible with the economic, social and environmental objectives of the State. Further, the MRSD Act, including its purpose and objectives, is central to the decision-making framework for matters governed by the MRSD Act, such as the work plan.⁹⁹ Council submitted:

...like the EPBC Act is to the approvals in respect of matters of national environmental significance; like the Environment Protection Act is to the relevant works approval; like the Water Act is to the relevant take and use licence; and so on.¹⁰⁰

However, Council took issue with the Proponent's characterisation of the legislative regime more broadly,¹⁰¹ submitting that:

In the context of the present Inquiry under the EE Act, the purpose and objectives of the MRSD Act do not take centre stage. The provisions of the MRSD Act provide an understanding of the context in which activities associated with the Project would ultimately

⁹⁵ Closing submissions (oral), Day 35.

⁹⁶ Part A, B and C submissions.

⁹⁷ Document 451 page 3.

⁹⁸ MRSD Act, ss2A(2)(f), (c), (g) and (h).

⁹⁹ Document 407 page 22-23.

¹⁰⁰ Document 407 page 23.

¹⁰¹ Document 407 page 22ff.

be undertaken, but do not come to bear upon the significance or acceptability of environmental effects, or on the assessment of any benefits the Project might have. If positive benefits exist, they exist to be taken into account in the determination of the acceptability of the environmental effects of the Project.¹⁰²

Council reinforced the IAC's role in the Terms of Reference to consider and report on the "significance and acceptability" of the Project's potential environmental effects.¹⁰³

(ii) Discussion

The MRSD Act will be the primary statutory approval required by the Project if it is to proceed. If the regulator decides to approve the Work Plan under the MRSD Act there are other statutory provisions that will need to be applied including economic feasibility and sustainability.

The IAC is appointed under the EE Act to undertake an integrated assessment. It is not 'standing in the shoes of the decision maker' for any of the legislation approvals required for a future approval of the Project. Rather it has a specific role in considering the environment effects of the Project within the framework of the EE Act, Ministerial Guidelines for Assessment of Environment Effects, and the Terms of Reference provided by the Minister for Planning.

The IAC has not, and should not, develop its advice and recommendations to the Minister for a line by line statutory assessment against the MRSD Act or any of the other relevant pieces of legislation.

To some extent, the question whether the MRSD Act encourages or facilitates mining at all costs is moot; the determination that an EES is required clearly identifies this is not the case. The broader frame of reference for the IAC provides a clear pathway for the IAC's work in providing recommendations to inform the Minister's assessment. The IAC has used its best endeavours to develop that advice.

The IAC notes that ERR were invited to attend the Hearing but chose not to. ERR offered written advice to the IAC; the IAC took advantage of this offer on several occasions. Whilst this was useful to the IAC, the IAC considers it would have been beneficial to the process if ERR had attended the Hearing and explained the workings of the MRSD Act and mining regulation in person. This would have been of use to the IAC as well as providing an opportunity for the community and parties to better understand ERR's role, obligations, and regulatory responsibilities.

3.2 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The Commonwealth Minister for Environment determined the Project is a 'controlled action' under section 75 of the EPBC Act as it is likely to have a significant impact on MNES requiring assessment and approval under the EPBC Act (Referral 2017/7919).¹⁰⁴ The assessment was undertaken under the Bilateral Agreement with Victoria which authorised the EES process to be used. The Victorian Minister's EES Assessment will be provided to the Commonwealth Minister for

¹⁰² Document 407 page 23.

¹⁰³ Clause 5(b) of the Terms of Reference, from Document 407, para 95.

¹⁰⁴ The MNES likely to be impacted are Ramsar wetlands (specifically the Gippsland Lakes Ramsar site) (EPBC Act, ss 16 and 17B); listed threatened species and communities (EPBC Act, ss 18 and 18A); listed migratory species (EPBC Act, ss 20 and 20A); and nuclear actions (EPBC Act, ss 21 and 22A).

Environment for consideration in the decision whether to grant an approval for the Project under the EPBC Act. MNES are discussed in detail in Chapter 23.

3.3 Environment Effects Act 1978

The EE Act provides for the integrated assessment of works with the potential for significant environmental effects. The IAC's report will inform the Minister for Planning's Assessment of the Project. This assessment will, in turn, be considered by other decision makers when deciding whether to grant the various authorisations that are required for the Project.

3.4 Mineral Resources (Sustainable Development) Act 1990

The Proponent requires a mining licence and approval of, amongst other things, a Work Plan for the Project under the MRSD Act.¹⁰⁵ A draft Work Plan (with Appendices) was exhibited with the EES (Attachment B) and an updated version provided during the Hearing to address centrifuges.¹⁰⁶

The Proponent applied for a mining licence for the Project (Mining Licence Application MIN007636) which was accepted by ERR on 8 July 2021 (during the Hearing).¹⁰⁷ The mining licence application covers an area larger than the Project Area and larger than was notified in the EES. As a result, the additional mining licence area has not been assessed under this EES process.

ERR accepted the application and commenced advertising during the Hearing as required by the MRSD Act.

A mining licence is not able to be granted for 'protected' areas designated under sections 6 and 7 of the MRSD Act. The Project Area is not a designated protected area.¹⁰⁸ However, the adjacent area of the Lindenow Valley horticultural area is a designated protected area.

The Proponent must not commence work under the mining licence and approved Work Plan unless various conditions have been met, including that it has obtained all the necessary consents and other authorities required by the MRSD Act or any other applicable Act.¹⁰⁹

The compensation provisions of the MRSD Act are discussed in Chapter 17.

3.5 Environment Protection Act 2017

On 1 July 2021, during the Hearing, the *Environment Protection Act 1970* (Vic) and associated regulations were repealed, and the *Environment Protection Act 2017* (Vic) (EP Act) and *Environment Protection Regulations 2021* (Vic) (EP Regulations) commenced. In addition, State Environment Protection Policies were replaced, in part, by the Environmental Reference Standards (ERS).

The IAC has considered the Project having regard to the new EP Act framework.

The EP Act introduced a 'general environmental duty' (GED) that now applies to all entities engaging in activities that may give rise to risks of harm:

¹⁰⁵ MRSD Act, s42(1).

¹⁰⁶ Document 197a.

¹⁰⁷ Document 518.

¹⁰⁸ Document 304.

¹⁰⁹ MRSD Act, s42(1)(c).

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.¹¹⁰

The GED will apply to all Project activities that give rise to risks of harm, whether inside or outside the mining licence area.

The exact nature/number of the authorisations needed under the EP Act was in dispute between the EPA and the Proponent, particularly around the issue of whether discharge from tailings via seepage constitutes a ‘waste’ that would require a Development Licence.

Generally, mining activities that involve:

- discharging or depositing mining or extractive industry wastes solely to land
- discharges or emissions solely to the atmosphere

are exempt from the requirement to hold a development and operating licence under the EP Act provided those activities are undertaken in accordance with the MRSD Act.¹¹¹

The Proponent made an application for a Works Approval under the *Environment Protection Act 1970* (Vic), which was exhibited concurrently with the EES (Attachment D). The WAA was supported by technical reports.¹¹² The application associated with the EES was just for treatment and discharge from the DAF plant.

The WAA transitioned into Development Licence Application (DLA) on 1 July 2021 and will be assessed under the (new) EP Act.¹¹³

On 22 December 2020, the EPA issued a s22 request for information under the (old) EP Act. After discussion, the Proponent and EPA agreed on 15 February 2021 under s67A of the (old) EP Act the requested information would now not to be provided until the 31 December 2021.¹¹⁴ While some submitters raised concern about the timing of this information, it is a separate statutory process, and the IAC makes no comments on the content of that request. It has not seen any response.

The IAC has been tasked with making relevant recommendations to the EPA regarding the WAA, now the DLA, including recommendations on what conditions the IAC might appropriately be imposed. At the conclusion of the EES process, the EPA must consider the Minister's Assessment of the EES (as informed by the IAC's Report) before deciding the DLA.

Although the EPA approvals jurisdiction is limited to discharges to surface water and groundwater, it will have a consultation/advisory role in relation to the mine, and its general powers under the EP Act. However, the mine will largely be regulated pursuant to the MRSD Act.

¹¹⁰ EP Act, s25.

¹¹¹ EP Regulations, Schedule 1, item 37, C01 (Extractive industry and mining).

¹¹² Appendix C–Conceptual Surface Water Management Strategy and Water Balance (EMM, 2020); Appendix D–Surface Water Assessment–Site study (Water Technology, 2020a); Appendix E–Groundwater and surface water impact assessment (Coffey, 2020); Appendix F–Surface Water Assessment–Regional Study (Water Technology, 2020b); Appendix H–Stage Two Air Quality and Greenhouse Gas Assessment for the Fingerboards Mineral Sands Project (Katestone 2020); Appendix I –Fingerboards Mineral Sands EES Noise and Vibration Assessment (Marshall Day Acoustics 2020).

¹¹³ EP Act, ss 470 and 474.

¹¹⁴ Document 225.

3.6 Planning and Environment Act 1987

A planning permit under the PE Act is not required for Project activities within the mining licence area if mining is in accordance with the MRSD Act.¹¹⁵ The Planning Scheme continues to apply to ancillary works outside the mining licence area (Infrastructure Area).

Draft Planning Scheme Amendment C156egip (the Amendment) was prepared under the PE Act and exhibited jointly with the EES (Attachment C). In this case the Minister for Planning is the Planning Authority. The Proponent seeks the Amendment to enable associated works to be undertaken in the Infrastructure Area in accordance with the proposed Incorporated Document. The Amendment is discussed in Chapter 20.

The PE Act requires planning and responsible authorities to:

- consider environment protection in decisions
- refer certain applications to EPA for advice on the risk of harm to human health and the environment associated with land use and development
- consider, where appropriate, instruments under the EP Act including the ERS.

The Planning Authority must take into account any significant effects the amendment might have on the environment or vice versa (s12 (2)(b) PE Act).

3.7 Water Act 1989

Under the *Water Act 1989* (Water Act) the Proponent must seek licences for the construction of water management dams associated with the Project from SRW.

The Project's water needs of approximately 3 gegalitres a year will need to be sought within the parameters of the Water Act including ground and surface water licences under s51. The availability of water for the Project is discussed in Chapters 6 and 7.

3.8 Flora and Fauna Guarantee Act 1988

This Act provides a framework for biodiversity conservation in Victoria. It facilitates the listing of threatened species, communities of flora and fauna and potentially threatening processes. A permit will be required under this Act for activities that could harm listed threatened species and communities of flora and fauna within the Project Area.

3.9 Wildlife Act 1975

The Act establishes procedures for the protection and conservation of wildlife. The Act includes procedures to prohibit and regulate the conduct of activities concerning or related to wildlife. An authorisation under section 28A of this Act will be required where fauna habitat is required to be translocated for the Project.

¹¹⁵ C52.08 (Earth and energy resources industry) of the Planning Scheme and ss 42(6)-(7) of the MRSD Act oust planning permit requirements for mining undertaken where an EES process is undertaken.

3.10 Heritage Rivers Act 1992

The Project Area sits adjacent to the Mitchell River, the largest unregulated river in Victoria and one of Victoria's 18 heritage rivers under the *Heritage Rivers Act 1992* (Vic).¹¹⁶ The *Heritage Rivers Act 1992* seeks to protect the significant nature conservation, recreation, scenic and or cultural heritage attributes of Victoria's heritage rivers.

¹¹⁶ *Heritage Rivers Act 1992*, Schedule 1 Part 12.

4 Biodiversity

4.1 Introduction

Biodiversity effects are discussed in EES Chapter 9 and Technical Reports included in Appendix A005.

The relevant draft evaluation objectives is:

Biodiversity – To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory 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 EES proposes 51 mitigation measures included in Attachment H to manage the impacts of the Project on biodiversity. These were, in summary:

- TE01: Approvals and permits
- TE02: Compensation habitat for the removal of hollow-bearing trees
- TE03: Offsets in accordance with state and Commonwealth legislation and policy
- TE04: Buffers around no-go areas
- TE05: Access tracks marked to prevent secondary access
- TE06: Access tracks adjacent to areas of high ecological sensitivity
- TE07: Locations for parking, stockpiles, machinery depots and site buildings
- TE08: Trees adjacent to the Project footprint and Tree Retention Zones
- TE09: Rehabilitation sub-plan
- TE10: Revegetation of disturbed areas
- TE11: Revegetation of mined areas
- TE12: Staff/contractor inductions
- TE13: Sensitive areas management prior to construction and operation
- TE14: Pre-clearing activities
- TE15: Relocation of animals during clearing works
- TE16: Trench design
- TE17: Speed limits
- TE18: Traffic movements during the night, dusk and dawn hours
- TE19: Hollow-bearing tree retention
- TE20: Pre-clearance surveys
- TE21: Salvaged or artificial hollow installation
- TE22: Isolation and fragmentation of habitat
- TE23: Erosion and sediment control strategies
- TE24: Buffers around waterbodies
- TE25: Sediment control strategies
- TE26: Bunding for fuel storage areas
- TE27: Design, construction, monitoring and rehabilitation of the temporary TSF
- TE28: Biodiversity sub-plan
- TE29: Use of underpasses/culverts and overpasses
- TE30: Management of remaining areas of ecological value near the Project Area
- TE31: Fauna escape features and refuges
- TE32: Dust suppressant management

- TE34: Construction machinery management
- TE36: Lighting system design
- TE37: Micro-siting of Project infrastructure and activities
- TE39: Management of trenches and other excavations
- TE41: Handling and/or storage of flocculent and hazardous materials
- TE42: Mobile plant and vehicles
- TE44: Leak or spill management
- TE45: Biosecurity
- TE46: Disturbed area revegetation
- TE47: Revegetation of mined areas
- TE48: Gaping-leek orchid management
- TE49: Construction machinery access to Cowells Lane
- TE50: Progressive rehabilitation
- TE51: Habitat restoration works
- TE52: Targeted recovery program
- TE53: Flora and fauna survey of unsurveyed portion of the Project Area
- TE54: Pre-clearance searches for fauna
- TE55: Construction and significant weather events
- TE56: Supervision of felling of large hollow-bearing trees.

The Proponent provided the following Technical Notes (TN) relating to biodiversity:

- TN2: Response to IAC Request for Information – Part 2.1, questions 1 and 2
- TN13: Response to IAC Request for Information – Part 2.1, question 2
- TN24: Native Vegetation Removal Reports
- TN28: Stygofauna in groundwater
- TN36: Timing of restoration described in TN18.

The IAC benefited from extensive submissions and evidence in its consideration of potential impacts to biodiversity.

Table 5 lists the biodiversity evidence that was called.

Table 5 Biodiversity evidence

Party	Expert	Firm	Evidence
Proponent	Aaron Organ	Ecology & Heritage Partners	- Ecology Expert Witness Statement, 2 February 2021 ¹¹⁷ - Ecology Supplementary Expert Witness Statement, 8 February 2021 ¹¹⁸
Council	Brett Lane	Nature Advisory	- Ecology Expert Witness Statement, 2 February 2021 ¹¹⁹ - Ecology Supplementary Expert Witness Statement, 12 February 2021 ¹²⁰

¹¹⁷ Document 70.

¹¹⁸ Document 123.

¹¹⁹ Document 97.

¹²⁰ Document 189.

Party	Expert	Firm	Evidence
MFG	Lincoln Kern	Practical Ecology	- Ecology Expert Witness Statement, 1 February 2021 ¹²¹

Mr Organ and Mr Lane both lodged supplementary evidence and responses to other evidence and matters raised during the Hearing.¹²²

A conclave report on biodiversity was prepared following the expert conclave meeting.¹²³ The joint conclave report set out agreed positions and comments relating to biodiversity.

4.2 Key issues

The key issues are:

- whether sufficient measures have been taken to avoid and minimise ecological impacts, particularly in relation to native vegetation
- whether the proposed mitigation measures, in particular the loss of habitat from large old trees are acceptable
- whether the proposed offsets are acceptable and achievable
- the impacts on GDE and the EPBC Act listed ecological communities.

4.3 Ecology and native vegetation removal

4.3.1 Background

The EES assessed potential impacts of the Project on flora and fauna values. In relation to native vegetation, the assessment involved the Project Area, except for the property at 2705 Bairnsdale - Dargo Road and the proposed extended mining licence area neither of which have been surveyed.

The final agreed total area of native vegetation proposed to be removed is 223.58 hectares comprising:

- 110.47 hectares (49 per cent of the total area to be removed) of Plains Grassy Forest Ecological Vegetation Class (EVC), of which 1.74 hectares is EPBC Act listed threatened community Gippsland Red Gum Grassy Woodland and Associated Native Grassland
- 373 large trees in patches and 461 scattered trees
- 74.88 hectares (33 per cent of the total area to be removed) of Valley Grassy Forest EVC
- Areas of Plains Grassy Woodland, Aquatic Herbland, Plains Grassy Wetland, Box Ironbark Forest and Lowland Forest making up the balance (18 per cent) of the cleared area
- Removal of state significant flora species, including Slender Wire-lily (33 plants), Blue Mat-rush (3 plants) and Sandfly Zieria (10 plants).¹²⁴

The Project is proposed to be located within an environment that has been substantially modified by past vegetation clearing associated with sheep and cattle grazing, pine and blue gum timber plantations and rural residential living. Remnant vegetation can be found in the road reserves, gullies and infrastructure areas set aside for the rail siding.

¹²¹ Document 92.

¹²² Documents 123, 189.

¹²³ Document 238.

¹²⁴ Document 537, page 9.

Removal of native vegetation will take place both within the Project Area (including the mining area) and the Infrastructure Area (including the water supply borefield, power, water and road and rail infrastructure).

4.3.2 Evidence and submissions

The Proponent acknowledged that a significant volume of vegetation is proposed to be cleared for the Project but submitted that, having regard to the offsets to be provided and the mitigation measures to be adopted, as well as the broader benefits of the Project, the impact is acceptable.

The Proponent submitted the key objective of the Project is to mine the ore body within the Project Area, and that due to the shallow depth of the ore body beneath the ground surface, mining is required to be open cut and cannot avoid impact on native vegetation. The Proponent submitted the *“avoidance and minimisation do not need to be undertaken to an extent that would undermine the objectives of the proposed use or development”*¹²⁵, and furthermore, nothing in the planning scheme or the native vegetation framework establishes a ‘hard cap’ on the extent of permissible clearing.

Mr Organ gave evidence the three step approach of avoid minimise and offset had been followed and that a large proportion of the vegetation to be cleared was of low to moderate quality.¹²⁶ Mr Organ’s evidence was that impact to native vegetation had been avoided through changes to the mine area, for example to avoid the State Park to the west, realignment of haul roads and pipelines, positioning of rail siding to avoid native vegetation and populations of the Gaping Leek orchid, and the siting of process infrastructure, Carey’s Lane diversion and waste dumps to avoid impact.¹²⁷

Mr Organ confirmed the property at 2705 Bairnsdale - Dargo Road was not surveyed as the landowner had denied access. All ecology experts agreed that a detailed ecological assessment should be undertaken of this property to determine the status of national and state significant flora and fauna species on this part of the Project site.

The Proponent submitted that the design of the Project is continuing to be refined to further avoid and minimise native vegetation clearance where possible. Through discussions with DELWP-FFR, the Proponent has identified further potential avoidance opportunities¹²⁸ that *“would result in a reduction in the extent of overall clearing of approximately 15%, as well as avoiding impacts on State significant flora species”*.¹²⁹

The Proponent submitted staged vegetation clearing is a practical and positive approach that mitigates losses, allowing for further evaluation and avoidance opportunities as the Project proceeds, and in the event the Project does cease unexpectedly, vegetation planned to be cleared will be saved from being removed.

MFG commissioned a report from Treetec,¹³⁰ and this and MFG’s expert witness Mr Kern noted deficiencies in the survey and classification of EVCs which Mr Kern pointed out in the biodiversity

¹²⁵ Document 698, page 47.

¹²⁶ Document 299, page 15.

¹²⁷ Document 299 page 18.

¹²⁸ Document 592, page 5.

¹²⁹ Document 698 page 48.

¹³⁰ Document 449.

conclave.¹³¹ The result was additional native vegetation losses being identified in Mr Organ’s second supplementary expert witness statement.

MFG, Council and several submitters stated the extent of proposed vegetation removal would be irrecoverable. All ecology experts agreed the total extent of the native vegetation removal “*is substantial in scale compared to most development projects in Victoria*”.¹³²

The evidence from Mr Kern was the level of native vegetation clearing is extreme for any recent project in Victoria, because the EVCs affected are mostly endangered or vulnerable, and already too uncommon because of past clearing.¹³³

MFG submitted the value of the native vegetation to be removed is demonstrated by the fact that:

- three State significant flora species will be directly impacted by the Project¹³⁴
- Commonwealth protected native vegetation will be impacted; being the proposed removal of 1.74 hectares of the nationally significant Gippsland Red Gum Grassy Woodlands and Associated Native Grassland ecological community.¹³⁵

It was MFG’s position the effects on biodiversity are excessive and are likely to be significantly understated as the EES was informed by assessments that took place after a bushfire and during a period of drought.¹³⁶

DELWP-FFR submitted their key areas of concerns regarding native vegetation removal are:

How actions to avoid and minimise native vegetation impacts with the highest values have been addressed, with specific attention to cumulative impacts on endangered and vulnerable EVCs, large trees and habitat for threatened species as a result of the use and development

How impacts to areas of native vegetation affected by the Environmental Significance and Vegetation Protection Overlay have considered and addressed the objectives and decision guidelines as described in the relevant planning provisions.¹³⁷

DELWP confirmed that until the property at 2705 Bairnsdale – Dargo Road has been assessed, final figures for the total area of native vegetation removal, large tree impacts and impacts to threatened species habitat cannot be determined. They also submitted that given the ecological impacts that would result from the Fernbank rail siding option, their preferred transport option is for the Proponent to use the Bairnsdale rail siding which would avoid the native vegetation impact associated with the Fernbank siding development.

The Proponent submitted that neither Mr Lane nor Mr Kern identified specific avoidance or minimisation opportunities that have not been explored or adopted by the Project.

At the conclusion of the Hearing, Council submitted that given the proposed extension to the mining licence area and potential relocation of the borefield, the ecological impacts of the Project have not been fully identified, including a final position on how many trees are to be lost and the extent of vegetation and habitat proposed to be removed.

¹³¹ Document 238.

¹³² Document 238, page 3.

¹³³ Document 92, page 5.

¹³⁴ Document 451, page 14.

¹³⁵ Which is listed as critically endangered under the EPBC Act and faces continued threatening processes: Document 451, page 17.

¹³⁶ Document 250, page 10

¹³⁷ Document 521, page 10.

4.3.3 Discussion

The IAC acknowledges the Project objective is to mine the ore body in the Project Area by open cut mining methods and as a result vegetation will be lost.

Vegetation removal is extensive, resulting in the removal of 223.58 hectares of native vegetation across the Project and Infrastructure Areas which is equivalent to approximately 223 international sized rugby fields,¹³⁸ or more than the size of the Melbourne Central Business District.¹³⁹ In comparison, the North East Link state infrastructure project predicted the loss of native vegetation to be 52.10 hectares,¹⁴⁰ which is less than a quarter of the removal proposed for this Project. The IAC notes that native vegetation removal calculations do not include additional loss due to the extension of the mining licence area and potential borefield relocation, neither of which were assessed as part of the EES process.

The Proponent's primary position is that having regard to the offsets to be provided and the proposed mitigation measures, the impact is acceptable.

The IAC does not agree and does not consider sufficient measures have been taken to avoid and minimise ecological impacts.

The IAC heard from Mr Lane and Mr Organ the site is a largely modified landscape with ecological values primarily concentrated in gullies and roadsides.

The IAC is of the view that although a project of this nature is somewhat dictated by the location of the ore body, the presence of the ore does not take priority over the extent of native vegetation removal. This is especially important in modified landscapes with concentrations of high ecological values which, given their rarity, become more significant and valued to support biodiversity.

The IAC acknowledges the avoid, minimise, offset approach is a well-established part of Victoria's native vegetation management framework. This requires a hierarchical approach where impacts on native vegetation are avoided, if possible, minimised where they cannot be avoided, and offset to the extent they cannot be avoided or minimised further. All development proposals must demonstrate or provide evidence to show no options exist to further avoid and minimise native vegetation removal without undermining the objectives of the proposal before removal is permissible. The IAC considers the Project cannot avoid areas of high biodiversity values such as the gullies and roadsides without undermining the objectives of the Project.

The IAC considers it is not best practice to start with the premise that all native vegetation within the Project boundary must be removed. This approach, which appears to have been used in this case, does not meet the EES evaluation objective *"To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory 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"*, nor does it meet the policy of avoid and minimise in the Guidelines.¹⁴¹

¹³⁸ [How Big Is A Hectare? \(thecalculatorsite.com\)](http://thecalculatorsite.com)

¹³⁹ The Hoddle Grid is 180.48ha [Hoddle Grid - Wikipedia](https://en.wikipedia.org/wiki/Hoddle_Grid)

¹⁴⁰ Inquiry and Advisory Committee Report - North East Link, 2019 pg 175.

¹⁴¹ *Guidelines for the removal, destruction or lopping of native vegetation* (environment.vic.gov.au).

The IAC cannot make recommendations or findings in relation to the extended mining licence area or any change to the borefield as these areas have not been assessed or tested through the EES or Inquiry process.

4.3.4 Findings

The IAC finds:

- The Project has not taken sufficient measures to avoid and minimise ecological impacts and removal of native vegetation.

4.4 Groundwater dependent ecosystems

4.4.1 Background

GDE are ecosystems that require access to groundwater to meet all or some of their water requirements to maintain the communities of plants and animals and ecological processes they support. These can include vegetation with roots that access groundwater.

The EES reported there is potential for terrestrial GDE in the Project Area, whilst aquatic GDE have a low to high potential of occurring.

4.4.2 Evidence and submissions

Several submissions were made the Project, including the extraction of groundwater, has the potential to cause significant changes to groundwater levels and reduce groundwater availability to GDE and their habitats.

West Gippsland CMA submitted that a review should be undertaken to guide impact assessment and mitigation strategies.

...the CMA recommends a comprehensive review of all potential GDE within the potential impact area to assess which ones are likely to be fed by perched aquifers or the regional waterable aquifer. This can then guide impact assessment and, if necessary, mitigation strategies.¹⁴²

The West Gippsland CMA submitted that a “*greater emphasis on localised GDE assessments and ongoing monitoring*” be completed to understand the interactions and reliance on groundwater prior to approvals for the Project and any work commencing.

At the groundwater conclave several matters regarding hydrology and the potential impact on GDE were discussed:¹⁴³

- It was agreed the pooled water within the ephemeral drainage gullies on the Project site, and in the unnamed tributary of Honeysuckle Creek immediately south of the Project Area are several tens of metres above the regional groundwater table, and under existing conditions are unlikely to be considered GDE that rely on the regional water table. Whether these are features at risk of impact as a result of changed groundwater conditions due to mining (e.g. mounding) was not agreed.
- The Providence Ponds and other chain of ponds features west of the Project Area have not been directly assessed by field investigations to confirm connectivity with the regional groundwater system. However, if the conceptual model is correct and the regional water

¹⁴² Submission 358, page 10.

¹⁴³ Document 255, page 8.

table is several metres below the base of the Providence Ponds, a viable groundwater pathway would not exist for the Project to have a direct impact on the Chain of Ponds system. Whether it is acceptable to assume this conceptual model is true without further collection of groundwater level data in the vicinity of the Providence Ponds and between the mine site and ponds, was not agreed.

- The time between the release of tailings seepage migrating via groundwater and impacting on GDE has not been estimated.

Mr Lane gave evidence¹⁴⁴ that *“the GDE impact assessment in EES Appendix A005 concluded the project will have a low to negligible risk to this terrestrial GDE because of predicted groundwater mounding”*.

MFG submitted that was limited characterisation of GDE to understand their relationship to groundwater, and GDE such as spring fed dams and areas of River Red Gum were not fully identified within the Project area.¹⁴⁵

Mr Kern gave evidence that Gippsland Red Gum Grassy Woodlands in general and specific sites such as Sapling Morass Flora and Fauna Reserve, may be GDE and any risks to these values have not been addressed. He stated the Gippsland Red Gum Grassy Woodlands will remain around the mine and through the borefield and rely on groundwater in dry times. However, he acknowledged he was not qualified to comment on possible groundwater changes that could occur that may impact on these GDE but gave evidence the issue needs to be better considered.¹⁴⁶

All experts at the groundwater conclave agreed¹⁴⁷ the EES did not identify a potential chemical hazard posed by tailings seepage that might affect GDE. However, if further work or conditions indicate a water quality hazard exists, it was agreed that modelling to predict the likely concentrations in groundwater discharging to receptors should be undertaken.

In terms of mitigation measures, DELWP-FFR submitted that the biodiversity-related mitigation measures for GDEs lacked sufficient detail to demonstrate what actions will be undertaken and how success would be measured.¹⁴⁸

Submitter Mr Helps asked if stygofauna (groundwater dwelling organisms) had been considered by the biodiversity experts and whether flocculants seeping into groundwater may affect them.¹⁴⁹

The Proponent provided TN28¹⁵⁰ in response. Its view was that regional surveys for stygofauna have not identified any species of state or Commonwealth listed stygofauna and it did not need assessment in responding to the relevant evaluation objective.

4.4.3 Discussion

The IAC agrees with MFG’s submission there has been limited characterisation of GDE and it is unclear whether GDE are present on the Project site and surrounding areas such as the Providence Ponds. If GDE are present, it is unclear what impact the Project would have on these ecosystems without further collection of groundwater data and confidence in groundwater conceptual modelling.

¹⁴⁴ Document 97, page 27.

¹⁴⁵ Document 451, page 30-31.

¹⁴⁶ Document 92, page 6.

¹⁴⁷ Document 255, page 9.

¹⁴⁸ Submission 521, page 6.

¹⁴⁹ Document 321.

¹⁵⁰ Document 436.

The evidence provided does not allow the IAC to make recommendations on the presence or impacts of GDE from the Project. The IAC accepts Mr Kern’s evidence that GDE “*may be*” present at the Sapling Morass Flora and Fauna Reserve, however values were not addressed and need to be better considered.

The IAC concludes that further investigation is required to confirm the presence of GDE on and offsite, and to assess the impact of the Project on these ecosystems. It is not appropriate to address impacts on GDE through conditions of approval as that investigation should have been undertaken to determine the Project’s impacts prior to approvals being granted.

These investigations should include further expert consideration of whether there are likely to be listed or threatened stygofauna present and any impacts on them.

4.4.4 Findings

The IAC finds:

- The EES assessment of GDE is inconclusive.
- Further assessment is required to determine if GDE are present on the Project site and surrounding environments and, if present, if there is an impact from the Project and how this impact can be managed.

4.5 Fauna and habitat

4.5.1 Background

The EES documents¹⁵¹ that fauna species known in the Project Area are the nationally significant Grey headed Flying-fox and Australian Grayling, the State significant Yellow-bellied Sheath-tail Bat and two regionally significant fauna species, the Emu and Eastern Long-necked Turtle. The Project Area has the potential to be used by four species of national significance, the Swift Parrot, Painted Honeyeater, Giant Burrowing Frog, and Dwarf Galaxias, the State significant Masked Owl and Powerful Owl.

The main issue raised in terms of impacts on fauna is the extent of loss of hollow bearing trees, and the long timeframes for the reoccurrence of hollows in trees planted as part of revegetation efforts.

Giant Burrowing Frog surveys were undertaken as part of the EES assessment¹⁵², with survey locations selected on the presence of potentially suitable habitat. Surveys did not detect the presence of the Giant Burrowing Frog.

4.5.2 Evidence and submissions

(i) Hollow Bearing Trees

Mr Organ gave evidence that over 373 large trees in patches would be impacted within the Project Area, with an estimated 110 large trees to be impacted across the 2705 Bairnsdale - Dargo Road site which had not yet been surveyed.¹⁵³

¹⁵¹ EES Appendix A005, page7.

¹⁵² EES Appendix A005.

¹⁵³ Document 299 page14.

The IAC heard from several submitters on the scenic, landscape and biodiversity contribution of the hundreds of large old trees within the Project Area that would be removed if the Project proceeds.

MFG submitted the EES identifies several species known or considered to be present which rely on hollow bearing trees for roosting. MFG contended the impact of removing those trees was dismissed by the Proponent through the proposed mitigation measure of installing nesting boxes.

All ecological experts in the conclave agreed that large old trees serve an important ecological function and provide habitat for a range of fauna species.¹⁵⁴ Mr Kern gave evidence the loss of large old trees would be irreversible:

The loss of Large Trees would be an irreversible impact that cannot be mitigated by the proposed revegetation for at least 100 to 200 years because hollows only start forming in eucalypts once they reach 80 or more years of age.¹⁵⁵

Council submitted the extent of loss of trees has not been fully identified, including, how many trees are to be lost, how old the trees to be lost are, or how many of those trees are hollow bearing. Council acknowledged Mr Lane indicated that large old trees provide a proxy for likelihood of hollows being present.

In terms of quantifying the impact on hollow bearing trees, the Proponent confirmed no hollow audit was undertaken for the EES, as the Scoping Requirements did not require it to be undertaken. The native vegetation framework assumes that any tree that meets the criterion for a 'large tree' (based on EVC or species-specific measures) has hollows. The Proponent confirmed that it will be required to ensure offset sites have an appropriate number of large trees.

The Proponent submitted the proposed mitigation measures included in the Fauna Impact Mitigation and Landscape Plan¹⁵⁶ include measures aimed at ensuring all wildlife is protected from Project impacts as far as possible. Further, the Proponent confirmed that where removal of hollow bearing trees cannot be avoided, a combination of salvaged or artificial hollows and nest boxes would be installed in retained vegetation adjacent to the Project footprint.¹⁵⁷

The Proponent acknowledged the risk that, if nest boxes are not properly managed, they may not provide alternative habitat and agreed it would be reasonable for the Fauna Impact Mitigation and Landscape Plan to be updated to impose a monitoring and management regime for nest boxes.

(ii) Listed threatened and migratory species

In his expert witness statement, Mr Organ provided evidence there are several nationally significant species known to occur or have the potential to occur within the Project Area, including the Swift Parrot, Grey headed Flying Fox, Painted Honeyeater, Giant Burrowing Frog, Australia Grayling and Dwarf Galaxias.¹⁵⁸

MFG expressed ¹⁵⁹ its dissatisfaction with the timing and thoroughness of fauna surveys undertaken by the Proponent. Using the Swift Parrot as an example, MFG submitted the

¹⁵⁴ Document 238 page 4.

¹⁵⁵ Document 92, page 13.

¹⁵⁶ Document 592.

¹⁵⁷ Document 592, page 33.

¹⁵⁸ Document 70, page 11.

¹⁵⁹ Submission 813.

Proponent’s assessment against the Significant Impact Guidelines¹⁶⁰ *“does not appear to have been updated to take into account the amount of native vegetation to be cleared”*¹⁶¹ and which includes implications for the Swift Parrot foraging habitat, and therefore impact on the species:

In circumstances where the Project will result in the destruction of 9.91 ha of endangered Plains Grassy Woodland (EVC 55) and 7.51 ha of vulnerable Box Ironbark Forest (EVC 61), both of which are known foraging habitat for the Swift Parrot, it is clear there will be a significant and unacceptable impact on the critically endangered Swift Parrot.¹⁶²

Mr Kern’s evidence for MFG was the assessment of Swift Parrot critical habitat in the Project Area is a judgement by the Proponent’s ecologists, and it is possible the Swift Parrot visits the Project Area:

Rare woodland birds such as the Swift Parrot have been recorded in the local area over time and some of their preferred and occasional habitat is in the Project Area and surrounding local area. It is more than possible they are occasional visitors during their migrations in search of their preferred flowering eucalypts and the species is generally reliant on dispersed areas of habitat over a long-term time frame.¹⁶³

In reply, the Proponent stated there was no evidence to support findings of Swift Parrot or *“habitat critical to the survival of”* Swift Parrot¹⁶⁴ within the Project Area. The Proponent submitted that none of the expert ecologists gave evidence the Project would have impact on Swift Parrot, and the last record of Swift Parrot near the Project area was in 1986, which is consistent with evidence that East Gippsland is generally not part of the core habitat for the Swift Parrot.¹⁶⁵

The Proponent disputed the MFG submission that clearing of EVC 55 and 61 would result in a significant impact on Swift Parrot. The Proponent submitted that although the National Recovery Plan identifies these EVCs as habitat for the Swift Parrot, it does not state these are the *only* EVCs that provide habitat. Further, EVCs likely to be more important are those in core habitat of the Swift Parrot which is not within East Gippsland.

Mr Lane gave evidence the Swift Parrot is *“highly mobile and nomadic”*, and *“the project will result in the removal of potential foraging habitat, however these species are not expected to occur more than rarely”*.¹⁶⁶

(iii) The Giant Burrowing Frog

Despite the Project Area supporting low quality habitat for Giant Burrowing Frog,¹⁶⁷ targeted surveys were undertaken in line with DELWP’s recommendation to determine the presence or absence of the species. Surveys had not detected the presence of the Giant Burrowing Frog within the Project Area, and all ecological experts agreed that, based on information available, the targeted surveys were adequately undertaken consistent with the applicable survey guidelines and standards.¹⁶⁸

¹⁶⁰ Document 457.

¹⁶¹ EES Appendix A005, page 310.

¹⁶² Document 451, page 19.

¹⁶³ Document 92, page 26.

¹⁶⁴ Document 698, page 57.

¹⁶⁵ Document 698, page 58.

¹⁶⁶ Document 97, page 30.

¹⁶⁷ EES Appendix A005, page 37.

¹⁶⁸ Document 238, page 2.

In his submission, Mr Casey stated he had detected the Giant Burrowing Frog within the Project Area.¹⁶⁹ The audio recording and location of recording was not provided to the IAC, Mr Organ, Mr Lane or Mr Kern or any government department, however the audio recording was uploaded to the Atlas of Living Australia following the Hearing.

In response to this submission, the Proponent confirmed that targeted surveys for the Giant Burrowing Frog were undertaken in accordance with approved Commonwealth and State Government survey standards and no Giant Burrowing Frogs were detected.

Mr Lane gave evidence that he considered the Giant Burrowing Frog was unlikely to be present, however suggested mitigation measures be developed in the event they are found:

Giant Burrowing Frog was considered unlikely to occur after targeted surveys and a desktop assessment. A management plan should be implemented with detailed mitigation measures, as well as salvage and translocation protocols in case an individual is found.¹⁷⁰

Mr Lane added the Giant Burrowing Frog is currently endangered under the EPBC Act and is listed as Critically Endangered in Victoria under the FFG Act.

4.5.3 Discussion

The IAC notes the EES and related technical reports only document the biodiversity site values associated with native vegetation loss,¹⁷¹ which is only part of the total vegetation removal for the Project. Due to the nature of the Project requiring removal of *all* vegetation to access the ore body, there will be significant loss of habitat comprised of both native and non-native vegetation. Offsets will only replace the native vegetation component and vegetation lost on site would take many years to re-establish.

The IAC notes the Project will not only have a direct impact on habitat through removal of vegetation and loss of burrows through excavation onsite, but there will also be an impact on fauna surrounding the Project Area through noise of machinery and night lighting during mining operations.

(i) Hollow Bearing Trees

The experts agreed that large old trees serve an important ecological function and provide habitat for a range of fauna species. It was undisputed by the Proponent these trees provide hollows that are not easy to replace.

The IAC accepts the rationale from the Proponent that a hollow bearing tree audit was not undertaken as the native vegetation framework assumes that any tree that meets the criterion for a 'large tree' has hollows and therefore the audit is not required to meet DELWP requirements. Further, DELWP did not call for a hollow bearing tree assessment to be undertaken.

To mitigate the removal of hollow bearing trees, the Proponent proposed a combination of artificial hollows and nest boxes in retained vegetation to provide alternative habitat.

The IAC agrees with Mr Kern the loss of large trees would be irreversible and cannot be mitigated by revegetation, as tree hollows take decades to form and if nest boxes are not managed, success may be limited.

¹⁶⁹ Document 387.

¹⁷⁰ Document 189, page 6.

¹⁷¹ Document 537, page 9.

Given the number of large old trees proposed for removal (which is yet to be confirmed but the IAC understands is over 700), the IAC is of the view that priority should be given to retaining as many trees as possible to continue the provision of existing habitat connection in the landscape given that hollows will not be formed until after the mining operation has ceased.

(ii) Listed threatened and migratory species

Due to the significant amount of native vegetation proposed to be removed within the Project Area, native terrestrial fauna species which utilise the vegetation as habitat are likely to be impacted by removal. Mr Organ provided evidence there are several nationally significant species known to occur or have the potential to occur within the Project Area.¹⁷²

Regarding the potential impact on the Swift Parrot, there is no evidence before that IAC to suggest the Swift Parrot is present in the Project Area.

The IAC agrees that removal of EVC55 and EVC61 should be avoided to preserve habitat for fauna species which rely on the habitat these EVCs provide. The preservation of habitat where possible is particularly important given that vegetation offset sites will be provided at other locations, and rehabilitation will take many years to develop established habitat in the Project and Infrastructure Areas.

(iii) The Giant Burrowing Frog

The IAC notes that the audio recording of the Giant Burrowing Frog has not been provided to the IAC, Mr Organ, Mr Lane, or Mr Kern or DELWP-FFR, nor has the precise location of the recording.

It is the IAC's view that in the absence of material evidence by any suitably qualified person, the audio recording provided in the Hearing cannot be relied upon as evidence the Giant Burrowing Frog is present on or within the Project Area. The evidence provided by Mr Lane, and Mr Organ is that Giant Burrowing Frog was considered unlikely to occur on the Project site.

The IAC agrees with Mr Lane that a management plan for the Giant Burrowing Frog should be implemented in case an individual is found.

4.5.4 Findings

The IAC finds:

- The assessment of hollow bearing trees as undertaken in the EES is satisfactory.
- A fauna assessment of areas to be impacted which have not been assessed in the EES should be undertaken, including the property at 2705 Bairnsdale - Dargo Road and the mining licence extension area.
- There is no evidence to suggest the Swift Parrot is present in the Project area or will be impacted.
- A management plan for the Giant Burrowing Frog should be implemented in the event the species is found within the Project or Infrastructure Areas.

¹⁷² Document 70, page 11.

4.6 Biodiversity offsets

4.6.1 Background

The loss of native vegetation due to the Project is proposed to be offset as outlined in the Biodiversity Offset Strategy¹⁷³ (Offset Strategy) which explains the Project would impact:

- 1.744 hectares of EPBC Act listed Gippsland Red Gum, giving rise to an offset of 8-10 hectares
- estimated offset of 1.001 General Habitat Units (GHU) with a minimum Strategy Biodiversity Value of 0.253, along with 704 Large Trees.

4.6.2 Evidence and Submissions

Council submitted that offsets are insufficient to balance the extent of loss of habitat,¹⁷⁴ and given the extent of removal of native vegetation proposed, it is *“entirely appropriate to insist absolute clarity in relation to how offsets will be secured, managed and monitored”*.

MFG submitted the Offset Strategy was *“fundamentally flawed”*, and *“does not provide any certainty the offsets required are available and able to be secured, particularly species habitat units”*.¹⁷⁵

The Proponent stated that offsets will be put in place as each stage of the mine is implemented and will be secured by a combination of offset credits from the Native Vegetation Offsets Register and agreements with relevant landholders to secure and protect native vegetation in accordance with the *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP, December 2017). The Proponent stated that Memoranda of Understanding with the owners of five properties were being prepared to secure the required native vegetation offsets. If the Project is approved, more comprehensive agreements would be entered into which would secure the protection of the native vegetation transfer by transferring the offset credits to the Proponent.

Mr Organ gave evidence that all ‘general habitat’, ‘large trees’ and ‘large species habitat’ unit requirements can be met.¹⁷⁶

Council submitted that *“offsets are simply insufficient to serve to balance the extent of loss”*¹⁷⁷ and the Proponent has not sufficiently demonstrated its ability to secure the required offsets. Given the extent of removal of native vegetation, it was Council’s view that it is appropriate to insist on clarity in relation to offset security, management, and the benefit the offset would bring to the community.

The Proponent submitted the evidence before the IAC does not support a finding the offsets are not available, and the fact there are insufficient credits on the register does not indicate that sufficient credits cannot in fact be obtained. It submitted it is common for additional offsets to be sourced from outside the register when required.

Mr Kern gave evidence there is a significant problem with staged offsets in that critical offsets might be taken from the market and may not be available when required. Mr Kern stated a legal agreement or bond to ensure offsets will be available may create certainty.

¹⁷³ EES Attachment E.

¹⁷⁴ Document 407, page 34.

¹⁷⁵ Document 451 page 20.

¹⁷⁶ Document 299 page 21.

¹⁷⁷ Document 407, page 34.

DELWP-FFR submitted the current offset management strategy does not satisfy the requirements of the Guidelines:

The proponent has not identified staged clearing and offsetting in accordance with the Guidelines in the documentation provided to date. The offset strategy does not include evidence the offsets required, should removal be permitted, are available and able to be secured.¹⁷⁸

DELWP submitted the Guidelines provide for staged clearing and offsetting, which can be included as conditions in the Native Vegetation Removal Plan within the Incorporated Document.

All expert witnesses agreed at the conclave that *“legal security of all required offsets must be provided prior to commencement of clearing”*.¹⁷⁹

The Proponent submitted there is no prospect of uncompensated clearing occurring without obtaining the required offsets because the Incorporated Document and Work Plan would require all the offsets for each stage of the Project to be obtained to the satisfaction of DELWP before clearing could occur for the relevant stage. The Proponent stated there is an incentive to ensure offsets are secured to avoid project disruption:

In reality, there is a powerful incentive for the Proponent to ensure that this does not occur, as it would disrupt the operation of the Project. The Proponent will seek to hedge the risk of offsets becoming unavailable by entering into option agreements with landholders to ensure that some, or even all, of the offsets continue to be available. It might even choose to fully secure those offsets ahead of them being required.¹⁸⁰

If offsets become unavailable over time, the Proponent submitted it would halt the Project until the required offsets were obtained.

4.6.3 Discussion

The IAC recommends that the Proponent provide an updated Biodiversity Report to DELWP-FFR that includes assessment of all Project and Infrastructure Areas not surveyed, including the property at 2705 Bairnsdale - Dargo Road, the mining licence extension area and the borefield area, to ensure updated offsets are determined.

The IAC considers that offsets for the removal of native vegetation should be secured prior to the start of works for the construction of the Project. This is important to ensure the offsets required are provided and secured.

The IAC has given considerable thought to whether all the Project’s offsets should be secured upfront or whether a staged approach could be used (which is common practice and countenanced by the Guidelines).

If all the offsets for the entire Project are secured upfront, this will provide the certainty that the offsets are available and secured. If they are provided and secured on a staged basis to the satisfaction of DELWP-FFR before clearing can occur for that stage, there is no prospect of uncompensated clearing occurring. If the offsets relied upon for future stages were not available when required, the Proponent would have to halt the Project, either permanently or until it could obtain the required offsets.

¹⁷⁸ Document 521 page 10.

¹⁷⁹ Document 238, page 5.

¹⁸⁰ Document 698, page 50.

The risk in the latter approach is the Project could become ‘stranded’ if at that future time offsets are not available. While this is initially a financial risk for the Proponent, it is a broader risk of a stalled Project for the community.

4.6.4 Findings

The IAC finds:

- The Offset Strategy has demonstrated to an acceptable level the offsets required for the Project are capable of being provided.
- A staged approach to securing offsets over the life of the Project presents an unquantified risk to Project delivery.
- DELWP-FFR when considering whether to approve a ‘staged’ or ‘all upfront’ approach to offset security should consider the risk of offset provision and security based on the regional picture of offsets at that time.

4.7 Grassy Woodland Restoration Project

4.7.1 Background

As part of the rehabilitation of the Project Area, the Proponent proposes to replace an area of blue gum plantation on the Project Area with approximately 200 hectares of Plains Gum Grassy Woodland (Restoration Project). The Restoration Project would be in addition to biodiversity offsets required for the Project.

4.7.2 Evidence and submissions

The Proponent engaged Dr Gibson-Roy to begin seed collection, propagation, and implementation of the Restoration Project. Dr Gibson-Roy provided a presentation to the IAC on his work to date but was not called by the Proponent as an expert witness. TN18¹⁸¹ provides further information on the Restoration Project.

Mr Kern gave evidence that he is familiar with Dr Gibson-Roy’s work and although the Restoration Project would likely be unprecedented, he was confident the desired restoration could be achieved if enough resources are provided.¹⁸²

MFG submitted the Restoration Project will not result in a replacement of the Gippsland Red Gum Grassy Woodland community:

- the planted Gippsland Red Gums will take many hundreds of years of growth to replace what is lost and to bear hollows;
- the soil food web within the manufactured soil will not replicate that which is lost;
- there is no evidence before the IAC to demonstrate that a restoration project of this scale, using manufactured soil made up of mined and chemically treated earth and a seed collection and generation project Dr Gibson-Roy accepts is a great challenge, will be successful; and
- it will require a permanent and intensive maintenance regime involving slashing controlled burning, weed removal and fauna management to ensure it continues as a Gippsland Red Gum Grassy Woodland.¹⁸³

¹⁸¹ Document 270.

¹⁸² Document 92, page 23.

¹⁸³ Document 451 page 39-40.

MFG submitted the Restoration Project should not be regarded as a benefit of the Project, but rather a measure to mitigate biodiversity impacts.

By contrast, the Proponent stated the Restoration Project would have unprecedented benefits and has the potential to contribute to other Victorian restoration projects:

the proposed 200 hectare Gippsland Red Gum Grassy Woodland has the potential to deliver unprecedented benefits in markedly expanding the range of a critically endangered threatened ecological community. In addition, the infrastructure and experience used to support that restoration project has the potential to contribute valuable lessons learned and seed resources to restoration projects through Victoria and Australia.¹⁸⁴

Mr Kern raised concerns about the lack of certainty regarding the long-term management and security of the Restoration Project area. He stated that *“a security agreement should be placed on title to ensure the area is protected and managed in perpetuity”*.¹⁸⁵ All ecology experts agreed legal agreements are required to secure and manage the rehabilitated area in perpetuity.

In closing, the Proponent accepted that a long-term commitment is required to ensure ongoing management of the Restoration Project area. It advised it would be appropriate to recommend a condition requiring an agreement be entered into by the Proponent which includes costs of maintaining the Restoration Project area prior to commencing mine closure:

The Proponent also accepts that it would be appropriate to recommend conditions requiring the Proponent to undertake calculations to the satisfaction of ERR (in consultation with DELWP) of the likely costs of maintain[ing] the reserve for a given period (noting that at a certain point it becomes reasonable to expect subsequent landowners to take over management) and to set that amount aside in a trust fund or similar.¹⁸⁶

The Proponent put forward that given the site of the proposed Restoration Project is used currently as a blue-gum plantation *“it is simply implausible to assert that a properly managed reserve will not deliver an outcome at least equivalent to what currently exists.”*¹⁸⁷

4.7.3 Discussion

The IAC acknowledges the Restoration Project would be in addition to the biodiversity offsets required for the Project and should be taken on face value as a positive contribution to the biodiversity values which will be extensively impacted by the Project.

The IAC agrees with Mr Kern that if there is no certainty about long term ownership and management responsibility of the Restoration Project area, the native vegetation and habitat created would not be secure for the long term.

The IAC considers if properly managed and resourced, the Restoration Project would result in an uplift in ecology values to at least that of the current blue gum plantation.

The IAC supports the Proponent’s suggestion that a condition be imposed requiring the Proponent enter into an agreement, whether it be a Trust for Nature covenant, a conservation agreement under the *Conservation, Forests and Lands Act 1987*, a s173 agreement under the PE Act or other similar legally enforceable measure that is registered on title and binds future owners of the land in perpetuity. Such an agreement should be to the satisfaction of DELWP-FFR as part of the

¹⁸⁴ Document 698, page 2.

¹⁸⁵ Document 238, page 5.

¹⁸⁶ Document 698, page 169.

¹⁸⁷ Document 698, page 169.

Rehabilitation and Closure Plan¹⁸⁸, and the costs of maintaining the reserve until maturity be set aside as part of such agreement. The IAC notes revised Attachment H (Mitigation Register) includes a new mitigation measure (RH38) which provides further detail that should be included in such a measure.

4.7.4 Findings

The IAC finds:

- The proposed Restoration Project would improve the biodiversity values of the existing blue gum plantation area.
- The Rehabilitation and Closure Plan (part of the Work Plan approval) should include a condition requiring the Proponent to enter into an agreement or other legally enforceable measure that is registered on title and binds future owners of the land in perpetuity. This should be to the satisfaction of DELWP-FFR and ensure the Restoration Project area is maintained and resourced until maturity.

4.8 Overall conclusions on biodiversity

The IAC concludes:

- The Project has not taken sufficient measures to avoid and minimise ecological and native vegetation impacts.
- The assessment of the Project's impacts on GDE is inconclusive.
- Findings cannot be made on the impacts on the proposed extension to the mining licence area or any change to the borefield location, because these areas have not been assessed or tested through the EES or Inquiry process.
- The assessment of hollow bearing trees is satisfactory.
- There is no evidence to suggest the Swift Parrot is present in the Project Area or will be impacted by the Project.
- The Proponent has demonstrated offsets can be secured through a staged approach throughout the life of the Project.
- The proposed Restoration Project would improve the biodiversity values of the existing blue gum plantation area.
- The Rehabilitation and Closure Plan (part of the Work Plan approval) should include a condition requiring the Proponent to enter into an agreement or other legally enforceable measure that is registered on title and binds future owners of the land in perpetuity. This should be to the satisfaction of DELWP-FFR and include the Restoration Project area is maintained and resourced until maturity.

¹⁸⁸ Appended to the Work Plan.

5 Water balance

5.1 Introduction

Water impacts are discussed in EES Chapter 9 and Technical Reports included in Appendix A006, A007 and A008.

The relevant draft evaluation objective is:

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 Gippsland Lakes Ramsar site) over the short and long-term.

The Proponent provided the following TN relating to water balance:

- TN2: Response to IAC Request for Information – Part 2.1, questions 1 and 2
- TN13: Response to IAC Request for Information – Part 2.1, question 2
- TN22: Response to MFG’s request for further information in relation to water balance modelling
- TN29: Response to the IAC’s third request for information questions 6-8 relating to rainfall and runoff
- TN37: Findings of climate change impact assessments

The IAC benefited from extensive submissions and evidence in its consideration of water balance modelling. Table 6 lists the water balance evidence that was called.

Table 6 Water balance evidence

Party	Expert	Firm/Institution	Evidence
Proponent	Jarrah Muller	EMM	<ul style="list-style-type: none"> - Water Balance Expert Witness Statement, 2 February 2021¹⁸⁹ - Water Balance Supplementary Expert Witness Statement, 8 February 2021¹⁹⁰ - Water Balance Expert Witness Statement Errata, 5 May 2021¹⁹¹
Proponent	John Sweeney	Coffey	<ul style="list-style-type: none"> - Water Impacts Expert Witness Statement, 2 February 2021¹⁹² - Water Impact Supplementary Expert Witness Statement, 8 February 2021¹⁹³
Proponent	Tony McAlister	Water Technology	<ul style="list-style-type: none"> - Surface Water Quality Expert Witness Statement, 1 February 2021¹⁹⁴ - Surface Water Quality Supplementary Expert Witness Statement, 8 February 2021¹⁹⁵

¹⁸⁹ Document 70.

¹⁹⁰ Document 78.

¹⁹¹ Document 273.

¹⁹² Document 81.

¹⁹³ Document 135.

¹⁹⁴ Document 85.

¹⁹⁵ Document 138.

Party	Expert	Firm/Institution	Evidence
Council	Assoc. Prof. Anthony Kiem	University of Newcastle	- Surface Water Expert Witness Statement, 1 February 2021 ¹⁹⁶

A water balance and water management conclave was held and a report prepared.¹⁹⁷ The conclave report set out agreed positions and comments relating to water balance and management. The matters of disagreement were whether stochastic climate modelling should be undertaken, environmental impacts and surface water management measures.

5.2 Key issues

The issues are:

- quantity of water to be used by the mine
- water balance modelling approach
- application of climate change data in the water balance model.

5.3 Modelling approach

5.3.1 Background

The Proponent prepared a water balance model that projects likely water demand in the order of 3 gegalitres per year to support operation of the Project.

The water balance model is affected by the amount of water that “crosses the fence”¹⁹⁸ at the process plant to tailings. If more water can be recycled within the process plant water circuits, then the volume of water that would be lost in tailings is reduced.

5.3.2 Evidence and submissions

(i) Fine tailings solids concentration

The Proponent proposes to use centrifuges to achieve a water recovery rate of 80 per cent and maintain the overall water balance. The water balance modelling showed the adoption of centrifuges¹⁹⁹ would reduce water loss from fine tails entrainment from 2.8 gegalitres/year to 1.4 gegalitres/year.²⁰⁰

Mr Muller provided a model of seepage rates from fine tailings using an input of 73 per cent solids concentration. The data used in the model was provided by the Proponent.

However, the Proponent’s TN23, estimates that “the full-scale production unit P3 (which is the unit intended to be used for the Fingerboards Project) will achieve solids concentrations of 65-73%”.²⁰¹

MFG requested Mr Muller to rerun the model using an input of 63 per cent rather than 73 per cent solids concentration, on the basis there is insufficient evidence to substantiate an assumption of

¹⁹⁶ Document 95.

¹⁹⁷ Document 254.

¹⁹⁸ Document 346, page 2.

¹⁹⁹ Refer to discussion of centrifuges I section 1.3.

²⁰⁰ Document 132, PDF page 5.

²⁰¹ Document 348, page 1.

73 per cent solids concentration. TN22²⁰² demonstrated that reducing the solids to 63 per cent reduced the water recovery by 0.83 gegalitres per year.

In response, the Proponent submitted that reducing the solids to 63 per cent is not reflective of a full-scale centrifuge process:

this is not a realistic scenario based on the current centrifuge test work results. For the reasons described in section 3.2 and 6.2 of this technical note, the centrifuge feed contains a higher relative percentage of clays than the P1 feed material and therefore the percentage solids in the P1 fines cake 5 will always be lower than what will be achieved with a full scale centrifuge processing the WCP fines, which contains higher silts percentage silts relative to clay content.

The Proponent submitted it unrealistic to assume the centrifuges would achieve a solids concentration of less than 65 per cent:

noting that of six P1 samples, only one recorded a solids concentration range of below 65%, and even that achieved a range of between 60 and 65%. All other tests returned results of being between 65 and 71% for a test material that was never intended to achieve the final design density, given the sample was prepared by screening rather than cycloning. As indicated in TN 23, it is anticipated based on P1 tests the recovery range for the full-scale centrifuge processing cycloned fines would be in the order of 65 – 73%.²⁰³

The Proponent acknowledged the ability to recover water through the centrifuges is an important issue in minimising water usage and accepted that conditions should be imposed which require the carrying out of a pilot program to prove up the centrifuges prior to mining commencing.

(ii) Modelling water balance

When cross-examined by Council, Mr Muller acknowledged the seepage and entrainment rates were critical to the water balance model and that input data was provided by the Proponent's process engineers and relied on without interrogation.²⁰⁴

Mr Muller gave evidence the water balance model did not make allocation for dust suppression in the mine or pit area as it was assumed it would not be required.²⁰⁵

The Proponent confirmed the water balance is subject to uncertainty and relies on assumptions. It submitted there was nothing improper about Mr Muller's reliance on inputs provided by others and to suggest he should have interrogated the model inputs where he was not an engineer is "*not reasonable*".²⁰⁶ The Proponent submitted IACs routinely accepts the outputs from modelling used for impact assessment of many State transport projects.

The Proponent put forward the ramifications of the water balance being incorrect was immaterial, and if the water balance was incorrect and more water was required than modelled, water cannot simply be taken depriving others access to that water:

Before taking any water for the Project, Kalbar would need to:

- a) In the case of surface water, obtain a take and use licence either directly from SRW or by transfer from an existing licence holder (which transfer would need to be approved by SRW); or

²⁰² Document 347.

²⁰³ Document 698, page 36.

²⁰⁴ Mr Muller, cross examination by Council, 6 May, 2021.

²⁰⁵ Ibid.

²⁰⁶ Document 698, page 34.

- b) In the case of groundwater, obtain a licence from SRW and obtain allocations from existing allocation holders.²⁰⁷

If the Project is unable to obtain the water as it requires, the Proponent confirmed it would scale back its operations to use the water to which it has access.

5.3.3 Discussion

(i) Fine tailings solids concentration

The IAC considers it unclear how solid concentrations and water recovery rates have been derived, and why the highest figure in this range was used in the model. What is clear, however, is the input figure has a significant impact on the outcomes of the model, as demonstrated in TN22.

The IAC is being asked to rely on the Proponent's witnesses and accept the considerable further work required will be undertaken and that all the effects identified by that work will be acceptable. The IAC is not comfortable with this approach.

The IAC notes the ability of the centrifuges to recover water at full-scale centrifuge processing is a key input into the water balance. Further, all experts agreed that further work needs to be done to prove the centrifuge technology at a full scale, and that until that work is done, the fine tailings solids concentration of outputs of the centrifuge remain uncertain and the water balance model unreliable.

(ii) Modelling water balance

The water model is based upon assumptions and data that were not capable of testing through the evidence at the Hearing. Mr Muller used data supplied by the Proponent without further testing or inquiry.

The IAC agrees with Council's submission that "*Models are only ever as good as the assumptions that underpin them*".²⁰⁸

The inadequacy of the Proponent's water balance model has consequences for the adequacy of the work undertaken by other experts called by the Proponent, including water management experts.

The IAC notes the Project has not yet secured water to facilitate the Project.

The IAC does not accept the Proponent's proposed mitigation that if water is unable to be obtained as required, the Project would be 'scaled back' to use the water to which it has access in the sense that less mining would be undertaken over the life of the Project. The IAC considers that it is more likely the Project timeframe would simply be extended, which may result in impacts which have not been assessed and could impact the Project's viability.

5.3.4 Findings

The IAC finds:

- The water balance undertaken for the EES is acceptable in terms of methodology.
- The performance of the centrifuge at a full scale processing is a key input into the water balance.

²⁰⁷ Document 698, page 35.

²⁰⁸ Document 451, page 22.

- The water balance model is unreliable because the inputs from centrifuges are uncertain.

5.4 Climate change data

5.4.1 Background

Historical climate data was used in the water balance model to simulate future scenarios such as floods and droughts which may impact on the water requirements for the Project.

5.4.2 Evidence and submissions

TN37²⁰⁹, produced by the Proponent in response to the IAC's request for climate change modelling consistent with the 2020 Climate Change Guidelines²¹⁰, indicates the impact of climate change will not increase groundwater consumption beyond any scenario already modelled as part of the EES to significantly impact on water availability.

From a 'spill' perspective, while there are changes in the predicted discharges from site operations, some increases and some decreases, none of these changes are of sufficient magnitude to affect any of the previous findings and conclusions of the EMM and Water Technology EES investigations; and from a 'water resource' perspective, climate change may result in increased reliance on groundwater. The magnitude of this change is not of sufficient size to affect any of the previous findings and conclusions of the EMM and Water Technology EES investigations.

Dr Kiem gave evidence that in his opinion, the EES Scoping requirements of *"accounting for climate risks and potential effects of climate change are not met because the impacts of protracted, multiyear droughts are not considered."*

Dr Kiem gave evidence that to assume that future catchment dynamics will remain as they were in the past based on historical data was *"not valid"*. He gave evidence that *"Catchment characteristics and dynamics are expected to change due to (a) climate-change-induced changes to rainfall, evaporation, and temperature and (b) changes in land use, vegetation, and soil."*²¹¹

All experts in the water balance conclave agreed the effect of drought conditions worse than those modelled would result in reduced availability of water supply:

there is inherent uncertainty in water balance model predictions, particularly when accounting for future climate scenarios. Each drought or flood event is different. Future droughts or floods may be different to those in the historical record and therefore different from those simulated in the model.²¹²

Dr Kiem's view in the conclave statement²¹³ was that a range of plausible climate change scenarios should be considered:

Revised water balance modelling should be conducted to consider a range of plausible climate change scenarios, so the proponent can adequately manage water supply security, and ensure that adaptive management strategies and water management systems are adequately scaled to address potential future climate scenarios.

²⁰⁹ Document 535.

²¹⁰ Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria, DELWP (2020).

²¹¹ Document 95, page 7.

²¹² Document 254, page 2.

²¹³ Document 254, page 9.

Mr Muller gave evidence there would be no benefit in using the post-1975 or post-1997 data in climate modelling, or running stochastic modelling, on the basis that doing so would produce a result consistent with the median value already identified by historical modelling.²¹⁴

Council submitted the form of analysis recommended by Dr Kiem to account for stochastic modelling is entirely proportionate to the risk to the Project and the community, and should be undertaken by the Proponent.²¹⁵ Council submitted that when the quantity of water available to the Project is unknown, it is important the limits and understanding of water availability are included in all aspects of the Project assessment including climate change considerations.²¹⁶

The Proponent disagreed with Council's insistence on stochastic modelling as the sole acceptable method for assessing climate change impacts, where official guidance for water corporations expressly recognises the validity of historical scaling as a means of assessing climate change impacts. The Proponent submitted that stochastic modelling as the sole acceptable method of climate change modelling is inconsistent with the Climate Change Guidelines which state that *"both historical scaling and stochastic data generation were valid options and that '[n]o single approach is recommended over another'"*.²¹⁷

In closing,²¹⁸ the Proponent submitted the scope of climate change to materially affect the impact of the Project on water availability is limited:

- a) In relation to surface water, any winterfill licence would only permit the Proponent to take water when flows exceeded 1,400 ML/day. This restriction was agreed at the conclave to provide 'adequate protection for year-round irrigators and other surface water users who are permitted extract surface water at flow rates below the 1,400ML/day limit during the same period'.
- b) This threshold limit on the ability of the Project to take surface water is not affected by climate change. As such, even under severe climate change scenarios where flows in the Mitchell River were significantly reduced, irrigators would continue be adequately protected from changes to water availability 'due to predicted extraction groundwater or surface water for operational use'.
- c) To the extent that a reduction in surface water flows would require the Project to rely more heavily on groundwater, it was agreed at the conclave – and confirmed in Dr Kiem's evidence – that groundwater levels in the LaTrobe Group would not be affected by climate change during the life of the Project. It follows there is no scope for climate change to exacerbate the impact of groundwater extraction by the Project.

5.4.3 Discussion

TN37 was produced by the Proponent in response to the IAC's request for climate change modelling consistent with the 2020 Climate Change Guidelines. The IAC notes the modelling included in TN37 was produced more than halfway through the Hearing²¹⁹ and was not available when the EES was exhibited. The provision of this TN so late in the Hearing has resulted in limited time for parties to consider the results.

²¹⁴ Document 254, page 4

²¹⁵ Document 407, page 52.

²¹⁶ Document 407, page 51.

²¹⁷ Document 698, page 32.

²¹⁸ Document 698, page 31.

²¹⁹ TN37 is dated June 2021.

The IPCC Climate Change 2021 Report²²⁰ states that it is unequivocal that human influence contributes to climate change. However, the results from the climate change modelling for the Project indicate the impact of climate change will not materially increase groundwater consumption beyond any scenario already modelled or materially alter the impact of the Project on water availability.

The IAC is satisfied with the water balance modelling undertaken to consider impact of climate change on water availability.

5.4.4 Findings

The IAC finds:

- Climate change modelling using historical data is accepted.
- The climate change modelling consistent with the 2020 Climate Change Guidelines is acceptable.

5.5 Overall conclusions on water balance

The IAC concludes that:

- There is uncertainty whether the Project can achieve the relevant draft evaluation objective due to the unproved full-scale performance of centrifuges which impacts on the reliability of the water balance for the Project.
- The modelled impacts of climate change should not materially affect the impacts of the Project on water availability.
- There are unlikely to be climate change impacts not included in the model and residual risk can be managed through the Project Environmental Management Framework.

²²⁰ Climate Change 2021, The Physical Science Basis – Summary for Policymakers, IPCC Intergovernmental Panel on Climate Change, 2021.

6 Groundwater

6.1 Introduction

Groundwater effects are discussed in EES Chapter 9 and Technical Reports included in Appendix A006, A007 and A008.

The relevant draft evaluation objective is:

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 Gippsland Lakes Ramsar site) over the short and long-term.

The EES proposes 12 mitigation measures included in Attachment H to manage the impacts of the Project on groundwater. These were, in summary:

- GW01: Infiltration to groundwater
- GW02: Extraction from the Latrobe Group Aquifer
- GW03: Onsite chemical storage
- GW05: Handling of concentrated flocculant
- GW06: Hazardous waste removal
- GW08: Inductions and training
- GW09: Waste removal
- GW10: Waste hydrocarbons
- GW11: Spills of fuels or chemicals
- GW12: Hazardous materials transport
- GW15: Water recovery in mine void tailings
- GW16: Open void backfilled

The Proponent provided the following TN relating to groundwater:

- TN2: Response to IAC Request for Information – Part 2.1, questions 1 and 2
- TN13: Response to IAC Request for Information – Part 2.1, question 2
- TN26: Further information relating to seepage rates
- TN28: Stygofauna in Groundwater

The IAC benefited from submissions and evidence in its consideration of groundwater impacts. Table 7 lists the groundwater evidence that was called.

Table 7 Groundwater evidence

Party	Expert	Firm/Institution	Area of expertise
Proponent	Joel Georgiou	EMM	- Groundwater Modelling Expert Witness Statement, 2 February 2021 ²²¹ - Groundwater Modelling Supplementary Expert Witness Statement, 7 February 2021 ²²²
Proponent	Hugh Middlemis	HydroGeoLogic	- Groundwater Peer Review Expert Witness Statement, 2 February 2021 ²²³

²²¹ Document 79.

²²² Document 133.

²²³ Document 66.

Party	Expert	Firm/Institution	Area of expertise
			- Groundwater Peer Review Supplementary Expert Witness Statement, 5 February 2021 ²²⁴
Proponent	Tony McAlister	Water Technology	- Surface Water Quality Expert Witness Statement, 1 February 2021 ²²⁵ - Surface Water Quality Supplementary Expert Witness Statement, 8 February 2021 ²²⁶
Proponent	John Sweeney	Coffey	- Water Impacts Expert Witness Statement, 2 February 2021 ²²⁷ - Water Impact Supplementary Expert Witness Statement, 8 February 2021 ²²⁸
Council	Assoc. Prof. John Webb	Latrobe University	- Groundwater Expert Witness Statement, 29 January 2021 ²²⁹ - Groundwater Supplementary Expert Witness Statement, 11 March 2021 ²³⁰
MFG	Assoc. Prof. Matthew Currell	RMIT University	- Hydrogeology Expert Witness Statement, 29 January 2021 ²³¹ - Hydrogeology Supplementary Expert Witness Statement, 10 March 2021 ²³²
MFG	Dr Julia Jasonsmith	Murrang Earth Sciences	- Tailings Expert Witness Statement, 19 January 2021 ²³³ - Tailings Supplementary Expert Witness Statement (combined), 3 February 2021 and 22 March 2021 ²³⁴

A conclave report²³⁵ on groundwater was prepared which sets out agreed positions and comments relating to groundwater.

6.2 Key issues

The issues are:

- whether groundwater modelling is fit for purpose
- whether data and pumping tests relied on in groundwater modelling is sufficient to assess Project impacts
- groundwater allocation to support the Project

²²⁴ Document 129.

²²⁵ Document 85.

²²⁶ Document 138.

²²⁷ Document 81.

²²⁸ Document 135.

²²⁹ Document 96.

²³⁰ Document 190.

²³¹ Document 88.

²³² Document 186.

²³³ Document 91.

²³⁴ Document 211.

²³⁵ Document 255.

- groundwater reliability as a sole source of supply during times of drought
- water source contingency should groundwater not be available for take and use.
- quality and quantity of water seeping to the groundwater table and potential impacts on the Woodglen Aquifer Storage and Recovery (ASR) and other groundwater users
- impacts and management of groundwater mounding
- impacts of the Project on water supply to spring fed dams.

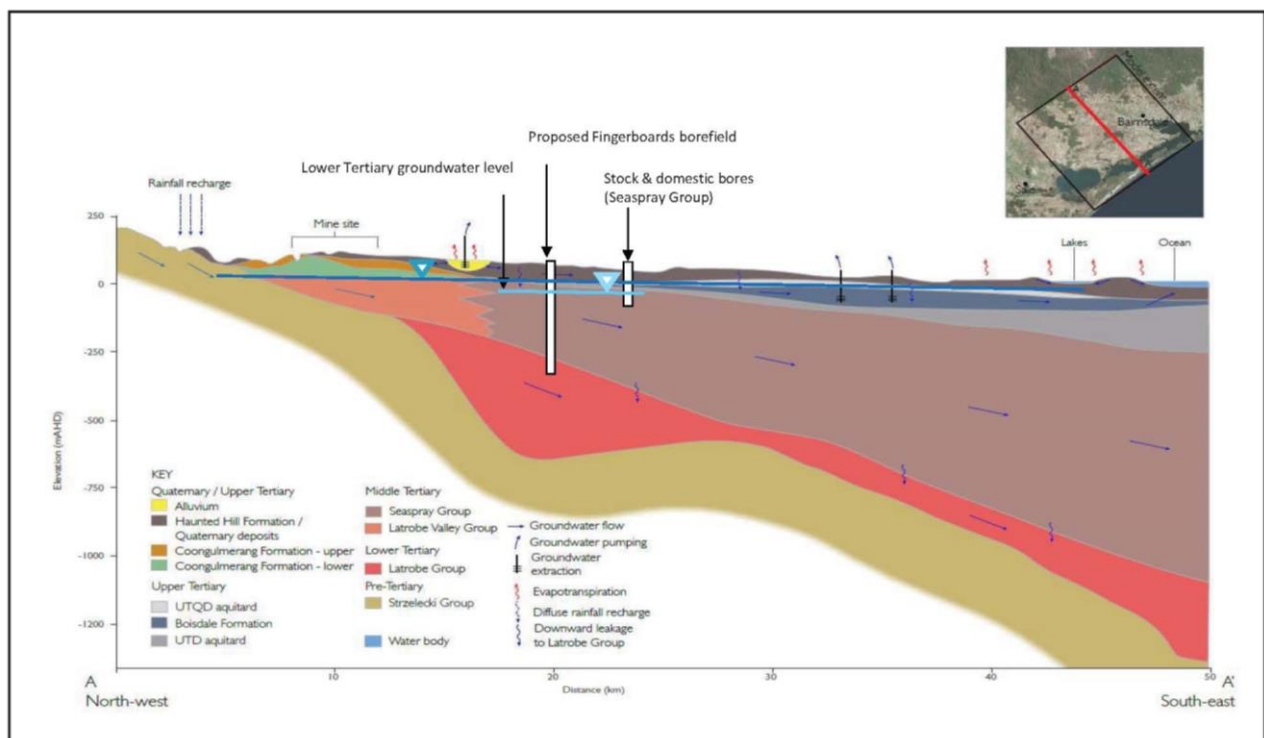
6.3 Groundwater modelling

6.3.1 Background

Groundwater modelling was used as the basis of assessing potential impacts arising from the Project on the groundwater system. Modelling included conceptualisation of both the regional and local aquifer and aquitard systems. The study included an initial drilling program to verify the existence of water-bearing gravel sequences within the deep aquifer system associated with the Latrobe Group. A follow-up 4-day pumping test program involved establishing a production and nested monitoring bore site to estimate the aquifer properties and yields.

The EES conceptualised the groundwater system in the Project Area as follows.

Figure 10 Conceptual hydrogeological model and potential receptors²³⁶



6.3.2 Evidence and submissions

Council submitted that aquifer test and analysis were “insufficient” because the test pumping rates and duration of the testing were insufficient to enable assessment of the overlaying aquitard which therefore requires further assessment.²³⁷

²³⁶ EES Appendix A007, page 21.

²³⁷ Submission 716B, page 67 of SLR report.

SRW submitted²³⁸ that more detailed impact assessment and substantial further work will be required in support of a licence to use groundwater including:

- conceptualisation of the groundwater system around the proposed bore field and particularly further north where the overlying formations become more sandy (more permeable) and the aquifers rise up to the surface on the basin margin.
- test pumping to better inform the groundwater conceptualisation, utilising the additional investigation bores drilled by Kalbar in 2019, and possibly new bores, to provide a more robust assessment of the impacts of pumping and mine water seepage.
- aquifer geometry, aquifer parameters, potential vertical pressure effects and leakage due to pumping (particularly along the basin margin).
- revised modelling and impact assessment.
- peer review taking into account this additional work.

The groundwater conclave experts agreed the groundwater pumping test was suboptimal, and further testing would be needed to better understand the aquifer's behaviour in response to pumping.²³⁹

The sub-optimal production bore design for the pumping test resulted in low bore efficiency, with rapid drawdown in the production bore (due to large well loss) and far less drawdown in the monitoring bore (aquifer loss). This affected the level of confidence with which the data could be used to estimate aquifer parameters.

A longer duration test, where high-quality late time data can be derived, would be needed to better understand the aquifer's behaviour in response to pumping, including the extent of confinement, hydraulic parameters, and potential boundary effects which may impact the response(s) of water levels to the proposed bore field in the long-term.

Experts agreed²⁴⁰ that additional pumping tests should be undertaken in accordance with SRW's groundwater licence application guidelines:

Additional pumping test is proposed by the proponent at a separate production bore location. This should be conducted for a period longer than four days. This is to be undertaken in accordance with Southern Rural Water's groundwater licence application guidelines.

Following pumping test, consider implications for the numerical model and, review conclusions drawn in the EES that relate to the potential impacts associated with groundwater drawdown around the bore field.

SRW submitted the Proponent will need to demonstrate impacts from pumping will not adversely impact existing users, or the environment:

A significant issue for consideration is the connection between the three aquifers at the project site. This location is close to the edge of Gippsland's sedimentary basin where the middle and lower aquifers rise towards ground level and the aquitards separating the aquifers are thin. The proponent will need to demonstrate impacts from its pumping will not adversely impact existing users, the environment, and the sustainability of the resource.²⁴¹

In closing, the Proponent advanced that although the groundwater pumping test was suboptimal, it does not provide a reason to dismiss the modelling that was carried out in accordance with Australian Standards, and the level of drawdown that occurs will be driven by the extent to which the Project can access groundwater.²⁴²

Several submissions were made regarding the groundwater model reliability and complexity.

²³⁸ Submission 291, page 4.

²³⁹ Document 255, page 4.

²⁴⁰ Ibid.

²⁴¹ Document 38, page 4.

²⁴² Document 698, page 41.

As Dr Webb noted, the relevant experts agreed to the potential for a nearby boundary high, as indicated in figure 2-48 from Appendix 006B – or for less permeable areas. As Dr Webb explained, that means the drawdown modelled by EMM, which assumed uniformity across the aquifer, is likely to be inaccurate in the drawdown around basement highs, or less permeable areas, will be greater than currently modelled.

Dr Webb noted modelling is often wrong. This means that without further real-world data, including from pumping tests, the extent of the aquifer and water availability and impacts on other users remain uncertain. This may be confirmed with future planned tests and modelling but is not presently available.

6.3.3 Discussion

The IAC generally considers the groundwater modelling acceptable. Experts at the groundwater conclave accepted the overall modelling approach and methodology used to develop the impact assessment.

The IAC agrees there is ongoing uncertainty regarding the response of the Latrobe Group aquifer to pumping. All experts agreed the groundwater pumping test was suboptimal, and a more comprehensive understanding of the existing groundwater site specific conditions is required to predict potential impacts from the Project with certainty. It is the IAC's view that further work is required to demonstrate impacts from pumping will not adversely impact existing users, and the long-term viability of water supply from the bore field.

The IAC considers the information in the EES on baseline groundwater conditions does not demonstrate with any certainty that potential direct and indirect impacts from the Project can be acceptably managed. In the context of a project of this size, its potential wide-reaching impacts, and of such high importance to the community, it is appropriate at the EES stage to expect a greater level of certainty around groundwater impacts arising from the Project.

6.3.4 Findings

The IAC finds:

- The groundwater conceptualisation modelling approach is acceptable.
- Further assessment and understanding of the groundwater site specific conditions is required to predict potential impacts from the Project.

6.4 Groundwater availability

6.4.1 Background

The Project proposes to use groundwater from the Latrobe aquifer with total take estimated to be 2.8 gigalitres per year. Groundwater will be a supplementary water supply source to the proposed winterfill licence abstraction from the Mitchell River.

SRW is responsible for regulating access to groundwater and licensing the construction and operation of observation and production bores, in accordance with the *Water Act 1989*.

6.4.2 Evidence and submissions

MFG submitted the Latrobe Group aquifer is overallocated and being unsustainably pumped.²⁴³

Dr Currell gave evidence that aquifer levels have been falling substantially over time in the Latrobe Group aquifer and current extractions far exceed recharge.

As indicated by the proponent's groundwater modelling, drawdown is likely to be substantial within the target (Latrobe) aquifer and extend more than 10 km from the borefield to the south, where it would exacerbate existing water level declines being experienced in this aquifer due to other activities (e.g. offshore oil and gas). These cumulative effects have not been extensively discussed or analysed in the impact assessment.²⁴⁴

Several submitters suggested that groundwater level drawdown may be significantly greater than modelled and that extraction from a shallow aquifer may be required to augment supply from the Latrobe Group Aquifer, which may impact on existing groundwater users' ability to take and use water.

Mr Sweeney gave evidence that extraction from the shallow aquifer is not considered as a contingency by the Project and has therefore not been included.

There are no plans to seek an alternative water supply from shallow aquifers such as the Coongulmerang Formation or the alluvial aquifers along the Mitchell River that are heavily relied upon by irrigators.²⁴⁵

The Proponent submitted that if water is unable to be sourced from the Mitchell River or groundwater, operations would be scaled down, with priority given to dust control.

Mr Muller's water balance model showed the peak water requirement for the Project is likely to be around 3.1 gigitalitres/year²⁴⁶. During drought, winterfill volumes from the Mitchell River may be fully allocated and the Project may need to rely on groundwater supply.

SRW submitted that *"availability of the identified surface water and groundwater resources is limited, and access to the volumes required is not guaranteed"*.²⁴⁷ Access to groundwater resources of the Lower Tertiary Aquifer is capped, and can only be accessed by trading existing entitlements:

A proponent seeking groundwater entitlement would be required to trade from an existing licence holder to access water. The trade would require an application for determination by SRW. The proposed bore-field is in an area defined by SRW as the Lindenow Trading Zone where the local management rules allow groundwater trade from neighbouring management areas including: the Stratford GMA, the Rosedale GMA, and the Sale Water Supply Protection Area. Any application to trade would be subject to an assessment of the local impacts, in accordance with Section 40 of the Water Act (1989) which protects the rights of existing users, the environment and the sustainability of the resource, among other matters.²⁴⁸

The Proponent submitted the allocation of water is beyond the scope of the EES and IAC Hearing, and water required for the Project will only be obtained from willing sellers²⁴⁹:

²⁴³ Document 749, page 3.

²⁴⁴ Document 88, page 4.

²⁴⁵ Document 81, page 18.

²⁴⁶ Document 132, page 7.

²⁴⁷ Submission 291, page 3.

²⁴⁸ Document 38, page 2.

²⁴⁹ Document 698, page 29.

the Project has no power to compulsorily obtain water rights, it can reasonably be assumed that rights will only be obtained from willing sellers at a price which they regard as satisfactory.

6.4.3 Discussion

The IAC notes the Project does not currently have access to water to commence operations. If a surface water licence is not granted, or the full winterfill application is not available in any given year, the Proponent proposes to access groundwater from the Latrobe Group aquifer through the transfer of groundwater licences from existing licence holders.

What is not clear to the IAC, is from whom licences for groundwater will be purchased, whether there are enough licence holders willing to sell their allocations and the impacts on the environments and land uses that are currently relying on this water if it was to be transferred to this Project (including where groundwater is to be transferred between groundwater trading zones).

The IAC has no information before it to demonstrate that there are or will be “*willing groundwater licence sellers*”, which questions the viability of the Project.

The Proponent stated the Project’s contingency plan if the required amount of water to operate cannot be obtained from a combination of Mitchell River winterfill and Latrobe Group groundwater at any given time is to ‘scale back’ operations. The IAC is concerned the scaling back of operations may lead to an extension of the life of the mine beyond its current planned duration which may in turn result in other Project impacts which have not been contemplated through the EES process or Inquiry process.

6.4.4 Findings

The IAC finds:

- The viability of the Project rests on secure access to groundwater.
- The contingency plan to scale back operations should groundwater not be available is unacceptable, as limitations to water access may result in an unpredictable extension to the mine life and further impacts that have not been assessed.

6.5 Seepage to groundwater

6.5.1 Background

The Proponent plans to use centrifuges to dewater fines tailings. Flocculants will be added to the fine tailing slurry to increase coagulation of clay particles and improve the rate of recovery by the centrifuge. Tailing cake is then deposited into the mine void as backfill/waste.

Following an initial period of temporary storage, fine and coarse tailings will be placed within the mine void (fine tailings would be placed into containment cells). Centrifuge cake will be returned to the mine void, dewatered to the extent that any water remaining in the cake will not drain freely from the material when it is deposited back into the void with overburden.²⁵⁰

All the seepage within the groundwater model is assumed to originate from the sand tails and assumes water entrained within fine tails is not free draining.²⁵¹

²⁵⁰ Document 43.

²⁵¹ Document 133, page 2.

6.5.2 Evidence and submissions

(i) Flocculants

Flocculants are proposed to be used in the treatment of tailings before they are placed in the mine void. Mr Sweeny gave evidence²⁵² the amount of flocculant in entrained water had not been quantified and it was not possible to assess the risks to groundwater without such information.

It was agreed by all experts at the conclave that further information is required on the breakdown of flocculant to confirm risks posed to the aquatic ecosystem of the Mitchell River. Depending on the results of this assessment, laboratory trials or contaminant fate and transport modelling may be required to consider potential impacts on, or an added nutrient load to, the Gippsland Lakes (via groundwater discharge to the Mitchell River).

The West Gippsland CMA supported further work in its submission:

We note that PAM degrades to form nitrogen, ammonia, carbon dioxide and water. West Gippsland CMA supports the calls in the documentation for further work to “determine the concentrations and flux of total nitrogen and ammonia that might be generated if residual PAM degrades in the mine void and seeps into groundwater”.²⁵³

(ii) Seepage water quality

Several submitters were concerned with the quality and quantity of water seeping to groundwater from the tailings:²⁵⁴

...the documentation acknowledges that tailings seepage water is likely to have aluminium and copper concentrations which exceed the water quality objectives for ecosystem protection”

And:

...the tailings seepage will be contaminated by aluminium, arsenic, chromium, and copper. The impacts of neither the quantity nor quality of tailings seepage have been considered in the EES.

EPA submitted that it is important to understand the quality of water seeping from the tailings into the groundwater and how that quality may change over time. EPA recommended²⁵⁵ a monitoring program be implemented to monitor the seepage water draining from the tailings to ensure water quality would not lead to an unacceptable risk to protected beneficial uses of groundwater.

Tailings seepage quality was assessed by the Proponent from representative samples of fine tailings, coarse tailings and unprocessed ore. The leachability results presented in the EES suggest the dissolved concentrations of metals were not elevated above the baseline concentrations measured in groundwater beneath the site.

Experts at the groundwater conclave agreed that groundwater from the Latrobe Group aquifer may provide different seepage water quality than estimated and therefore verification is required:

The use of groundwater sourced from the Latrobe Group aquifer may produce different seepage water quality than estimated by the leachability results presented in the EES and as such further leaching studies using this groundwater, as well as further replicates of leaching tests using combinations of river and groundwater samples (using a variety of

²⁵² Document 81.

²⁵³ Submission 358, page 2.

²⁵⁴ Submission 358.

²⁵⁵ Submission 514, page 16.

sediment samples) are required to verify the conclusions reached in the EES and understand the range of water quality compositions that might develop below the mine site.²⁵⁶

All experts at the conclave agreed the EES assessed the main potential impacts qualitatively, however the extent to which this assessment characterised or quantified risks to all potential receptors was not agreed:

The EES Appendix A006 has assessed all elements of the project description for activities that may pose a hazard to groundwater and surface water quality, and contaminants of potential concern (COPC) have been identified and assessed throughout the document. Relevant receptors have been identified in line with the protected beneficial uses of groundwater and surface water as established by the State Environment Protection Policy (Waters of Victoria). The main potential impacts of the project have been identified qualitatively (noting the adequacy of qualitative assessment of potential impacts was not agreed for all risks - refer to item 5.30) and the project-specific risk assessment methodology has been applied. The adopted risk assessment methodology and presentation style of EES Appendix A006 aligns with the commonly accepted practice for Victorian EES. The extent to which this assessment has adequately characterised or quantified risks to all potential receptors was not agreed (see matters of disagreement).²⁵⁷

In its submissions²⁵⁸ EPA stated its concern that *“the capture and re-use of process water may cause increases in the concentration of leachable analytes over time”* and therefore there is potential for the quality of water seeping from the tailings to increase above background levels posing a risk to protected beneficial uses as the Project progresses.

EPA considered the seepage of water from the tailings to groundwater constitutes a direct waste discharge to an aquifer:

The Proponent’s modelling predicts that leachate from tailings returned to the mine voids will cause a groundwater mound to form, both horizontally and vertically, under the mine voids. Such leachate would be a discharge of waste to groundwater, which triggers the need for an EPA permission. Accordingly, the development licence application must be updated to reflect this.²⁵⁹

In closing submissions, the Proponent disagreed with EPA’s assessment that tailings seepage constitutes a waste and would therefore require a development licence. This matter was not resolved at the Hearing.

The EPA stated that although the proposed discharge to groundwater appears to present a low risk to beneficial uses, it has some concerns regarding potential impacts to protected beneficial uses of groundwater. EPA stated this would be considered during assessment of the DLA.

The EPA recommended that corrective actions be set out in the Groundwater Monitoring and Management plans which would be triggered if the results of ground water quality monitoring exceeds specified risk-based trigger levels.²⁶⁰

All experts at the conclave agreed to the following actions²⁶¹:

- Undertake tailings leachate analysis using Latrobe Group aquifer groundwater.

²⁵⁶ Document 255, page 12.

²⁵⁷ Document 255, page 12.

²⁵⁸ Submission 514, page 15.

²⁵⁹ Document 486, page 9.

²⁶⁰ Document 486, page 24.

²⁶¹ Document 255, page 13.

- Undertake additional tailings and ore leachate analysis to achieve a higher sample density to verify the adopted seepage water quality is correct.
- Ensure future baseline monitoring includes testing for dissolved uranium, thorium, and radium to characterise any potential risk of their mobilisation in groundwater.
- Undertake calculations to quantify the potential effect of recycling process water on the dissolved concentration of metals and salts.
- If future testing encounters zones of perched groundwater, collect soil samples to assess acid generating potential.
- Make publicly available all monitoring results and reports.

(iii) Seepage Rates to Groundwater

The Proponent's TN1²⁶² states the centrifuge cake to be returned to the mine void will be dewatered to the extent that any water remaining in the cake will not drain freely:

any water that remains in the cake will not drain freely from the material, even when it is deposited back into the void with overburden. The risk of groundwater mounding from seepage is removed as the ability of water to seep from the fines into the underlying soil, at a rate greater than the vertical permeability of the underlying soil, is eliminated.

By contrast, Dr Currell gave evidence that it is unlikely all residual water would remain permanently entrained once deposited into the mine voids, and over time, it is likely that entrained water would mix with recharging groundwater passing through the mine voids before reaching the water table.

My view is that it is unlikely all residual water would remain permanently entrained within this material once it is deposited into the mine voids (following centrifuging). It is likely that this water would, over time, mix with recharging groundwater passing through the mine voids before reaching the water table (albeit diluted by rainfall, and moving at lower seepage rates than water passing through the sand tailings).²⁶³

The EPA's position was that it is not clear from the EES whether the recovery of water draining from tailings will be applied only to the containment cells holding the fine tailings, or whether it includes water draining from coarse tailings. EPA's recommendation was that water recovery is maximised from the mine void not just the containment cells within the mine void.²⁶⁴

EPA submitted that if the use of centrifuges to dewater coarse sands tailings was found to be reasonably practicable, it would have the benefits of improved water recovery and would minimise, or possibly eliminate, groundwater mounding and water quality risks associated with the leachate seeping to groundwater.²⁶⁵ It submitted that such an approach would be consistent with the GED.

Several experts called by the Proponent gave evidence on seepage rates. Mr Georgiou confirmed that seepage modelling has not yet been done.²⁶⁶ Mr Muller gave evidence that seepage figures are important given they indicate how much water is entering the groundwater.²⁶⁷

²⁶² Document 43, page 5.

²⁶³ Document 186, page 3.

²⁶⁴ Submission 514, page 16

²⁶⁵ Document 486, page 23.

²⁶⁶ Document 79.

²⁶⁷ Document 78.

All experts at the groundwater conclave²⁶⁸ agreed seepage from and mounding beneath the mined voids is unlikely to pose a risk of impact to farm dams outside the Project Area, noting that exceptions may exist where earthworks or other mining activities disturb the local catchments and interfere with subsurface recharge pathways.

The Proponent submitted that a range of drainage infrastructure will be proposed to manage seepage such as toe drains, wet wells, and a subsurface drainage network.

Mr Saracik gave evidence that dewatering bores could be installed in the mine pit to deal with seepage from the centrifuge product (i.e. fine tailings) to prevent seepage to the environment. An understanding of the scope of uncertainty around that seepage will be critical to confirming the mine can manage seepage by use of dewatering bores.

The expert conclave agreed²⁶⁹ the Proponent should monitor the escarpment for lateral seepage and nested bores should be placed in the mine area to monitor seepage and any rise in water table and to understand vertical hydraulic gradients.

6.5.3 Discussion

The IAC acknowledges the EPA's reference to additional centrifuges to dewater coarse sand tailings may not be a reasonably practicable option, given the increase in capital and operating costs. However, the IAC notes the Proponent would be required to demonstrate that use of centrifuges to dewater coarse tailings is not reasonably practicable to satisfy the GED.

The IAC notes there are significant uncertainties regarding groundwater impacts, particularly how the major disturbance of the site through mining and emplacement of the tailings will influence groundwater recharge, seepage rates, water table levels and flow of groundwater towards surface water bodies in the area.

There is evidence before the IAC that it is unlikely all residual water would remain permanently entrained within material once it is deposited into the mine voids (following centrifugation). In addition, the IAC notes the seepage rates are dependent on the actual performance of the centrifugation process which is yet to be demonstrated in a full-scale plant.

There is evidence before the IAC the hazard presented by flocculants used in the treatment of tailings has not been assessed and potential effects on groundwater quality are significant and unacceptable, particularly discharges to groundwater. It is the IAC's view that further research is required as part of the full-scale trial of centrifuges to quantify the amount and type of flocculant required in processing tailings and the design system to recover seepage. Should further work demonstrate flocculant can be recovered to avoid seepage to the groundwater, or the level of flocculant required for operations does not pose an unacceptable risk, it is the IAC's view the water quality impact on groundwater could be managed.

The IAC notes, however, the Proponent would be required to demonstrate that it has taken all reasonably practicable measures to reduce the risk of harm from groundwater seepage (and flocculants) to satisfy the GED. Evidence regarding such measures is not before the IAC, but it is noted that updated Attachment H (Mitigation Register) includes reference to the GED.²⁷⁰

²⁶⁸ Document 255, page 2.

²⁶⁹ Document 255, page 7.

²⁷⁰ Document 775.

The IAC notes the EPA and the Proponent did not agree on the proper characterisation of the discharge of water seeping from tailings to groundwater and whether this discharge would require a development licence under the EP Act. This matter is not for the IAC to resolve.

The IAC considers it likely that seepage quantity could be managed using standard engineering strategies which are commonly applied in mining projects, such as dewatering extraction bores.

6.5.4 Findings

The IAC finds:

- The impact of seepage quality and quantity to groundwater is uncertain and dependant on full scale trials of the centrifugation process to confirm flocculant quantities, seepage and recovery rates.

6.6 Groundwater mounding

6.6.1 Background

The EES contained modelling which demonstrates a groundwater mound would develop below the mine due to water seeping from the tailings after they are placed in the mine void.

6.6.2 Evidence and submissions

All experts at the conclaves agreed that modelling of groundwater mounding from tailings deposition is likely to be conservative, but there remains uncertainty as to the timing and extent of groundwater mounding that will develop below the site:

The modelling of groundwater mounding from tailings deposition in the mine void is likely to be conservative, as it does not account for water efficiencies achieved by the use of centrifuges, but instead uses a higher rate of seepage (53 L/s) than is now estimated with the use of centrifuges (35 L/s). The higher seepage rate would result in predictions of higher mounding than the use of the updated seepage rate (but this has not yet been modelled for groundwater mounding). There is remaining uncertainty with respect to the pre-mining and post-disturbance groundwater recharge rates, and thus the exact timing and extent of groundwater mounding that will develop below the site.²⁷¹

Mr Sweeney gave evidence that assuming (conservative) modelled mounding, the amount of water sent to the Mitchell River by the Project would increase by 0.725 megalitres/day, equivalent to a 1 – 2 per cent increase in flow rates under low flow conditions.²⁷²

Council submitted the lack of consideration of climate change in the modelling of rainfall and runoff, and the failure to include rainfall into the mine pits as an input into groundwater models, means that groundwater mounding cannot be properly understood.²⁷³

MFG submitted that seepage of water through the coarse sand-sized tailings to the Coongulmerang Formation water table immediately below the mine pit, would create a new pathway for poor quality Coongulmerang Formation groundwater to flow to the floodplain creating a risk of harm to those accessing the groundwater. MFG submitted that this risk is primarily related to the fact that groundwater within the water table aquifer contains elevated

²⁷¹ Document 255, page 2.

²⁷² Document 81, page 13.

²⁷³ Document 407, page 46.

concentrations of multiple potentially harmful contaminants, including heavy metals and cyanide.²⁷⁴

Dr Currell gave evidence that:

It's quite reasonably established now there will be some rise in this water table underneath the site. We know there is reasonably high levels of contaminants within the water table aquifer currently, even under the baseline conditions, so it is highly likely there's going to be increased discharge or movement of groundwater within that aquifer towards those surface systems which may then result in an increase in the amount of groundwater then discharges and reaches those surface water systems. So that's the kind of risk pathway we're talking about here.²⁷⁵

The Proponent submitted that in cross-examination, Dr Currell accepted the existing fieldwork suggested there was in fact already a connection between the Coongulmerang Formation and the Mitchell River, and therefore mounding will not create a 'new pathway' to the Mitchell River or be significant if it occurred.²⁷⁶

The Proponent clarified that its modelling assumed that seepage from the tailings immediately reports to the regional groundwater table (being the Coongulmerang Formation). However, as was agreed by all groundwater expert witnesses and included in TN26²⁷⁷, seepage will take time to reach the water table.

The Proponent submitted that groundwater mounding is not automatically a negative outcome, as it can contribute to more water being able to be recovered by groundwater users accessing the regional groundwater table.²⁷⁸

All experts at the groundwater conclave agreed that if a groundwater mound does develop, there are corrective actions that can be taken to reduce the mound:

If the mound develops and moves away from the tailing cells, and presents a risk to offsite receptors greater than that assessed in the EES (such as discharge at the escarpment), corrective actions (such as installation of perimeter interception bores) can be implemented to reduce the mound.²⁷⁹

The Proponent accepted that it would be appropriate to require water quality monitoring, including at interception bores between the Project Area and the Mitchell River, to allow for corrective action to be taken (which could include pumping water out) if significant departures from predictions are identified.²⁸⁰

6.6.3 Discussion

The IAC accepts the modelling of groundwater mounding effects in the EES is sufficient to demonstrate that, even in dry conditions, the capacity of mobilisation of nutrients and metals to affect water quality in the Mitchell River is limited.

Based on Mr Sweeney's evidence, the amount of water sent to the Mitchell River by the Project would increase the flow rate by 1 – 2 per cent under low flow conditions.

²⁷⁴ Document 451, page 24.

²⁷⁵ Document 749, page 4.

²⁷⁶ Document 698, page 38.

²⁷⁷ Document 393.

²⁷⁸ Document 698, page 37.

²⁷⁹ Document 255, page 6.

²⁸⁰ Document 698, page 39.

The evidence before the IAC is there is already a connection between the groundwater system and the Mitchell River, and therefore mounding will not create a ‘new pathway’ to the Mitchell River.

The IAC accepts the Proponent’s submission that groundwater mounding is not automatically a negative outcome, as it can contribute to groundwater supply, provided the quality is acceptable.

The IAC acknowledges that groundwater mounding can be monitored, and if unacceptable mounding develops presenting a risk, corrective actions such as interception bores are available to reduce the impacts of mounding.

6.6.4 Findings

The IAC finds:

- The Project would not introduce a new pathway between the groundwater system and the Mitchell River.
- There is no basis for concluding that groundwater mounding would have unacceptable impacts on water quality in the Mitchell and Perry Rivers.

6.7 Woodglen aquifer storage and recovery site

6.7.1 Background

The Woodglen ASR is a drinking water storage and water treatment plant at Woodglen, north-east of the Project site. The storage system injects untreated water from the Woodglen facility into an underground aquifer for storage and later extraction for use by customers.

The potential for tailings seepage to migrate towards the Woodglen ASR and affect the quality of potable water supply was assessed through numerical groundwater modelling and ‘particle tracking’. Modelling traced the transport of groundwater originating from multiple points beneath the mine site as the mound develops and throughout the life of the mine. Modelling considered the significant pressure changes that would occur in response to the injection of surface water and subsequent extraction as part of the ASR program.

6.7.2 Evidence and submissions

Many submitters considered the Woodglen ASR a high value water asset and were concerned the Project would result in impact on the water quality of the aquifer storage system.

East Gippsland Region Water Corporation submitted the following concerns regarding the potential risks to the ASR groundwater borefield:

- Reduced groundwater yield from our Woodglen borefield (due to groundwater pumping).
- Increased groundwater levels in our Woodglen borefield (due to potential seepage from tailings and water storages).
- Adverse impacts to groundwater quality in our Woodglen borefield (due to potential seepage from tailings dams).²⁸¹

Mr Georgiou gave evidence that modelled particle tracking results indicated groundwater beneath the Project Area is predominantly transported vertically to the underlying Balook Formation aquifer away from the Woodglen ASR:

²⁸¹ Submission 692.

Although the deeper aquifers beneath the project site and the aquifers beneath Woodglen are likely hydraulically connected, modelling predicts that mining activities will not result in the transport of groundwater in the direction of the Woodglen ASR wells.²⁸²

Mr Middlemis gave evidence the Groundwater Assessment report²⁸³ shows a reduction in groundwater yield, mounding at the Woodglen bores, or adverse impacts on groundwater quality were likely.

As a precautionary measure, the experts at the groundwater conclave agreed that a risk assessment should:

... consider a less extensive aquifer than anticipated (in light of the pumping test results and apparent boundary effect encountered), and the impacts of the edge of the aquifer and Woodglen managed aquifer recharge (MAR) site.²⁸⁴

Mr Georgiou proposed management measures including groundwater monitoring in the Balook Formation/Latrobe Valley Group aquifer between the Project boundary and the Woodglen ASR so that potential groundwater quality impacts could be detected in advance and appropriate remedial actions implemented as necessary.²⁸⁵

6.7.3 Discussion

The IAC accepts the evidence of Mr Georgiou and Mr Middlemis, noting their evidence was unchallenged at the conclave by Council or MFG. The IAC considers it unlikely the Project would impact the Woodglen ASR site and that monitoring measures can be adopted to mitigate any potential risks.

6.7.4 Findings

The IAC finds:

- The risk of impact on the Woodglen ASR is acceptable and can be monitored over the life of the Project.

6.8 Spring fed dams

6.8.1 Background

The Project will result in the removal of several existing farm dams.

6.8.2 Evidence and submissions

Submissions noted there are dams within and surrounding the Project Area that are fed by the groundwater system, including parts of Moulin/Stoney Creek. Submitters raised concerns the Project would interrupt the water supply to dams and called for further impact assessment.

Mr Barton submitted that shallow aquifers are present along the edge of the Project Area which support water levels in local dams in the absence of surface water, and the impacts of disruption to the shallow aquifer have not been considered:

Groundwater (www.vvg.org.au) shows numerous shallow aquifers along the northern edge of the project area. Local farmers (R Coleman, G Johnson (pers. com)) have dams which

²⁸² Document 79, page 18.

²⁸³ EES Appendix A006.

²⁸⁴ Document 255, page 4.

²⁸⁵ EES Appendix A006.

maintain water levels in the absence of surface run off. The “chain of ponds” characteristic of the significant GDE of Providence Ponds is seen in some of the small streams in the project area. All this would indicate there are numerous shallow aquifers within the project footprint. The effects of disruption of these on the mine itself, farmers’ stock water supply, and GDE such as Providence Ponds and Saplings Morass are either downplayed or not considered.²⁸⁶

Experts at the groundwater conclave agreed groundwater modelling indicates that dams are unlikely to be supported by the groundwater system and are most likely dependant on isolated perched aquifers. However, it was noted the precise location of spring fed dams had not been provided by submitters to allow assessment of specific dams claimed to be spring fed.

While it is not disputed that some dams may be sustained by the subsurface flow of water during dry periods, it was agreed these dams are unlikely to be supported by groundwater from the regional water table aquifer of the Coongulmerang Formation, which exists at depths in excess of 30 m below the ground surface in most places (i.e.. they are most likely dependent on isolated perched water). Referring to John Webb’s second expert witness statement dated the 11 March 2021; some spring-fed dams are likely supported by soil/subsurface water stored within the porous and permeable dunal sands. Springs may emerge at the boundary between the dune sand and the less permeable underlying Haunted Hills Formation.²⁸⁷

Dr Webb gave evidence that it is likely dams are fed from perched groundwater, and the Project may impact on these dams due to removal of dune sands:

It is likely that at least some of the perched groundwater lies within the porous and permeable dune sand, and that springs emerge at the boundary between the dune sand and the less permeable underlying Haunted Hills Formation. If this is the case, spring-fed dams and perhaps also the perennial parts of Moulin/Stoney Creek will lie along this boundary.

Therefore removal of the dune sand across the proposed mine site could affect nearby spring-fed dams and potentially also the perennial parts of Moulin/Stoney Creek that may be spring-fed. The distribution of the dune sand needs to be mapped and compared to the location of the spring-fed dams and the perennial sections of Moulin/Stoney Creek, in order to identify any dams or parts of the creek that might be negatively impacted by removal of the sand over the mine site.²⁸⁸

The Proponent submitted the only identifiable dam which is claimed to be spring fed is on 2705 Bairnsdale - Dargo Road, a property to which access has been refused. Notwithstanding this, the Proponent confirmed it is amenable to a process to consult with the community with a view to identifying and minimising impacts on spring fed dams “*to the extent reasonably practicable*”.²⁸⁹ The Proponent recognised that it may not be practicable to protect dams within the Project Area itself, but owners of dams which were shown to be impacted due to loss of water would be entitled to a compensation agreement.

The experts at the groundwater conclave did not reach agreement as to whether field-based investigations of spring fed dams which occur near the mine site should be conducted as part of baseline monitoring.²⁹⁰

²⁸⁶ Submission 423, page 4.

²⁸⁷ Document 255, page 2.

²⁸⁸ Document 190, page 5.

²⁸⁹ Document 698, page 45.

²⁹⁰ Document 255, page 2.

6.8.3 Discussion

The IAC notes that it is not disputed between experts that dams are unlikely to be supported by groundwater from the regional water table aquifer of the Coongulmerang Formation and agrees with Dr Webb's evidence with respect to dams being fed by perched groundwater. There is no persuasive evidence before the IAC which proves the existence of spring fed dams in the area, and without the Proponent being provided access to the property at 2705 Bairnsdale - Dargo Road further investigation cannot be expected.

The IAC recognises that dams fed by perched groundwater will be lost if the Project proceeds, and it is not practicable to protect dams within the mining area. It is the IAC's view these dams should be replaced during rehabilitation and provided with a reliable ongoing water supply through artificial means such as pumped-in replacement water to replicate pre-mining conditions as far as practical.

The IAC acknowledges the Project could restrict surrounding properties' access to the perched water table system. The IAC agrees with Dr Webb the distribution of the dune sand needs to be mapped and compared to the location of the spring-fed dams and the perennial sections of Moulin/Stoney Creek, to identify dams or parts of the creek that might be negatively impacted by removal of the sand over the Project site. If dams outside the Project Area are shown to be impacted through loss of perched water supply, it is the IAC's view that this loss of water should be compensated by the Proponent.

6.8.4 Findings

The IAC finds:

- Dams within the Project Area are unlikely to be supported by groundwater from the regional water table aquifer of the Coongulmerang Formation.
- Further assessment of dams is required on and surrounding the Project Area to assess whether they are fed by perched water supply.

6.9 Overall conclusions on groundwater

The IAC concludes:

- There is uncertainty whether the Project can achieve the relevant draft elevation objective without access to groundwater.
- Further assessment and understanding of the groundwater site specific conditions is required to predict potential impacts from the Project.
- The contingency plan to scale back operations should sufficient groundwater not be available to the Project is unacceptable, given the impact could be an unpredictable extension to the mine life with flow on impacts that have not been assessed.
- Seepage quality and quantity to groundwater is uncertain and dependent on unproven centrifugation technology.
- The Project will not introduce a new pathway between the groundwater system and the Mitchell River.
- There is no basis for concluding that groundwater mounding would have unacceptable impacts on water quality in the Mitchell and Perry Rivers.
- The risk of impact on the Woodglen ASR is low and acceptable.
- Further assessment of dams is required on and surrounding the Project Area to assess whether they are fed by perched water supply and assess impacts.

7 Surface water

7.1 Introduction

Surface water effects are discussed in EES Chapter 9 and Technical Reports included in Appendix A006, A007 and A008.

The relevant draft evaluation objective is:

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 Gippsland Lakes Ramsar site) over the short and long-term.

The EES proposes mitigation measures included in Attachment H to manage the impacts of the Project on surface water. These include:

- SW01: Extraction from the Mitchell River
- SW02: Design and placement of infrastructure to prevent flood risk
- SW03: Water management
- SW04: Surface water and groundwater sub-plan
- SW05: Maintaining freeboard
- SW06: Stream bed instability inspection prior to construction
- SW07: Stream bed instability management
- SW08: Stream bed instability movement rates
- SW09: Runoff capture management
- SW10: Erosion management
- SW11: Dam design and spillway activation
- SW12: Design, construction, and operation of the freshwater storage dam
- SW21: Rainfall runoff treatment
- SW22: Temporary TSF construction
- SW23: Water recovery and reuse
- SW24: Surface water runoff management
- SW28: Adaptive management strategy
- SW30: Stormwater outlet scour protection
- SW32: Mine contact water management dams
- SW33: Mine contact water management during storm events
- SW34: Ephemeral drainage gully revegetation
- SW35: Adaptive management strategy – offset water
- SW36: Minor waterways water quality management
- SW37: Management of natural surface water drainage courses
- SW38: Surface water ponding on post-mining landforms
- SW39: Erosion and sediment
- SW40: Maintenance of Sediment traps and dams
- SW41: Riparian vegetation retention
- SW42: Maintenance of access tracks and roads

The Proponent provided the following TN relating surface water:

- TN2: Response to IAC Request for Information – Part 2.1, questions 1 and 2

- TN13: Response to IAC Request for Information – Part 2.1, question 2
- TN29: Response to the IAC’s third request for information questions 6-8 relating to rainfall and runoff
- TN37: Findings of climate change impact assessments

The IAC benefited from submissions and evidence in its consideration of surface water impacts. Table 8 lists the surface water evidence that was called.

Table 8 Surface water evidence

Party	Expert	Firm/Institution	Evidence
Proponent	Tony McAlister	Water Technology	- Surface Water Quality Expert Witness Statement, 1 February 2021 ²⁹¹ - Surface Water Quality Supplementary Expert Witness Statement, 8 February 2021 ²⁹²
Proponent	James Weidmann	Water Technology	- Surface Water and Flooding Expert Witness Statement, 28 January 2021 ²⁹³ - Surface Water and Flooding Supplementary Expert Witness Statement, 7 February 2021 ²⁹⁴
Proponent	John Sweeney	Coffey	- Water Impacts Expert Witness Statement, 2 February 2021 ²⁹⁵ - Water Impact Supplementary Expert Witness Statement, 8 February 2021 ²⁹⁶
Council	Assoc. Prof. Anthony Kiem	Newcastle University	- Surface Water Expert Witness Statement, 1 February 2021 ²⁹⁷

An expert meeting on flooding was held and a report prepared.²⁹⁸ The report set out agreed positions and comments relating to flooding.

The experts uniformly agreed there is a need for additional modelling work to be undertaken, with no matters of disagreement raised.

7.2 Key issues

The issues are:

- the Project’s ability to access water from the Mitchell River winterfill
- application of climate data in flood modelling
- dam management in times of high rainfall events
- water balance modelling approach
- discharge water management practices

²⁹¹ Document 85.

²⁹² Document 138.

²⁹³ Document 77.

²⁹⁴ Document 131.

²⁹⁵ Document 81.

²⁹⁶ Document 135.

²⁹⁷ Document 95.

²⁹⁸ Document 242.

- application of groundwater and surface water modelling to assess impacts on the Perry River Chain of Ponds system.

7.3 Water availability from the Mitchell River

7.3.1 Background

Water for the Project is planned to be sourced from winterfill from the Mitchell River which is available when the river is flowing at >1,400 megalitres/day (1.4 gigalitres/day). Allocations for surface water for the Project will be sought from SRW through an open market auction.

SRW is responsible for regulating surface water take and use in accordance with s51 of the *Water Act 1989*.

As of 11 January 2021,²⁹⁹ SRW advised there was 6 gigalitres of winterfill licences unallocated from water take from the Mitchell River. The Minister for Water announced the following intentions for this volume:

- 2 gigalitres is being made available for the Gunaikurnai people (through GLaWAC), the Traditional Owners
- 2 gigalitres available in a competitive process for those eligible in mid-2021
- 2 gigalitres would be reserved for allocation later in 2021 via a competitive process for those eligible to be considered for a licence at that time.

On completion of the EES process, and should the Proponent be granted approval to proceed with the Project, the Proponent would need to establish its eligibility for a s51 take and use licence to participate in the competitive auction process.

SRW cannot lawfully grant a water licence while the Inquiry into the Project is in process.

7.3.2 Evidence and submissions

Concerns were raised by several submissions the Proponent's extraction of surface water from the Mitchell River may reduce the available water supply to other users and water flows to the Mitchell River and the Gippsland Lakes.

Many submitters expressed concerns the demand for mine water will compete with agricultural uses and prevent expansion of existing agricultural businesses. Some submitters expressed the view the mining operators will be provided priority access to water which will impact on the flows in the Mitchell River and Gippsland Lakes.

SRW submitted that *"availability of the identified surface water and groundwater resources is limited, and access to the volumes required is not guaranteed"*.³⁰⁰ SRW advised that access to winterfill surface water entitlements from the Mitchell River will be subject to a water auction process.

Where unallocated water can be made available for consumptive use, within sustainable diversion limits for unregulated rivers and permissible consumptive volumes for groundwater systems, auctions and tenders will be used to ensure the price is based on the value of the resources.³⁰¹

²⁹⁹ Document 38, page 3.

³⁰⁰ Submission 291, page 3.

³⁰¹ Document 38, page 5.

SRW submitted that applications for “*large volumes of entitlement*” such as proposed by the Proponent will require a detailed impact assessment under s40 of the *Water Act 1989* including an assessment of impacts on the local and downstream environments, other users, and the waterway.

The Proponent put forward that extraction of water from the Mitchell River would only be conducted in line with water licence conditions which it expects would align with current practice to limit extraction to between July 1 to October 31 each year when flow at the Glenaladale gauge is above 1.4 gigalitres per day.³⁰²

In terms of impact on water users, Mr Sweeney gave evidence the extraction of surface water would result in a low impact because extraction rates and allocation are managed by SRW licences:

I considered the likelihood of Kalbar’s proposed extraction of surface water from the Mitchell River having an adverse environmental effect on the Mitchell River and/or the Gippsland Lakes is Rare, and the consequence would be Moderate. Therefore, I assessed that Kalbar’s proposed extraction from the Mitchell River would have a Low residual impact.³⁰³

Regarding the availability of water, the Proponent’s primary position is the Project itself will not have any impact on the overall availability of water relative to a ‘no project scenario’.³⁰⁴ The Proponent’s position is based on the submission by SRW there is limited water available for allocation from the Mitchell River, and if the Proponent is unsuccessful in its licence application or at auction, this volume of water would be taken by other successful licence holders.

MFG submitted the Proponent’s application for 2 gigalitres of surface water by auction from the Mitchell River “*will be in direct competition with farmers on ‘exceptional’ horticultural land.*”³⁰⁵

In closing, the Proponent submitted the impacts on water availability are “*not permanent*”,³⁰⁶ and when the Project is completed, water entitlements would be returned to the market.

7.3.3 Discussion

The IAC acknowledges that water is a highly valued commodity in the region for agriculture, horticulture, domestic use and to sustain the natural environment and health of the downstream Gippsland Lakes. This Project will add another water user into an already competitive, constrained market that relies on a finite water resource.

The IAC notes that of the 6 gigalitres of winterfill allocation available at the start of 2021, 2 gigalitres has been allocated to GLaWAC and 2 gigalitres was allocated via auction in mid-2021. SRW has confirmed the remaining 2 gigalitres of allocation will be available for auction later in 2021 through a competitive process, and should the Proponent be eligible for a s51 take and use licence, it would have the right to bid for an allocation. It is uncertain whether the Proponent would have met the eligibility requirements in time to take part in the auction scheduled for later in 2021. The IAC is not aware of any further intended allocations for extraction from the Mitchell River, but notes that it may be possible for the Proponent to buy or temporarily transfer an unused licence from an existing holder.

³⁰² Document 81, page 17.

³⁰³ Document 81, page 11.

³⁰⁴ Document 698, page 31.

³⁰⁵ Document 749, page 3.

³⁰⁶ Document 698, page 30.

The IAC notes the Project is not contingent on securing 2 gigalitres of surface water from the Mitchell River. The Project intends to seek groundwater entitlements as an alternative water supply should surface water not be available in the quantities required.

The IAC notes the concern of submitters the Proponent's participation in the winterfill auction would be in direct competition with existing farmers and horticulturalists. This is further discussed in Chapters 14 and 17. It is the IAC's position that consideration of the 'best' allocation of water from the Mitchell River is beyond the scope of this Inquiry, and it is not within the terms of the IAC to make recommendation as to water allocations, or the equity issues it raises. The sustainable allocation of water in accordance with the *Water Act 1989* is a matter for SRW.

7.3.4 Findings

The IAC finds:

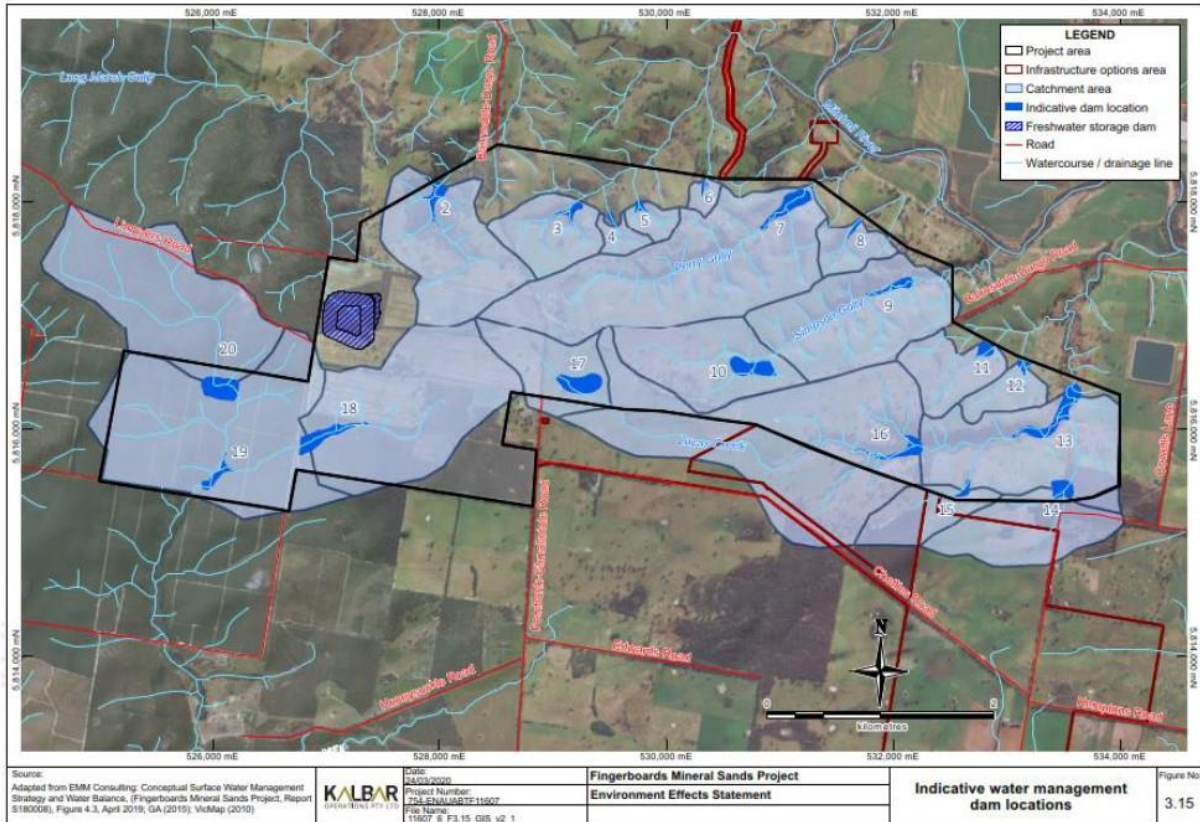
- The Project does not currently have a right to take and use water from the Mitchell River.
- 2 gigalitres of winterfill water from the Mitchell River will be made available in late 2021 through a competitive process. If eligible, the Proponent will have the opportunity to bid at this auction.
- It is not the IAC's role to determine how winterfill water from the Mitchell River should be allocated.

7.4 Site water management

7.4.1 Background

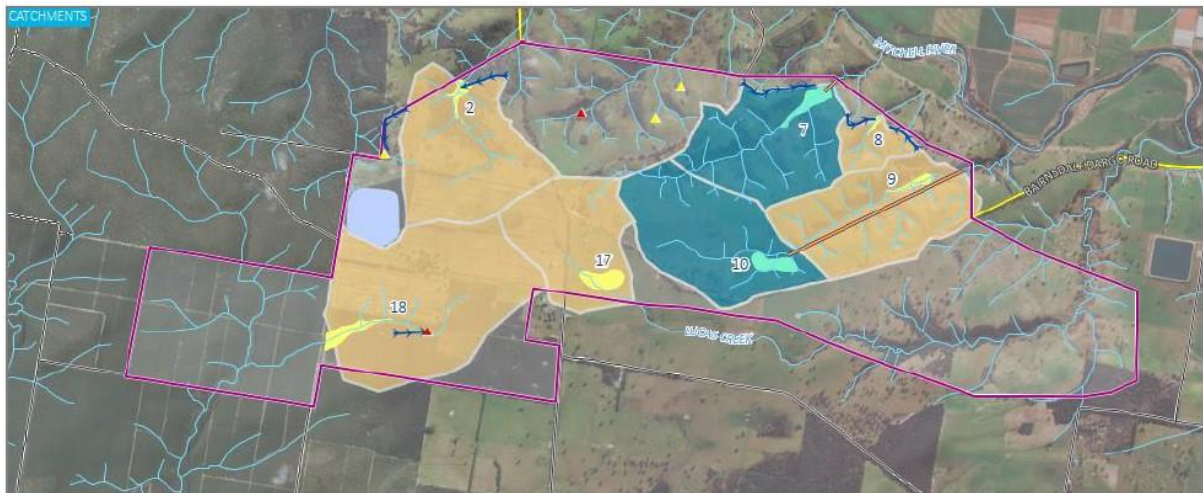
The Project Area contains ephemeral waterways that channel runoff from and across the site to the Mitchell River and Perry Creek. Nineteen water management dams are proposed upstream of, and at outfall points from the Project Area. The purpose of the dams is to prevent mine contact water from flowing directly into receiving waterways.

Figure 11 Indicative water management dam locations³⁰⁷



The proposed water management arrangements based on year 5 operations show water passing through undisturbed catchments coloured blue. This ‘clean’ water is collected in dams 7 and 10 and piped directly back to the Mitchell River. For disturbed catchments (shown in orange), water will be collected in dams 2, 17 and 18 and reused as process water or treated in the DAF plant before returning to the freshwater storage dam. Releases from freshwater storage dam back to the Mitchell River will balance water take associated with rainfall runoff capture.

Figure 12 Year 5 water management concept³⁰⁸



³⁰⁷ Document 243, page 18.

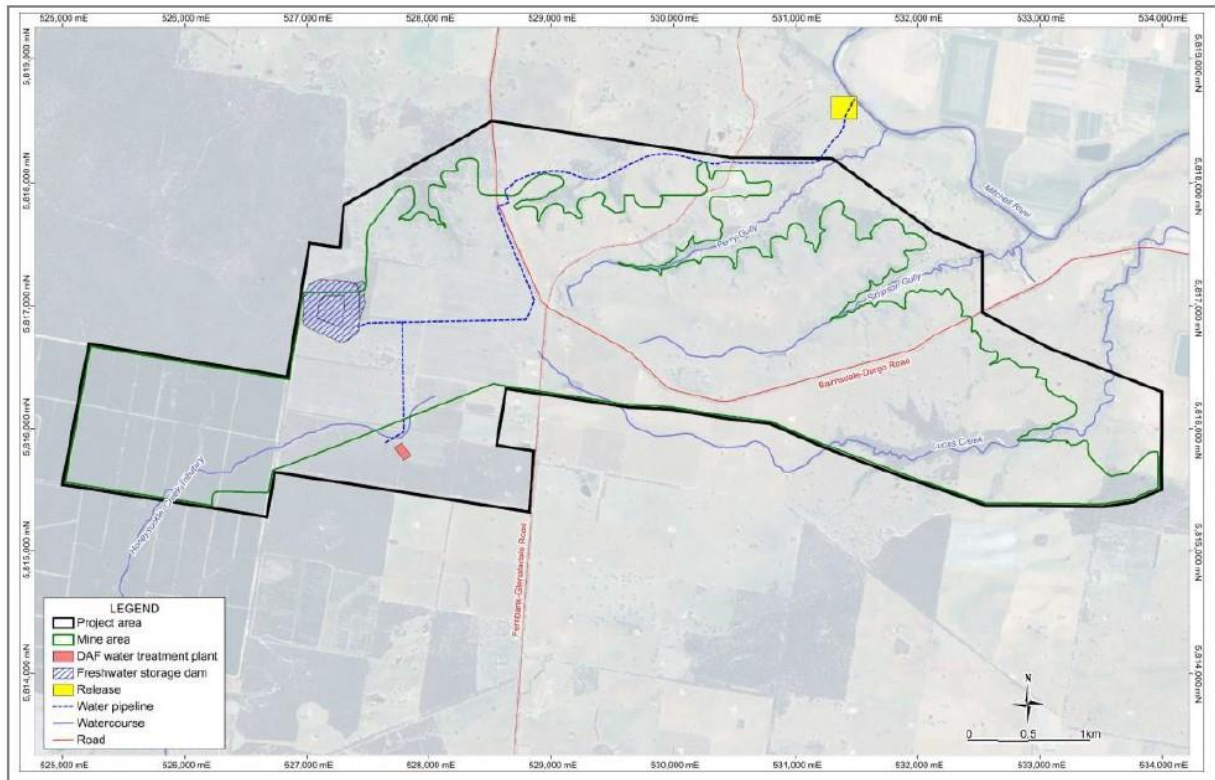
³⁰⁸ Document 243, page 19.

The Proponent proposes a water quality monitoring program in both the Mitchell and Perry Rivers which includes pre-construction, construction, and operational monitoring.

(i) Mine contact water treatment

Water collected in the mine water contact dams will be treated in the DAF plant at a rate of up to 24 megalitres/day. Treated water from the DAF will then be pumped to the freshwater storage dam and reused or released to the environment.

Figure 13 Water treatment components of the mine³⁰⁹



7.4.2 Evidence and submissions

(i) East coast lows

Several submissions were concerned about the impact of east coast lows, and the risk of water management dams overtopping and flooding, sending contaminated water into receiving waters (such as the Mitchell and Perry Rivers and downstream to the Gippsland Lakes) and the Lindenow Flats.

Mr Reid provided detailed rainfall records in his submission and expressed concern the Proponent did not comprehend the east coast lows weather and how rain events affect the local environment:

...with an East Coast low event this produces extreme amounts of water eg in June 2007 in three days, thirteen and a half inches of rain fell at 'Broadlands' (five kilometres east of Bairnsdale) and an unconfirmed report of seventeen inches fell at the back of Mount Taylor which is not far from the Fingerboards mine site.³¹⁰

³⁰⁹ Document 243, page 20.

³¹⁰ Document 614, page 2.

Mr Muller gave evidence that based on the 116 years of historical climate, the probability of water management dams overtopping and releasing water to the Perry River catchment was one event in either the year 8 or year 15 predicted mine scenarios.³¹¹

Mr McAlister gave evidence the Project Area is within an area of significantly lower rainfall than other portions of the Mitchell and Perry River catchments:

Importantly, ... this low rainfall pattern across the site highlights the low risk that is associated with operation of the mine on the site as there will be reduced probability of high rainfall volumes impacting the site, meaning that management of the site water regime will be far easier than were the site located in an area exposed to higher incident rainfalls.³¹²

Many submitters were concerned that meteorological data used to inform surface water modelling was inaccurate or inadequate. Mr Johnston provided photographs and rainfall data from his residence 4.5 kilometres east of the site which showed that rainfall near the eastern end of the Project Area can vary up to 275 millilitres less than the Fingerboards area in an east coast low or heavy rain which did not support Mr McAlister's evidence.³¹³

Mr Weidmann gave evidence that submitter concerns could indicate the existence of a micro-climate in the locality:

The submitter's concerns may be grounded in some truth, in that micro-climates can exist and rainfall patterns can vary significantly over small distances. However, rainfall patterns tend to vary where there is significant topography or landform changes. The submitter's property is on the eastern fringes of the site, located only 5 kilometres from the Fingerboards and the topography change is unlikely to be a contributor to the alleged rainfall differences. Rain gauges located 5kilometres apart will naturally vary and can sometime vary significantly over short time periods. The rain gauge differences noted in the submission are likely due to erroneous measurements. Additionally, measurements from only two time periods is not enough to draw any significant conclusions regarding spatial rainfall distribution.

Mr McAlister responded that in his opinion, baseline water quality and meteorological data was sufficient for the assessments conducted. However he accepted that more site-based run-off quality data would have been beneficial.³¹⁴

Several submissions contend that east coast lows occur randomly and are a major risk due to the high intensity of rainfall and the area's soil type, resulting in major runoff into the Perry River and Mitchell catchment, and water pooling in the locality for many weeks following each event.

Mr Weidmann gave evidence that water management dams had been designed for an east coast low to hold a 1 in 100 year storm:

The mine contact and process water dams have been sized to contain the volume of the 1% AEP (1 in 100-year ARI) 72hr storm. This storm event was selected because it is representative of a storm event caused by an 'east coast low'. Based on the water balance modelling undertaken by EMM, the dams are predicted to spill less than once in 30 years (which roughly equates to a 3.3% AEP, (1 in 30-year ARI)). This is because the dams are unlikely to be empty prior to a significant rainfall event.³¹⁵

³¹¹ Document 132.

³¹² Document 85, page 7.

³¹³ Submitter 568.

³¹⁴ Document 85, page 19.

³¹⁵ Document 77, page 21.

(ii) Flood modelling

Both Dr Kiem and Mr Weidmann agreed at the flooding conclave the flood modelling undertaken was sufficient. Mr Weidmann acknowledged the flood modelling undertaken has considered the 1 per cent Annual Exceedance Probability (AEP) event and assumes the dam storages are full, thus representing extremely conservative flooding conditions.³¹⁶

EPA sought further information on the proposed dams, including details of proposed transfer of water between dams and information on measure to prevent exceedance of dam capacity.³¹⁷ EPA considered the spill risk from dams “unacceptable” given the water quality of untreated mine contact water. EPA’s submission was that water management dams should be designed with sufficient capacity to prevent spills being less than 1 per cent for both the Mitchell and the Perry Rivers.³¹⁸

Experts at the flooding conclave agreed future flood modelling should consider climate change sensitivity assessment using 5 per cent increase in rainfall intensity and low water losses to represent worst case flooding conditions, and that mine management plans should consider extreme weather events.³¹⁹

(iii) Dam Capacity Exceedance

West Gippsland CMA submitted that during the winterfill period, the freshwater dam may exceed capacity resulting in flooding into local gullies and the Perry River catchment:

The Proponent plans to use a Dissolved Air Flotation plant (DAF) during peak rainfall events to treat excess mine contact inflows and discharge into the freshwater dam for use in future plant water requirements. However, if the freshwater dam is full then the water will be discharged to the Mitchell River and water management dams may spill to local gullies in the Perry River catchment.

Furthermore, West Gippsland CMA submitted that reliance on the DAF plant to treat water provides no margin for error if the DAF failed, presenting a risk of mine contact water entering natural watercourses:

As per our previous submission, the reliance of a temporary mechanical treatment facility to bring the risk rating to the minimum requirement is unwise and leaves no margin for error or redundancies. This presents a significant risk of mine contact water entering natural watercourses either through exceedance of water management capacity and/or failure of the mechanical treatment processes. The documentation is silent on measures to mitigate this risk.³²⁰

Mr Muller’s evidence supported the concerns of the West Gippsland CMA. He gave evidence that during the winterfill period, the freshwater dams may be full, and the DAF plant may not be able to operate. He stated that this scenario would increase probability of dams reaching capacity and spilling:

During and immediately following the winterfill period, the fresh water dam may be full, and so there could be periods when it is not possible to operate the DAF plant. Subsequently, mine contact rainfall runoff may be stored for longer periods in water management dams if centrifuges are adopted. If mine contact water cannot be immediately treated and removed

³¹⁶ Document 242, page 2.

³¹⁷ Document 486, page 11.

³¹⁸ Document 486, page 22.

³¹⁹ Document 242, page 1.

³²⁰ Submission 358, page 1

to the fresh water dam, there will be an increased probability of the dams filling and spilling.³²¹

As the Perry River is likely a more sensitive environment than the Mitchell River, the Proponent proposes to dewater dams in the Perry River catchment prior to dewatering dams in the Mitchell River catchment, to lower the probability of dam overflow in the Perry River catchment.

(iv) Discharge Water Management

All experts at the water balance and water management conclave agreed the water balance model estimated the potential frequency and volume of discharge events from the water management dams on the receiving environment of the Mitchell River and Perry River based on historical data.³²²

EPA submitted the EES does not describe the frequency, volumes of discharge and times of the year when water from the DAF plant will be delivered back into the Mitchell River and sought further information from the Proponent on surface water discharges including timing, circumstances of discharge and discharge points.³²³ EPA was concerned that if water is delivered to the Mitchell River during times of low river flows (summer/autumn flows), this may impact water quality of the river due to reduced dilution of the discharge.³²⁴

SRW raised concern about the complexity of the proposed water management system and how surface water entering the site would be discharged to natural receiving waters.³²⁵ SRW noted the Proponent's suggestion to release water from the freshwater storage dam back to the Mitchell River at a time of maximum benefit *"is not in accordance with normal passing flow requirements for instream storages outside licenced harvesting periods"*.³²⁶

EPA submitted the EES does not describe the quality of water to be discharged from the freshwater storage dam to the Mitchell River. EPA was concerned the transfer of water from the DAF plant to the freshwater storage dam may result in further dilution of nitrogen and other contaminants of concern.³²⁷

MFG submitted that droughts would impact on the dispersion of contaminants entering the Mitchell River from discharge water.

(v) Drought

During drought, winterfill volumes from the Mitchell River may be fully allocated and under these circumstances the Project will rely on groundwater supply.

TN37³²⁸ states it is likely that a drought would occur at least once during the 15-year mine life, and peak groundwater use would occur in drought years when the Mitchell River winterfill allocation is not available. The peak groundwater requirements expected during a drought is not expected to increase beyond 2.8 ggalitres/year, which is the total Project water demand.

³²¹ Document 132, page 7.

³²² Document 254, page 10.

³²³ Document 486, page 11.

³²⁴ Submission 514, page 13.

³²⁵ Submission 291, page 5.

³²⁶ Submission 291, page 5.

³²⁷ Submission 514, page 13.

³²⁸ Document 535, page 17 of the PDF.

MFG submitted that water security supply was a fatal flaw in the Project, particularly given the more frequent droughts experienced in East Gippsland. MFG submitted that during the recent three-year drought, farms within the Project Area found the only available sources of water were dams and springs fed by aquifers.³²⁹

MFG submitted that if the Project's water access is reduced due to drought, mine operations become problematic:

- What if the drought continues and there is no winter-fill in a given year or longer?
- What happens if the mine is approved and there isn't enough water from winter-fill and the bore field?

Mr McAlister gave evidence that he was confident the operation of the Project would not affect flows in the Mitchell River and downstream water quality in times of drought:

Water resource modelling conducted under my supervision conclusively showed the proposed extraction regime associated with operation of the Fingerboards project will have minimal (less than 0.02%) impact on water resource availability in the Mitchell River, noting that this analysis extended over many decades, with and without drought conditions. This is comprehensively documented in the EES.³³⁰

Dr Kiem gave evidence for MFG the impacts of protracted, multiyear droughts had not been considered on surface water (and groundwater) availability:

The prevailing view is that droughts even worse than the Millennium Drought have occurred in the pre-instrumental past. This further emphasises the need to properly consider the impacts of interannual to multidecadal climate variability. My opinion is the EES Scoping Requirements of "accounting for climate risks and the potential effects of climate change" are not met because the impacts of protracted, multiyear droughts are not considered.³³¹

Dr Kiem stated in the conclave report that he understood serious droughts will require extended duration of groundwater use, however his primary concern was whether groundwater would be available when required for the Project.³³²

Mr Sweeney stated in the water balance conclave report that due to licence capping, the risk to the environment during drought will not increase:

The condition of the winterfill licence prevents the proponent from extracting surface water under drought conditions (or any low flow periods). The severity of length of the drought cannot increase the potential impacts from the project to the surface water environment.

Similarly, increased reliance on groundwater due to drought is limited to the capped allocation that may be granted by SRW. Drought won't increase risk to the environment beyond that assessed by the EES.³³³

7.4.3 Discussion

(i) East coast lows

The IAC considers the assessment of impacts from east coast lows were not adequately acknowledged and assessed in the EES. Submissions have demonstrated that east coast lows result in large volumes of rainfall in short periods of time leading to flooding of the catchments and surface water pooling on the land for weeks after the storm event. The IAC agrees with the

³²⁹ Submission 813, page 74.

³³⁰ Document 85, page 21.

³³¹ Document 95, page 12.

³³² Document 254, page 4.

³³³ Document 254, page 5.

evidence of Mr Weidmann that submitters' concerns regarding east coast lows or heavy rainfall periods could indicate a microclimate in the Project Area that may not be reflected in meteorological data.

The IAC accepts the evidence of Mr Weidmann the water management dams have been sized to contain a storm event which is representative of an east coast low, and the evidence of Mr Muller that dam overtopping was predicted to be one event through 116 years of historical climate. It is the IAC's view the Project would benefit from further site-based run-off data collection within the Project Area during an east coast low to assist with concluding whether a microclimate is present or whether meteorological data is a reliable source.

It is the IAC's view that east coast lows will present challenges for onsite water management both during the storm event and after. This could, potentially, have impacts for the Gippsland Lakes if contaminated water flows into the Mitchell or Perry Rivers. Further work is required to model the performance of the DAF plant using site-based rainfall data to test plant performance under extreme rainfall conditions. The IAC's view is that mine management plans should include a recovery plan to manage east coast low rainfall events.

(ii) Flood modelling

The IAC accepts the sufficiency of the flood modelling put forward in the EES, which was accepted by the flood conclave experts. The flood modelling assumes dam storages are full which represents conservative conditions, given the Proponent would likely have pre-warning to plan for an impending flood event and draw down dam water in advance to mitigate dam overtopping.

The IAC agrees with the experts in the flooding conclave that further modelling should consider increased rainfall intensity to simulate climate change events. It is the IAC's view that flood modelling would benefit from site-based rainfall data collected during an east coast low rainfall event.

This modelling should include assessment of impacts not only on the Mitchell and Perry Rivers, but also on the Gippsland Lakes.

(iii) Dam capacity exceedance

The IAC agrees with the submissions of West Gippsland CMA and the evidence of Mr Muller there would be limitations to the DAF plant operation during the winterfill period when dams are full. If the DAF plant cannot operate when dams are full, there is a risk of mine contact water not being immediately treated and removed to the freshwater storage dam, which increases the probability of dams filling and spilling.

The IAC accepts the Proponent's management measure to dewater the more sensitive Perry River catchment dams as a priority, however it is not clear how dewatering would occur, the time it would take for dewatering and the impacts of dewatering events on the surrounding environment.

The IAC is concerned the Project relies on the DAF plant for the treatment of mine contact water without a contingency plan for treatment if the plant was to fail. This arrangement presents a significant risk of mine contact water entering natural watercourses and, potentially, downstream to the Gippsland Lakes.

(iv) Discharge water management

The IAC accepts the water balance model which used historical data to estimate the frequency and volumes of discharge events from the water management dams to receiving environments. The IAC notes that estimates of frequency and volumes of discharge events were not challenged in the water balance and water management conclave.

The IAC agrees with the EPA submission that if water is delivered to the Mitchell River during times of low river flows, this may impact water quality in the Mitchell River due to reduced dilution of discharge. This could have downstream impacts for the Gippsland Lakes. It is the IAC's view that management measures can be developed to manage water quality discharge into the Mitchell River to reduce the reliance on dilution of discharge through mixing with the Mitchell River water.

(v) Drought

The Proponent's primary position is that water will be available to the Project through a combination of winterfill from the Mitchell River and groundwater. It is clear to the IAC through TN37 and expert evidence, that a drought is likely during the life of the mine at which time the only water source for the Project would be groundwater.

The IAC agrees with submissions from MFG that water security is a major concern for the Project. Dr Kiem's evidence supports MFG's and the IAC's concerns that groundwater may not be available during serious drought conditions. This situation is further exacerbated in times of drought where groundwater is likely to be the primary source of water for existing land uses in the district which are unable to take water from the Mitchell River and groundwater drawdown is at its maximum. As discussed in Chapter 6, the IAC is concerned the Proponent's only contingency plan if it is unable to secure enough water is to scale back the Project, given the impact of this could be an unpredictable extension to the mine life, with flow on impacts that have not been assessed.

With regards to the impact on the Mitchell River in times of drought, the IAC accepts the surface water take and use limits managed by SRW will restrict water use during periods of low flow. It is the IAC's view the take and use restrictions will mitigate risk to the health and sustainability of the Mitchell River from the Project during drought conditions.

7.4.4 Findings

The IAC finds:

- The flood modelling undertaken in the EES is acceptable in terms of methodology.
- Flood modelling would benefit from further site-based run-off data collect during an east coast low rainfall event.
- Further work is required to model the performance of the DAF plant using site-based rainfall data.
- There is an unacceptable risk of untreated mine contact water entering natural watercourses at times the DAF plant is offline.
- Management measures are required to manage water quality prior to discharge into the Mitchell River in times of low river flow or drought.
- Given the further work required in relation to surface water quality, the Proponent has not demonstrated that it has taken all reasonably practicable measures to reduce risks of harm to surface water, including the downstream Gippsland Lakes Ramsar area, from the Project.
- Surface water take and use limits managed by SRW will restrict water use during periods of low flow to protect the Mitchell River flows.

- Water security is a major concern for the Project, which will be further exacerbated in times of drought.

7.5 Perry River Chain of Ponds

7.5.1 Background

Providence Ponds, the Perry River and their tributaries are a waterway system known as the ‘Chain of Ponds’ located south-west of the Project Area. The Chain of Ponds are a series of separated deep pools. The Chain of Ponds joins with the Avon River south-east of Stratford, before flowing into Lake Wellington, part of the Gippsland Lakes.

The catchment and its ponds are home to threatened plant and animal species such as Dwarf Galaxias, Pygmy Perch, Green and Golden Bell Frog, Gaping Leek-orchid and Prostrate Cone-bush.³³⁴

7.5.2 Evidence and submissions

Several submissions raised concerns regarding the permanent loss of the Chain of Ponds geomorphic features including the upper reaches of Honeysuckle Creek due to construction of the proposed dams within the Project Area and loss of groundwater.

GLaWAC’s submission highlighted the importance of the Perry system seasonal streams and the values they support:

through this submission wish to highlight the importance of Wangangarra, the seasonal streams in the area and the values they support, including freshwater cray, and the Perry and the Chain of Ponds that are part of the Perry system. For the Gunaikurnai, the Perry River and the Chain of Ponds would have been a reliable source of freshwater, even in times of drought.³³⁵

Dr Currell gave evidence there is limited information on the Chain of Ponds and their relationship with groundwater:

There is also limited characterisation of other groundwater dependent ecosystems – such as the chain of ponds associated with the Perry River – to understand their relationship to groundwater, and the potential for future impacts to these (it is assumed these will be unaffected by the predicted groundwater mounding, due to the distance from the site and inferred depth of the regional water table; however, this has not been characterised in detail).³³⁶

Mr Sweeney gave evidence the Chain of Ponds is unlikely to be connected to the Project Area’s groundwater system and in his opinion are reliant on shallow, subsurface drainage sourced only from the local catchment:

It is my opinion the chain of ponds within the Perry River catchment rely on near-surface drainage which directs water via the subsurface from the local surface water catchment.

The ponds exists at elevations that are several 10s of metres above the regional groundwater table (Figure 1). Groundwater beneath the mine site is therefore likely to be disconnected from the shallow drainage features that support the Providence Ponds and other chain of ponds west and south of the mine area.

³³⁴ [Protecting our Ponds 2016-2020 | West Gippsland Catchment Management Authority \(wgcm.vic.gov.au\)](https://www.wgcma.vic.gov.au/protecting-our-ponds-2016-2020).

³³⁵ Submission 662, page 5.

³³⁶ Submission 88, page 3.

In my opinion, the available evidence support the conclusion the Providence Ponds are reliant on shallow, subsurface drainage sourced only from the local catchment. They do not rely on, or interact with, deeper groundwater that might be influenced by the proposed mining activities.³³⁷

Mr Middlemis agreed with Mr Sweeney the Chain of Ponds is unlikely to be impacted by the Project:

perched conditions are isolated and not connected to the regional water table, and therefore any perching in the Providence Ponds area cannot be affected by drawdown of the regional water table. Nor can it be affected by seepage from the tailings storages that results in mounding of the water table, as the water table is around 30 metres deep in that area, and mounding is predicted to generally less than about 1 metre outside the mine area. However, it is theoretically possible for perched conditions in the Providence Ponds system to be affected by localised mound-related impacts of tailings seepage from the south-west corner of the project site, if the Seaspray Group marls are more extensive than previously assumed.

However, experts at the groundwater conclave disagreed whether sufficient work had been completed to adequately understand the connectivity of regional groundwater to the Chain of Ponds system.³³⁸

In closing, the Proponent submitted that sufficient information is available to conclude the risk of impacts on the Perry River Chain of Ponds is unlikely, however, agrees the groundwater monitoring plan should include monitoring requirements for the Chain of Ponds to ensure the information is verified.³³⁹

Particle tracking of groundwater documented in the EES indicates that groundwater does not travel towards the Chain of Ponds.³⁴⁰

7.5.3 Discussion

The IAC recognises that several submissions were concerned the Chain of Ponds system may be impacted by the Project due to loss of groundwater supply.

The IAC accepts the evidence given by Mr Sweeney and Mr Middlemis that it is unlikely the Chain of Ponds is connected to the regional groundwater aquifer, and the ponds system is more likely to rely on a localised perched groundwater source that would not be impacted by drawdown of the Project from the regional aquifer.

The IAC notes the groundwater conclave disagreed whether sufficient work had been done to understand connectivity of the Chain of Ponds to the regional groundwater system, and Dr Currell's evidence advised that detailed characterisation had not been completed.

Given the significance of the Chain of Ponds system for its ecological and cultural values, the IAC recommends that a risk management approach be adopted to monitor the Chain of Ponds system during groundwater test pumping to assess risk of impacts from potential groundwater drawdown.

The IAC is satisfied particle tracking undertaken in the EES demonstrates groundwater does not travel towards the Chain of Ponds system, and therefore should the groundwater quality be

³³⁷ Document 81, page 22.

³³⁸ Document 255, page 10.

³³⁹ Document 698, page 42.

³⁴⁰ EES Appendix A006-B, page 180.

impacted by the Project, it is unlikely to result in direct impact on the Chain of Ponds system in the event there is found to be a link to the regional aquifer.

7.5.4 Findings

The IAC finds:

- The Chain of Ponds system is unlikely to be impacted by the Project because there is no link between the Chain of Ponds and the regional groundwater aquifer.
- Monitoring of the Chain of Ponds system should be undertaken during groundwater test pumping to assess potential impacts from groundwater drawdown.

7.6 Overall conclusions on surface water

The Panel concludes:

- There is uncertainty to whether the Project can achieve the relevant draft evaluation objective at times of drought when surface water supply is limited.
- Flood modelling and dam capacity modelling would benefit from site-based run-off data collected during east coast lows.
- Further work is required to plan for a contingency in the event the DAF plant is offline.

8 Air quality and greenhouse gases

8.1 Introduction

Air quality and greenhouse gas effects are discussed in EES Chapter 9 and Technical Reports included in Appendix A009 and Attachment J. The air quality and greenhouse gas assessment was prepared by Katestone Environmental Pty Ltd (Katestone).³⁴¹

The relevant draft evaluation objectives are:

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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

The EES proposes mitigation measures included in Attachment H to manage the impacts of the Project on air quality and greenhouse gas. These were in summary:

Air quality

- AQ01: Minimising ground exposure
- AQ02: Water or suppressants application to working surfaces, stockpiles, haul roads
- AQ03: Heights for topsoil and overburden movement
- AQ04: Speed limits implementation and unsealed project roads
- AQ05: Topsoil stripping and weather conditions
- AQ06: Public roads and new intersections.
- AQ07: The mine void backfilling and rehabilitation
- AQ08: Haul vehicles and designated haul roads
- AQ10: Ore transfer through pipeline
- AQ11: Ore processing as a slurry
- AQ12: Crushing or grinding of ore.
- AQ13: Real time air quality monitoring
- AQ14: Activities during high wind
- AQ15: Air quality sub-plan
- AQ16: Dust management on haul roads
- AQ17: Construction of internal haul roads
- AQ18: Plant, machinery and vehicles.
- AQ19: Complaints contact
- AQ20: Activities during exceedances of air quality criteria.

Greenhouse gas

- GHG01: Solar electricity requirements
- GHG02: Energy efficient technology
- GHG03: Electricity usage
- GHG04: Vehicle diesel consumption

³⁴¹ Appendix A009, “Stage Two Air Quality and Greenhouse Gas Assessment for the Fingerboards Mineral Sands EES”, August 2020”.

- GHG05: Equipment maintenance
- GHG06: Generator diesel consumption
- GHG07: Land clearance minimisation
- GHG08: Greenhouse gas mitigation
- GHG09: Energy efficiency principles
- GHG10: Sourcing of materials and equipment.

Relevant TN produced during the hearing include:

- TN 4: Sensitive receptors
- TN 7: Dust deposition
- TN 11: Consultation for Agricultural and Horticultural assessments
- TN 12: Adjacent residences
- TN 18: Rehabilitation planning and activities.
- TN 19: Evaluation of potential exposures to sensitive receptors associated with metals in dust particulates and fallout
- TN 25: Compliance enforcement and complaint handling process
- TN 27: Fingerboards environmental review committee
- TN 34: Response by Katestone to questions asked by the IAC and Council
- TN 37: Further climate change modelling work
- TN 39: Project overview.

The IAC benefited from submissions and evidence in its consideration of air quality and greenhouse gases impacts. The Proponent called expert evidence in air quality and greenhouse gases as follows.

Table 9 Air quality and greenhouse gases evidence

Party	Expert	Firm	Evidence
Proponent	Simon Welchman	Katestone Environmental Pty Ltd	<ul style="list-style-type: none"> - Air Quality and Greenhouse Gases Expert Witness Statement 2 February 2021³⁴² - Supplementary Expert Witness Statement, 9 February 2021³⁴³ - Second Supplementary Expert Witness Statement, 5 May 2021³⁴⁴

8.2 Key issues

The issues are:

- air quality and modelling confidence
- dust suppression
- offsite dust impacts
- greenhouse gas emissions.

³⁴² Document 84.

³⁴³ Document 139. Note document 84 was revised to consider use of centrifuges.

³⁴⁴ Document 277. Note document 84 was revised to consider use of centrifuges and their impact on greenhouse gases.

8.3 Air quality modelling

8.3.1 Background

The air quality assessment:

- identified relevant legislative and policy requirements
- assessed the existing environment and conditions
- outlined the air quality assessment methods used
- assessed emissions to the air and potential impacts of air quality on sensitive receptors³⁴⁵
- proposed mitigation measures and monitoring requirements.

The air quality assessment was a Tier 1 assessment in accordance with the Protocol for Environmental Management – Mining and Extractive Industries (PEM).³⁴⁶ It investigated the potential for the Project to affect air quality during construction, operation, and decommissioning.³⁴⁷ To assess the operational stage, three years during the mine life were selected, namely: Year 5, Year 8, and Year 12.

The air quality assessment used a dispersion modelling approach including use of:

- TAPM meteorological model³⁴⁸ using a 12 month onsite meteorological dataset
- published emission factors for key pollutants and activity data provided by the Proponent
- EPA-approved dispersion model AERMOD³⁴⁹ to predict ground-level concentrations of dust, key exhaust pollutants, respirable crystalline silica, and heavy metals.

The onsite meteorological monitoring collected data between 1 October 2017 and 30 September 2018 using a weather station installed by the Proponent generally near the middle of the Project Area on gently sloping land with vegetation in the vicinity. Due to equipment faults, it only collected wind speed and wind direction data for 77.3 per cent of that period.³⁵⁰ Some of the results are shown in Figure 14 and Figure 15.

³⁴⁵ The location of sensitive receptors near the proposed mine site was a contested issue in the Hearing which is addressed in Chapter 2.6.5.

³⁴⁶ EPA Publication 1191 *Protocol for Environmental Management – Mining and Extractive Industries* December 2007.

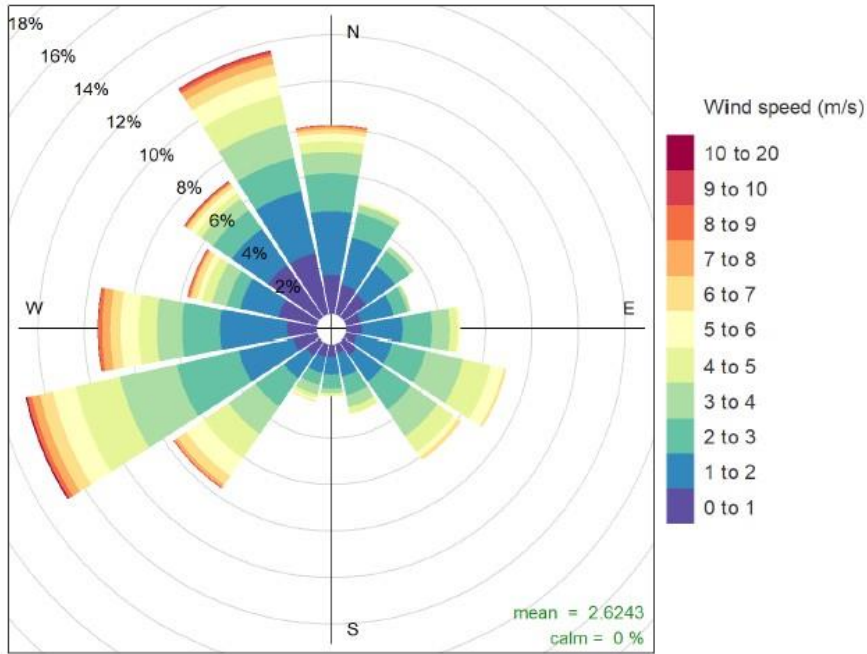
³⁴⁷ Document 38 Executive Summary Appendix A009.

³⁴⁸ Developed by the Commonwealth Scientific and Industrial Research Organisation [CSIRO], version 4.0.4.

³⁴⁹ Model required to be used by EPA.

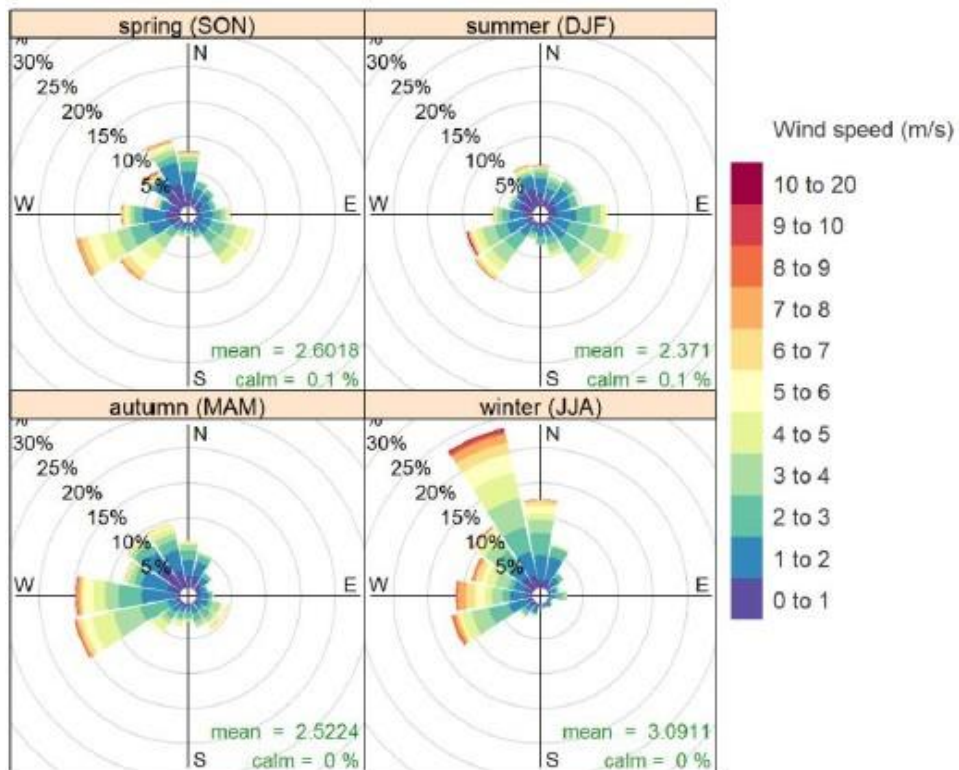
³⁵⁰ Document 38 EES Appendix A009 3.2.2, page 13.

Figure 14 Distribution of winds recorded at the on-site meteorological monitoring station³⁵¹



Frequency of counts by wind direction (%)

Figure 15 Seasonal distribution of winds recorded at the on-site meteorological monitoring station³⁵²



Frequency of counts by wind direction (%)

³⁵¹ EES Appendix A009, page 14.

³⁵² EES Appendix A009, page 15.

In addition:

A further four years of meteorological data were generated using the TAPM prognostic model as required by VIC EPA's AERMOD Modelling Guidance and a subset extracted near the centre of the Project site. These years were used to investigate the sensitivity of the dispersion modelling outcomes to variations in meteorological conditions.

The above datasets were used to construct meteorological files suitable for driving the AERMOD dispersion model.³⁵³

The air quality assessment concluded, in summary:³⁵⁴

- Dust emission rates from construction were found to be, at most, 20 per cent of the dust emission rates during operations.
- Emissions and potential impacts on air quality during decommissioning stages would be less than for operations.
- Predicted ground-level concentrations of key exhaust pollutants from generators during construction are predicted to comply at all sensitive receptors, being at most 17 per cent of the relevant air quality criteria.
- Predicted ground-level concentrations of particulates and respirable crystalline silica and dust deposition rates due to other construction activities are predicted to comply at all sensitive receptors.
- Operational ground-level concentrations:
 - of PM_{2.5}³⁵⁵, respirable crystalline silica, heavy metals and dust deposition rates during Year 5, Year 8 or Year 12 with standard mitigation measures and ambient background concentrations are predicted to comply at all sensitive receptors. (Emphasis added)
 - of PM₁₀³⁵⁶ during Year 5, Year 8 and Year 12 with standard and additional mitigation measures and ambient background concentrations are predicted to comply with the PEM objective at all sensitive receptors. (Emphasis added)
- Using standard mitigation measures, 24-hour average concentrations of PM₁₀ are predicted to be above the PEM objective on up to four days per year at any individual sensitive receptor. On these days, restricting activities on-site to daytime only is sufficient to prevent these exceedances. (Emphasis added)
- The residual emissions from the Project are predicted to comply with the air quality objectives at all sensitive receptors. This assumes standard mitigation measures are applied constantly and effectively, as well as best practice mitigation measures applied as needed, such as ceasing some operations due to forecast or real-time monitoring.

An environmental management plan is proposed including dust mitigation measures, ongoing monitoring program, and procedures for implementing additional mitigation measures in response to forecast conditions or real-time particulate monitoring.

8.3.2 Evidence and submissions

Mr Welchman was called by the Proponent to give evidence on air quality and greenhouse gases. His evidence largely reflected the material in Appendix A009.³⁵⁷

³⁵³ Document 38 EES Appendix A009 3.3.1, page 32.

³⁵⁴ Summarised from Appendix A009 conclusions.

³⁵⁵ PM_{2.5} is a fraction of airborne particles with a diameter less than 2.5 micrometres.

³⁵⁶ PM₁₀ is a fraction of airborne particles with a diameter less than 10 micrometres.

³⁵⁷ Document 38 EES Appendix A009.

Mr Welchman gave evidence that particulate matter is the major air pollutant emitted from mining and processing activities and that most particulate matter emitted consists of large particles generated from activities such as mechanical disturbance of soil and overburden by bulldozers, excavators, and vehicles on dirt roads.

He advised particulate matter is generated from wind erosion of stockpiles and bare ground. He gave evidence the emission rate estimates for the Project indicate that most of the dust emissions (approximately 89 per cent) are larger than 2.5 micrometres. He said air quality assessments of mining projects have shown that it is possible, with contemporary design and dust control measures, to avoid exceedance of the relevant air quality objectives.³⁵⁸

Various submitters expressed concern about the validity of the weather data collected from the on-site weather station. They argued the weather station did not give an accurate picture of the prevailing winds because it was affected by the nearby vegetation and was partially sheltered. Submitters stated that wind and weather varied across the Project Area and the location of the weather station was not suitably located to record the most extreme prevailing winds.

For example, Mr Rose, a 40-year resident with a 142 hectare wool and sheep farm about 1.5 kilometres south of the Project Area, submitted that:

- the weather station location was inappropriate and out of action for 25 per cent of time
- there is local awareness of fickle weather patterns, and it is common knowledge the weather station location is in a wind shadow; cattle go there in adverse weather.

During cross examination, Council suggested to Mr Welchman he had produced results that were roundly disagreed with by the local community, and that this should give him cause to reconsider the results.

Mr Welchman agreed with Council but stated he believed the weather data reflected the circumstances of the site. He gave evidence that other nearby Bureau of Meteorology (BOM) weather stations were either on flatter land, or in much hillier territory. His evidence was the weather station met the siting requirement in the relevant standard and the AERMOD model allows one station to be used. He gave evidence the AERMOD model produces a higher dispersal outcome than some other models and is therefore conservative.

Under examination by MFG, Mr Welchman said that he had not had any consultation with local land holders about their weather experience. When asked if dust from the proposed storage of mine tailings in the Perry Gully had been modelled, Mr Welchman replied that if it was in the first five years then it was not modelled.

When questioned about modelling of the HMC stockpiles, Mr Welchman acknowledged that he was not aware of what is proposed. In response to a question from the IAC, Mr Welchman said he had not separately modelled dust or material that might be lost to wind from HMC stockpiles. He said the major sources of dust would be from roads and the land in general.

The Project was modified to introduce the use of tailings centrifuges.³⁵⁹

Mr Welchman gave supplementary evidence³⁶⁰ in relation to the impact of the use of centrifuges for air quality which he summarised:

³⁵⁸ Document 84.

³⁵⁹ See Section 1.3 of this report.

³⁶⁰ Document 139.

Air quality assessment was revised to account for changes in the Project due to the use of tailings centrifuges. Key changes are associated with:

- Dust emissions due to overburden haulage, vehicle emissions and wind erosion are reduced
- Dust emissions from tailings management increase
- For Year 5, TSP and PM10 emissions are estimated to reduce by 3-4% and PM2.5 emissions are estimated to increase by 1%
- For Year 8, TSP and PM10 emissions are estimated to increase by 1-2%
- For Year 12, TSP and PM10 emissions are estimated to reduce by 3-4%
- Dispersion modelling of Year 5 and Year 12 revised to account for centrifuge changes
- Dispersion modelling of Year 8 was not conducted because lower predicted concentrations than Year 5 and Year 12 and emissions did not change significantly³⁶¹.

His supplementary expert witness statement included updated predicted maximum concentrations of PM₁₀ at sensitive receptors for operations at years 5, and 12, comparing the EES scenario against the inclusion of centrifuges.³⁶²

The IAC requested further information about likely maximum dust deposition rates to understand the deposition rates that could be expected if dust mitigation strategies were not working to the maximum extent achievable.³⁶³ The Proponent responded in TN7.³⁶⁴

Table A2 of TN7 reports the Project's predicted annual average dust deposition rates and shows the Project could contribute significant amounts of dust for some sensitive receptors, and that all sensitive receptors will experience significant dust deposition rates from Project-derived dust and background dust. In the absence of all dust mitigation measures working to full effect³⁶⁵, all sensitive receptors are expected to be impacted by dust deposition rates over 100kg/ha/year with some receiving up to 162.7kg/ha/year of dust.³⁶⁶

In a tabulated response to the IAC's request for information, the Proponent said:

The total predicted annual dust deposition rates (kg/hectare/year) at each sensitive receptor have been calculated and are presented in Table A2 in Technical note TN 007. These deposition rates are presented as the total for the Project in isolation (increment / inc) and the total for the Project plus background (Inc + Bg).

The dust deposition rates that are presented in Table A2 in Technical note TN 007 do not account for the additional dust controls that will be implemented to achieve compliance with the SEPP AAQ objectives. These additional dust controls will result in dust deposition rates that are lower than those presented above³⁶⁷.

The air quality peer review in the EES notes³⁶⁸:

...the contribution of the mining operations alone to PM10 and PM2.5 at sensitive receptors is significant, for example up to 88% if the PM10 criteria in Year 5 at R15 and up to 92% in Year 12 at R44. The additional controls have only been applied to reduce PM10 levels below the air quality criteria and in some cases this only just meets the criteria eg R1, R2 and R15 in Year 5 at 59.1, 59.2 and 59.5ug/m3 respectively compared to the PEM criteria of 60ug/m3. The management of emissions to just meet the criteria is not consistent with the

³⁶¹ Document 311 Simon Welchman presentation slide 15 of 19.

³⁶² Document 139 Supplementary Evidence Witness Statement of Simon Welchman February 2021 tables 4 and 6.

³⁶³ Questions 57 and 61 RFI.

³⁶⁴ Document 146 Technical Note 007 Dust Deposition Tables Questions 57 and 61 RFI.

³⁶⁵ Revised mitigation measures were tabled in Document 775.

³⁶⁶ Document 146 Technical Note 007 Table A2 Receptor 15 at 2024 Inc+Bg.

³⁶⁷ Document 108 Table of Responses to IAC Request for Further information updated 23/02/2021 at No 61.

³⁶⁸ Attachment J to EES – Air Quality Independent Peer review and Proponent Response, page 10.

intent of the PEM or SEPP (AQM) to minimise emissions and potential risk to the health of the surrounding community....

8.3.3 Discussion

The IAC accepts the overall approach to air quality modelling and assessment is appropriate. The reliance on data from a single on-site weather station is unfortunate because, in the IAC's view, there is no basis to determine if the weather data is truly reflective of worst-case conditions. This is compounded by a lack of recorded data at the weather station for about 25 per cent of the 12-month monitoring period.

It is important to note the additional four years of meteorological data used in the overall assessment process (generated using the TAPM prognostic model), demonstrated likely *higher* wind speeds than in the on-site recorded data. It is notable that Mr Welchman draws attention to this in recommending special focus on receptors that are more likely to be impacted by dust based on the 2013–2016 data, than the 2017–2018 on site data.³⁶⁹

The significance of this was demonstrated in the assessment where it shows the maximum 24-hour average PM₁₀ concentrations predicted at any receptor using the 2013 – 2016 meteorological data range from to 16 per cent to 174 per cent of the PEM objective. This can be compared with 23 per cent to 120 per cent for the 2017-2018 period based on the application of standard dust mitigation measures.³⁷⁰

The IAC notes the air quality assessment has not considered climate change, the Proponent rationale being that it is a relatively short project life, and therefore there will be little appreciable change in conditions. It is unfortunate the modelling undertaken did not test the consequences of an increase in wind or storm events to model likely consequences and sensitivity to changed weather conditions.

The IAC notes that climate science emerging in recent decades relevant to Victoria has predicted an increasing frequency in the intensity of storm events and an increase in east-coast lows. Both are relevant, particularly in the context of the likely duration of the Project when rehabilitation time frames are considered.³⁷¹

The worst-case scenario for dust deposition as described in TN7³⁷² becomes more relevant in the context of the potential for hotter and drier and windier periods of weather and when dust mitigation strategies do not perform as planned.

The IAC notes that under current conditions modelled in the air quality assessment, the air quality objective maximums for dust are capable of being exceeded. Even with standard dust mitigation measures, dust maximums will be exceeded on some occasions and additional dust mitigation measures will be required, including shutting down activities or shifting operations depending on the conditions.

More importantly, the updated air quality tables in Mr Welchman's first supplementary evidence statement³⁷³ demonstrate that for all receptors, the maximum air quality criteria for 24hour PM₁₀ concentrations of 60ug/m³, is only just met. For all 49 receptors referenced in the table, there is a

³⁶⁹ Document 38 EES Appendix A009 at 3.6, pages 78-79.

³⁷⁰ Document 38 EES Appendix A009 P154.

³⁷¹ Climate Change Act 2017 and Victoria's Climate Science Report 2019.

³⁷² Document 146 Technical Note 007 Dust Deposition Tables Questions 57 and 61 RFI.

³⁷³ Document 139 Supplementary Evidence Witness Statement of Simon Welchman February 2021 tables 4 and 6.

cumulative PM₁₀ maximum of 57.4ug/m³ or above. While the assessment shows that with standard and additional dust mitigation measures the air quality objective can be met, it is only just met, and there is little if any margin for error before the maximum PM₁₀ concentrations would be exceeded.

In the IAC's view, the Proponent's approach of 'only just' meeting the required standards is not consistent with the GED obligations under the EP Act.³⁷⁴ The IAC notes the EPA's submissions that GED, which requires any person 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, means that it is no longer acceptable to merely meet applicable standards. The requirement is to take all reasonably practicable measures to reduce relevant risks.

There is a very high probability that dust mitigation measures will not work perfectly all of the time, and even if they did, the evidence before the IAC demonstrates there would still be a significant impact on sensitive receptors and other offsite uses from dust deposition that is just below air quality objective maximums.

The IAC notes the assessment did not assess potential dust from material to be placed in the Perry Gully, separate to the now discarded temporary TSF.³⁷⁵

The IAC notes the assessment has not specifically modelled wind erosion of material from HMC stockpiles, even though large stockpiles of HMC are still potentially part of the Project. The air quality assessment does make reference to stockpiles but is silent in relation to the material in particular stockpiles and their scale.

The assessment also has not assessed the proposed extension to the mine licence area which may result in a larger operational footprint and surface area which could be reasonably concluded to add an uplift in the dust modelling results.

8.3.4 Findings

The IAC finds:

- The overall approach to air quality modelling and assessment is appropriate. The assessment demonstrated that air quality objectives set in the relevant EPA air quality standards for maximum concentration for PM₁₀ are only just met, even with all mitigation measures in place.
- The assessment shows there will be dust impacts beyond the Project Area that would require mitigation.
- The IAC notes there is almost no margin for error before maximum PM₁₀ concentrations would be exceeded at sensitive receptors, depending on the weather and wind conditions.
- The prevailing and strongest winds are from directions that will move dust from the Project Area over the horticultural areas of the Lindenow Valley and towards the Lindenow and Bairnsdale townships.
- Even with dust mitigation strategies working, all sensitive receptors will receive significant volumes of dust from the Project, at levels just below maximums permitted.

³⁷⁴ Section 25 of the EP Act.

³⁷⁵ See section 1.2 of this report in relation to Project changes introduced during the Hearing.

- Climate change impacts such as increases in wind and storm events are likely to increase the offsite dust impacts beyond that modelled.
- If the Project is to proceed, it will require review of the air quality modelling including consideration of the extended mining licence area, consideration of new Project elements (for example TSF areas in Perry Gully where centrifuge cake will be stored), erosion from HMC if external stockpiles are used and baseline data from the exploration pit.

8.4 Dust suppression

8.4.1 Background

The Project covers an area of approximately 1,600 hectares on a plateau that will be progressively stripped of vegetation, have overburden up to 40 metres deep moved, HMC recovered, and overburden and tailings replaced into mine voids. An area of up to 285 hectares will be disturbed at any one time.³⁷⁶ Earth moving equipment is to be used on a near continuous basis to shift overburden, extract the HMC, and replace materials into mine voids.

Vehicle movements in the Project Area will include earth moving equipment as well as large vehicles moving the processed HMC to either Fernbank South or to Bairnsdale for rail freight to the Port of Geelong.

Earth moving equipment contributes to dust generation through movement of material and also through crushing and grinding of material on the ground. Although likely to be minimal, dust can fall onto transport vehicles and be transported off site.

The primary dust mitigation strategy is to spray water onto roads and other surfaces to keep the landscape damp. Up to 375 megalitres per annum of water are identified as being needed for use for this task to be deployed by two water trucks.

8.4.2 Evidence and submissions

Mr Welchman gave evidence that dust controls in the EES air quality assessment provides a range of dust control measures:³⁷⁷

...dust control measures that will be used in addition to watering to control emissions of dust from haul roads, cleared areas and stockpiles. In addition to watering, proposed dust controls include:

- Haul roads
- Pave surface of product haul roads
- Low silt aggregate for unsealed roads
- Dust suppressants
- Speed limits
- Manage and maintain designated routes
- Minimise haul distances
- Wind erosion of cleared areas
- Chemical suppressants

³⁷⁶ Document 215 page 2-4.

³⁷⁷ Document 84, page 19.

During cross examination, the EPA tabled a range of photos that demonstrated elevated dust generation from unsealed roads, as vehicle speeds increased.³⁷⁸ The EPA submitted the photos showed that vehicles travelling at 15-24km/h generate a lot less dust than vehicles travelling at 35km/h, thus advocating for a maximum speed limit of 20km/h on unsealed roads.

During the EPA submission in response to a question from the IAC, the EPA submitted that its focus was to manage dust onsite, with offsite management a secondary measure.

Mr Welchman agreed that slower speeds generate less dust, but depended on final road treatments. He argued that if road surfaces were treated to reduce dust, then vehicle speeds might be higher without mobilising dust.

In response to a question from the EPA about where in the documentation it specifies what roads are to be treated (with suppressants), Mr Welchman responded that it is a matter for the management plan.

In response to a question from the IAC in relation to suppressants and their impacts, Mr Welchman replied that evaluation is required of environmental and health impacts of potential suppressants. He said he assumed products were safe to use.

The Proponent subsequently tabled a product brochure in relation to one potential suppressant 'Dustex' that is used within Australia.³⁷⁹

In his submission, Mr Barton presented an analysis of the likely effectiveness of the dust mitigation strategies proposed, including background calculations on water use for dust suppression.³⁸⁰

He concluded that:

EEM (2020a) p47 allowed 3 mm/day in excess of evaporation for the fact that water output cannot be so precise as to exactly match evaporation. Including this factor, on days of evaporation ranging from 5-10 mm, 1ML would cover from 12.5 to 7.7 ha. If this was sprayed over just the 60 ha of active exposed mine floor, the 25ML would last between 3 and 5 days. Kalbar are proposing to purchase 2 water trucks to suppress dust both on haul roads and disturbed areas. These are to be either 45000L or 75000L capacity. These would require 22 or 13 trips respectively to put out 1ML, with associated filling and spraying times. It is obviously completely absurd to suggest they could be used for widespread dust mitigation. It therefore follows the dust mitigation factors essential to Katestone's conclusions that dust emissions will be acceptable cannot be met.

Since the EES was published many of these fallacies have been recognised. The proposal for the TSF has been abandoned, and haul roads may be paved or treated with dust suppressants. Stockpiles may be treated with dust suppressants while vegetation is establishing. The use of scrapers has been discarded in favour of truck and shovel. Obviously these methods will reduce the need for water, although some will be needed to mix with suppressants and water trucks will be required to spread this.

Suppressants cannot be used where active work on shifting topsoil, stripping overburden, dumping in the mine void, levelling, and all other earthmoving activities are in progress. As mentioned above, there will be insufficient water trucks or water to suppress dust in hot windy conditions. Conversely, in wet conditions, operations on disturbed, dispersible soils may become impossible.

³⁷⁸ Document 314 Photos of dust at different vehicle speeds.

³⁷⁹ Document 355 Product Brochure – Dustex.

³⁸⁰ Document 473 Nick Barton – under MFG umbrella pages 12-13.

Mr Ewan Waller spoke about controls and compliance.³⁸¹ He said he was previously Chief Fire Officer for DELWP in the Victorian Government with accountabilities for achieving compliance with standards and procedures across agency staff involved in fire management and submitted:

It is just hard to get compliance and control even for simple things. How will it be achieved for such a complex project. It is such a high-risk operation with huge risks for other activities in the area. Very hard to achieve the compliance – it needs endless control.

Mr Welchman was questioned on the use of windbreaks as a dust mitigation measure, by Council, MFG and the IAC.³⁸² He confirmed that windbreaks were not part of the air quality modelling, and they could be useful in some circumstances. He gave evidence that, in most circumstances, they work best at the source of the dust.

8.4.3 Discussion

The IAC notes the approach proposed for dust mitigation is what would be expected from a mining Project, noting there is significant detail still to be resolved.

The IAC agrees that sealing or treatment of road surfaces with suppressants is an appropriate mitigation strategy that is likely to have beneficial impact in the reduction of dust, although observes the impact of the use of suppressants was not addressed in the EES.

The IAC does not however have confidence the primary mitigation method, spraying water to dampen surfaces, will be effective, particularly under the challenging weather conditions (strong winds and long periods of dry weather) likely to occur at the site.

The IAC notes the haul road is now proposed to be sealed and this will free up dust suppression water that was otherwise to be deployed on the private haul road.

However, there will be very large areas of disturbed land in various stages of manipulation over the life of the Project. The site sits on a plateau and is exposed to very strong winds. Almost all submitters at some stage referred to the winds that are experienced.

The IAC finds the analysis in Mr Barton's submission persuasive that it is not feasible that water trucks could effectively dampen all the disturbed landform with sufficient frequency to mitigate dust risk.

The IAC considers it is unrealistic to presume water trucks could maintain an effective moisture layer across the extent of the disturbed areas, including batter slopes, gullies and the like, during periods of hot, windy and dry weather. The IAC notes dust suppression would need to be achieved continuously, from the commencement of construction until rehabilitation of all disturbed areas is completed.

The IAC notes the air quality assessment did not propose windbreaks as a dust mitigation measure. Based on air quality assessment, offsite windbreaks (for example, on farms or in the Lindenow Valley horticultural area) were proposed as an important dust mitigation measure for horticulture in the evidence of Dr Blaesing (see Chapter 14). The IAC notes Mr Welchman indicated windbreaks were generally more effective at the source.

The IAC refers to its comments in Chapter 8.3.3 regarding the Proponent's approach which essentially argues the Project would meet relevant air quality standards and as a result would be

³⁸¹ Submission 652.

³⁸² Day 9, 13 May 2021.

acceptable in this regard. In the IAC's view, given the high likelihood the proposed dust mitigation measures will be insufficient to contain dust to an acceptable level, the Proponent has not demonstrated the Project will take all reasonably practicable measures to reduce harm to human health and the environment from dust and other air quality impacts. More work would need to be done to demonstrate the mitigation measures proposed are all that are reasonably practicable.

The IAC further notes that some of the proposed mitigation measures require the Project to 'scale back' or even cease for periods of time (for both dust management and, for example, where sufficient water is not available for the Project). Dust suppression measures would need to be maintained consistently during these periods and if the mine went into 'care and maintenance', when the Project's income would be reduced or be non-existent.

8.4.4 Findings

The IAC finds:

- A range of dust mitigation strategies are proposed that would have varying levels of success in suppressing dust.
- Sealing the haul road and deploying environmentally acceptable suppressants to other roads is appropriate.
- The likelihood of being able to successfully mitigate dust from the balance of the actively disturbed areas during the mine life is low, particularly in periods of hot, dry and windy weather.
- The Proponent has not demonstrated the Project would take all reasonably practicable measures to reduce harm to human health and the environment from dust and other air quality impacts as required by the GED.

8.5 Offsite dust impacts

8.5.1 Background

The air quality assessment considered 49 off site sensitive receptors at the time of the EES publication, with impacts for additional receptors identified after the EES exhibition considered during the Hearing (as discussed in TN4).³⁸³ Sensitive receptors included houses, and schools and did not include the open-air workplaces of fields in which farmers or horticulturalists work. Sensitive receptors are discussed in Chapter 2.6.6.

The air quality assessment describes the key issues associated with dust emissions from mineral sands mines as including:³⁸⁴

- amenity impacts, for example:
 - short-term reduction in visibility
 - build-up of particulate matter on surfaces within homes resulting in the occupant needing to clean more frequently
 - soiling of washing hung out to dry
 - build-up of particulate matter on the roofs of houses and, during rainfall, the flushing of the particulate matter into rainwater tanks potentially affecting quality of drinking water or tank capacity

³⁸³ Document 145 Corrected Technical Note 4 Sensitive Receptors.

³⁸⁴ Document 38 EES Appendix A009 P4.

- health impacts due to elevated particulate concentrations, including heart respiratory disease.

Issues regarding potential dust impacts on existing agricultural and horticultural industries are discussed in Chapter 14 and the existing tourism industry in Chapter 17.

8.5.2 Evidence and submissions

Many submitters advised the IAC their only water supply is from water collected off the roof of their house and farm buildings. Other submitters referred to potential impacts on their crops and animals from dust.

Ms Alison Waller³⁸⁵, a practising vet in the area, made a submission to the Hearing. In response to a question from the IAC, Ms Waller said that livestock acclimatise to noise, but dust can cause pinkeye, lung disease and can result in contaminants in meat.

The Bendigo and District Environment Council³⁸⁶ (BDEC) referred to regulatory failures associated with mining projects in Victoria and submitted that dust blowing off the now abandoned Woodvale mine near Bendigo resulted in arsenic in 78 per cent of water tanks on impacted properties.

The Proponent provided TN7 that included deposition tables demonstrating significant dust could fall on most sensitive receptors and nearby properties.³⁸⁷

In his expert witness statement, Mr Welchman included diagrams showing the 24-hour average concentrations of PM₁₀ plus background on exceedance days for the modelled years and with further mitigation measures being applied (Figure 16, Figure 17 and Figure 18).

³⁸⁵ Submission 743.

³⁸⁶ Submission 544.

³⁸⁷ Document 146 Technical Note 7 Dust Deposition Tables.

Figure 16 Year 5: 24-hour average concentrations of PM10 (plus background) on the exceedance day without further mitigation (Scenario 1 -left) and with further mitigation (Scenario 3 -right)³⁸⁸

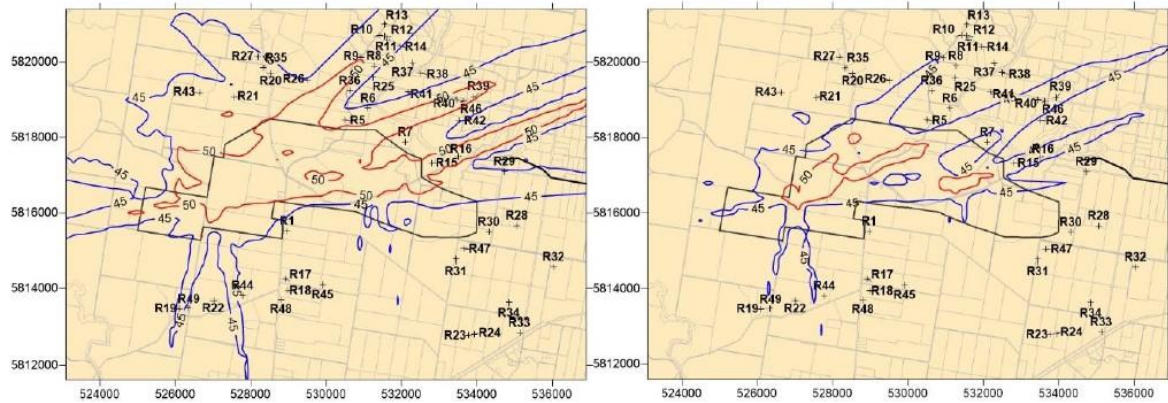


Figure 17 Year 8: 24-hour average concentrations of PM10 (plus background) on the exceedance day without further mitigation (Scenario 1 - left) and with further mitigation (Scenario 2 - right)³⁸⁹

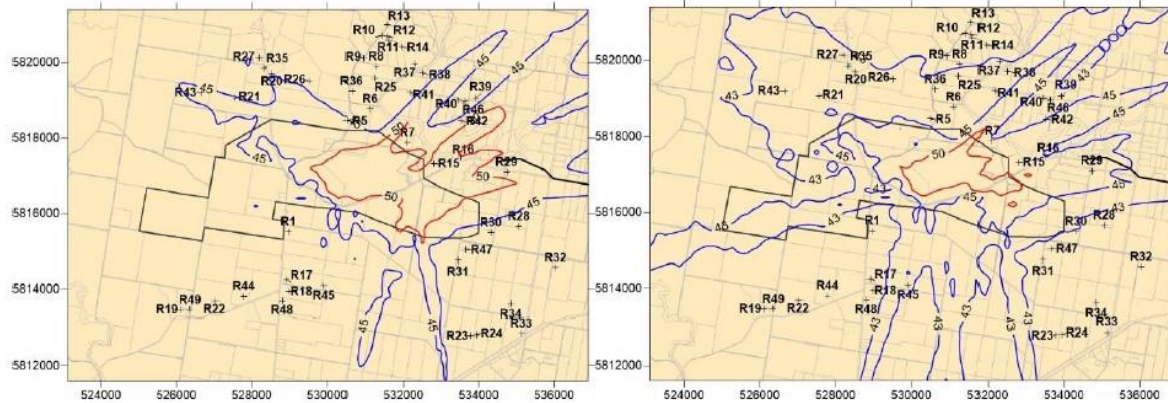
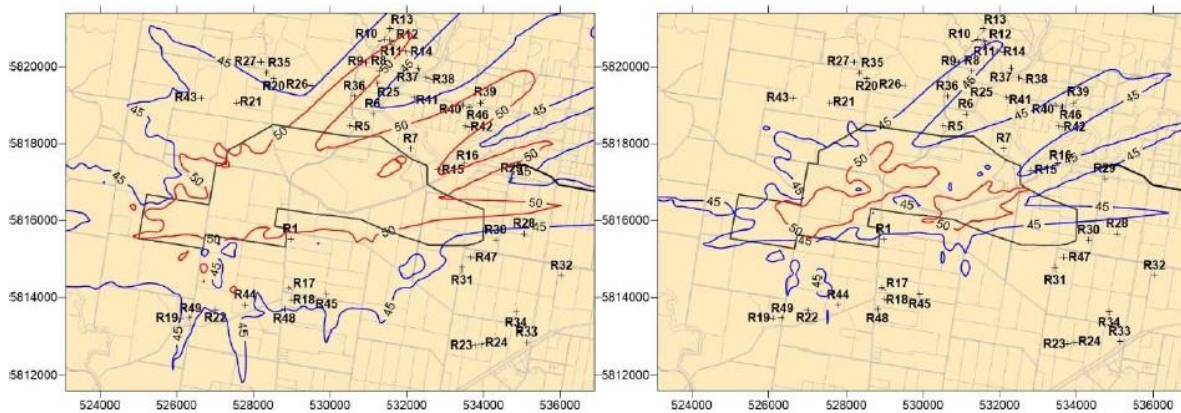


Figure 18 Year 12: 24-hour average concentrations of PM10 (plus background) on the exceedance day without further mitigation (Scenario 1 - left) and with further mitigation (Scenario 2 - right)³⁹⁰



8.5.3 Discussion

The evidence is the Project will generate significant dust. With all standard and extra mitigation measures applied, dust exposure at sensitive receptors should be below the maximum exposures

permitted under air quality standards. However, the dust deposition tables demonstrate that significant dust will fall on most sensitive receptors and nearby properties³⁹¹.

The IAC notes that dust exposure and accumulation will remain significant, and in the years modelled, exposure levels attained are just under maximum levels.

The IAC has previously concluded it does not consider dust mitigation measures proposed are likely to be totally effective, particularly in periods of very hot, dry and windy weather. The diagrams above demonstrate the area of potential impact where mitigation measures may not be as effective as planned.

Whilst there was discussion about the potential for use of first flush system to be fitted to domestic rainwater capture systems, there was no evidence on their effectiveness or overall practicality for communities that rely on rainwater from their roof for drinking supplies.

8.5.4 Findings

The IAC finds:

- There is a high likelihood for significant dust impacts at sensitive receptors.
- Dust sources could include HMC stockpiles and include flocculant with unquantified health impacts (if any).
- For dust impacted dwellings, there is a high reliance on rainwater for domestic consumption, and a clear risk that dust may not be able to be effectively removed from roofs before it finds its way into rainwater tanks and impacts drinking water.

8.6 Greenhouse gas emissions

8.6.1 Background

The EES assessed greenhouse gas (GHG) emissions in the air quality and greenhouse gas assessment in Appendix 9 of the EES.

8.6.2 Evidence and submissions

Mr Welchman gave evidence in relation to GHG emissions from the Project. His evidence was that annual GHG emissions resulting from mining operations range from 57,530 tCO₂-e³⁹² (Year 9) to 80,148 tCO₂-e (Year 11). Further, annual emissions from the construction and decommissioning periods result in GHG emissions of 18,609 tCO₂-e and 5,022 tCO₂-e respectively.

He gave evidence that based on these estimates, the Proponent would be required to commence National Greenhouse and Energy Reporting (NGER) for the Project in 2019/20 or the first year of operations, and regularly review emissions to identify opportunities for GHG mitigation.

Mr Welchman presented the graph below that shows a breakdown of GHG emissions by scope and source. He said most of the Scope 1 GHG³⁹³ emissions are associated with diesel consumption

³⁸⁸ Document 84, page 13.

³⁸⁹ Document 84, page 13.

³⁹⁰ Document 84, page 14.

³⁹¹ Document 146 Technical Note 7 Dust Deposition Tables.

³⁹² Tonnes of carbon dioxide equivalent.

³⁹³ Scope 1,2 and 3 emissions are defined here: <http://cleanenergyregulator.gov.au/nger/about-the-national-greenhouse-and-energy-reporting-scheme/greenhouse-gases-and-energy>.

of mining equipment and heavy machinery. Electricity usage is predominantly associated with processing operations.

Figure 19 Project GHG emissions by emission source and emission scope³⁹⁴



Mr Welchman's evidence noted that best practice in terms of energy efficiency and associated GHG emissions will be achieved through a range of initiatives including:

- ongoing monitoring and reporting GHG emissions and identifying opportunities to reduce GHG emissions
- equipment selection, operations and maintenance
- load optimisation, production scheduling and logistics planning including route optimisation
- use of solar power to supplement electricity use where practical
- minimisation of grid electricity consumption through power factor correction.

His evidence was the estimated GHG emissions (Scope 3) for train freight of the HMC via the Fernbank East rail siding (Option 3, the preferred transport option for the Project) of 5,406 tCO₂-e are lower than for the other transport options. GHG emissions associated with transport via truck to the Bairnsdale rail siding and rail to the Port of Melbourne (Option 2) are 6,708 tCO₂-e. GHG emissions associated with the combined truck haulage to Port Anthony/train freight via the Maryvale rail siding (Option 1) is the highest of the options considered, 8,208 tCO₂-e.

Following the decision by the Proponent to introduce centrifuges to the Project and IAC Direction 59, Mr Welchman submitted a supplementary expert witness statement³⁹⁵ that assessed the consequences for GHG. His evidence was the introduction of centrifuges would increase GHG emissions by about 15 per cent over years 1 – 15, but that would be offset by reductions in on site vehicle movements with reduction in diesel use, and that amphirols would no longer be used.

Mr Welchman concluded that he expected total emissions of GHG would not be significantly different from what was estimated in the EES air quality assessment because of the introduction of centrifuges.

³⁹⁴ Document 84, page 5.

³⁹⁵ Document 139. As discussed in Chapter 1.2, one of the changes was an increase in electricity demand from 9,000 KVa to 14,000 KVa.

The Proponent tabled the *Kalbar Commitment to Carbon Reduction*³⁹⁶ which includes, in summary:

- The Proponent is committed to reducing net scope 1 and 2 GHG emissions from the Project to achieve a reduction in net GHG of 26-28 per cent below the Project baseline levels by 2030, in line with current Australian government policy, with subsequent emission targets to be set in line with government policy at the time.
- The Project will meet these emission reduction targets through a series of measures including, amongst other initiatives:
 - combining the purchase of electricity from the grid with additional commercial arrangements such as entering into Renewable Power Purchase Agreements with renewable electricity generators
 - investing in emission reduction technologies, where reasonably practicable, through technological advancements (e.g. electrifying any mobile plant / vehicles, and/or using hydrogen powered equipment).
- Where emissions reduction targets cannot be achieved through measures such as those listed above, the Proponent would make up the shortfall through acquiring offsets (such as Australian carbon credit units, certified emission reduction units under the Clean Development Mechanism, or offsets available on the voluntary carbon offsets market).

8.6.3 Discussion

The IAC notes the Project is a very large-scale mining operation that will involve significant earth moving equipment, substantial machinery operations and transport of heavy materials.

The IAC's view is the GHG assessment is acceptable in that it has considered the major contributors to GHG emissions, and appropriate mitigation measures.

The EPA³⁹⁷ notes it is unclear how the commitments the Proponent made in relation to carbon reduction will be given effect in Project approval documentation should the Project proceed. The IAC considers these commitments should be included in the Mitigation Register for the Project, and notes that mitigation measure GHG11 in the updated mitigation register now embraces those commitments.³⁹⁸

The IAC notes the GHG assessment undertaken presumed transport of HMC to the Port of Melbourne. The GHG emissions from transport to the Port of Geelong has not been assessed and should be updated in this respect.

The IAC agrees the preferred HMC transport approach via a dedicated rail siding at Fernbank East, with rail to port, achieves the lowest and best outcome for GHG generation, compared with the other transport options assessed.

8.6.4 Findings

The IAC finds:

- The assessment of likely GHG emissions was appropriate.
- The introduction of centrifuges to the Project is unlikely to substantially change the overall GHG generated from the Project.

³⁹⁶ Document 339.

³⁹⁷ Document 486, para 94 and 95

³⁹⁸ Document 339.

- The GHG emissions of the revised Project as it was described at the end of the Hearing have not been assessed.
- Commitments to further GHG reductions as proposed by the Proponent will need to be given effect to in Project approval documentation should the Project proceed.

8.7 Overall conclusions on air quality

The IAC concludes:

- The Project has a very high likelihood of generating poor air quality outcomes affecting a broad area occupied with dwellings, residents and agricultural workers, livestock and sensitive horticultural businesses.
- With the mitigation measures proposed, there is a high likelihood the Project would generate significant dust which would not be able to be contained on site.
- The Project would only just meet air quality standards with all mitigation measures fully implemented and effective at all times.
- It is unrealistic to assume that all mitigation measures would be perfectly implemented and effective.
- Given the large number of nearby dwellings and horticulture and agriculture operations, the dust impacts from the Project are likely to be significant.
- The dust mitigation measures proposed will likely be ineffective at limiting dust generation, particularly in periods of hot, dry and windy weather.
- The Project should not proceed as it would generate unacceptable amounts of dust and adverse impact on houses, families, and livestock in proximity to the Project.
- If the Project is to proceed, it will require review of the air quality modelling including consideration of new Project elements (for example TSF areas in Perry Gully where centrifuge cake will be stored), erosion from HMC if external stockpiles are used and baseline data from the exploration pit.

9 Noise and vibration

9.1 Introduction

Noise and vibration effects are discussed in EES Chapter 9.6 and in Technical Appendix A010. The noise assessment in Appendix A010 was prepared by Marshall Day Acoustics Pty Ltd (MDA).³⁹⁹

The relevant draft evaluation objective is:

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.

Mitigation measures for noise and vibration were included in the EES in Attachment H. These were, in summary:

- NV03: Acoustic shields for pump stations
- NV06: Contingency procedures and mitigation for noise exceedances
- NV09: Preparation of a noise and vibration sub-plan informed by best practice guidelines
- NV10: Use of broadband reversing beepers on mobile plant
- NV11: Modelling of noise as mining progresses
- NV12: Construction of earth bunds to ensure compliance with EPA guidelines
- NV13: Noise reduction for Mining Unit Plant (MUP)
- NV14: Noise mitigation at the wet concentrator plant
- NV15: Consultation with affected residents to determine if at receptor mitigation needed
- NV16: Commissioning noise testing
- NV17: Scheduling noisier activities at less sensitive times where practicable
- NV18: Informing residents at noise-sensitive receptors
- NV19: Direction of mine void excavation to maximise attenuation
- NV20: Inform personnel about noise management measures
- NV22: Effective silencers on pneumatic tools
- NV23: Turn off plant when not in use
- NV24: Maintenance of plant, machinery and vehicles
- NV25: Switch off truck engines when standing
- NV27: Maintain Project vehicles
- NV28: Truck mufflers
- NV29: Project vehicles minimising noise
- NV31: Mains power to minimise diesel generators
- NV32: Avoiding equipment with intermittent or impulsive noise characteristics
- NV33: Use of equipment quieter than sound values used in noise modelling
- NV34: Construction of the Fernbank East rail siding during daytime hours
- NV35: Induction of employees and contractors on the noise and vibration sub-plan
- NV36: Restriction of B-double haulage movements and rail loading activities at Fernbank

TN relevant in whole or part to noise and vibration included:

- TN 2: Response to expert recommendations
- TN 3: Implementation and enforcement

³⁹⁹ Fingerboards Mineral Sands EES Noise and Vibration Assessment, 25 August 2020.

- TN 4: Sensitive receptors
- TN 5: Scheduling
- TN 13: Additional expert recommendations
- TN 14: Response to Request for Information (RFI) on centrifuges
- TN 17: Response to centrifuge submissions
- TN 25: Compliance enforcement and complaint handling
- TN 40: Independent technical reviewer

The Proponent called expert evidence in noise and vibration as follows.

Table 10 Noise and vibration evidence

Party	Expert	Firm	Evidence
Proponent	Christophe Delaire	Marshall Day Acoustics Pty Ltd	<ul style="list-style-type: none"> - Noise Expert Witness Statement, 30 January 2021⁴⁰⁰ - Revised Noise Supplementary Expert Witness Statement, 7 May 2021⁴⁰¹ - Comments on Mitigation Register in response to EPA⁴⁰²

9.2 Key issues

The issues are:

- compliance with the relevant regulatory criteria across day and night-time
- definition and management of construction compared to operational noise
- social impacts and amenity
- consideration of noise and the GED under the EP Act
- vibration effects, particularly from centrifuges.

9.3 Noise

9.3.1 Background

The noise assessment:

- identified noise policies and guidelines
- identified existing noise-sensitive receptors⁴⁰³
- compiled noise data for the Project, obtained from measurements, equipment manufacturers and British standards
- measured existing ambient and traffic noise levels
- identified terrain profiles for construction and operation scenarios for the subject site and surrounds
- developed representative worst-case operational noise scenarios
- developed representative worst-case construction noise scenarios

⁴⁰⁰ Document 71.

⁴⁰¹ Document 284. Note the original supplementary witness statement (Document 124) was revised to respond to centrifuge submissions in Document 284.

⁴⁰² Document 310.

⁴⁰³ The location of sensitive receptors near the proposed mine site was a contested issue in the Hearing which is addressed in Chapter 2.6.5.

- predicted noise levels at sensitive receptors for the representative scenarios
- developed noise mitigation strategies developed in consultation with industry experts.

The assessment concluded as follows.⁴⁰⁴

(i) Operational noise

The site is proposed to operate 24 hours a day 7 days a week. Night-time activities will require mitigation, including that some equipment will not be permitted to be used at night. Other mitigation at different periods will be needed, including operational restrictions when activities are close to dwellings and at source noise mitigation for some plant and equipment.

The assessment concluded:⁴⁰⁵

The predicted levels have generally demonstrated that with the recommended noise mitigation, noise levels at all relevant assessment locations around the subject site will be within the EPA *Noise from Industry in Regional Victoria* (NIRV) recommended levels for the day, evening and night periods.

The predicted day, evening and night levels and the NIRV criteria are shown in Appendix A010 of the EES.⁴⁰⁶

A dedicated noise management plan is proposed to articulate how compliance with NIRV will be achieved, detailed management and design measures and include community consultation.

(ii) Material transport

The assessment considered the preferred option of on-site haul roads to a new Fernbank rail siding and concluded that predicted noise levels would comply with NIRV criteria.

For an option involving road transport of product⁴⁰⁷, the assessment considered the guidance in the NSW Road Noise Policy (RNP)⁴⁰⁸ and that noise mitigation would not be required. The increase in heavy vehicle movements, however, means there might be increased sleep disturbance. Driving practices and regular vehicle maintenance measures are proposed in response.

The assessment concluded that noise impacts suggest a Fernbank East rail siding option is preferred.

(iii) Construction noise

Construction noise was assessed against the EPA Publication 1254 *Noise Control Guidelines*.⁴⁰⁹ The assessment noted some activities in the construction phase are similar to the operational phase, for example earthmoving.⁴¹⁰ The assessment noted that given the low background noise levels in the quiet rural environment, the construction noise criteria from Publication 1254 for evening and night periods resulted in stricter noise criteria than for operational noise.

⁴⁰⁴ Summarised from Technical Appendix A010 Executive Summary.

⁴⁰⁵ Technical Appendix A010, page 4.

⁴⁰⁶ Tables 20 and 21.

⁴⁰⁷ Either in to the rail siding in Bairnsdale or further afield.

⁴⁰⁸ There is no equivalent legislation or guidelines for increased road noise related to a Project in Victoria apart from the VicRoads Traffic Noise Reduction Policy which applies to freeways and some arterial roads.

⁴⁰⁹ The construction noise component of Publication 1254 was superseded by Publication 1834, *Civil Construction, Demolition and Building Guide* on 26 November 2020.

⁴¹⁰ There was some discussion and questions in the Hearing as to what constitutes 'construction' and 'operation' in the mining context; particular in relation to earthmoving.

The results indicated there might be exceedances of noise criteria at nine nearby properties in the evening and the criteria of construction noise inaudibility at night might not be met at six properties; with the caveat the noise prediction has a range of conservative assumptions.

The assessment concluded that mitigation measures will be needed (management measures and engineering controls) for construction noise for the evening and night period and these will need to be fully developed and documented in the noise management plan.

9.3.2 Centrifuge noise

Centrifuges were not assessed in the EES, but their noise characteristics were outlined in TN1.⁴¹¹ Potential noise impacts were considered in the supplementary expert witness statement prepared by Mr Delaire.⁴¹²

The noise impacts of the centrifuges (in locations provided by the Proponent) were modelled for Years 1, 5, 8 and 12 compared to the use of a TSF with associated plant and amphiboles. The modelling was said to be conservative based on:

- assuming no enclosure for the centrifuges when in practice they will be fully enclosed
- enclosing the centrifuges with sound insulation should result in at least a 15dB reduction in noise emissions
- modelling centrifuge haul trucks as a point source at the centrifuges
- modelling haul truck routes as if the TSFs are still being used when a reduction in haul truck distance is expected with the centrifuges.

The results for the modelling⁴¹³ in summary suggest that NIRV compliance could readily be achieved, with overall predicted noise levels comparable to the TSF proposal. In some locations, the centrifuges were expected to be 2-3dB louder than the TSF option but well within NIRV limits. In operation, these would be much quieter with enclosure and other mitigation.

The assessment concluded:⁴¹⁴

The results therefore demonstrate the viability of the centrifuge-based configuration of the Project with respect to environmental noise levels.

9.3.3 Evidence and submissions

Mr Delaire's⁴¹⁵ evidence largely reflected the material in Appendix A010. He noted that since the MDA report was prepared, the proposed pumping station north of the mine site on the south side of the Mitchell River has been assessed.

Appendix E of Mr Delaire's evidence included a technical memorandum from Mr Adcock of MDA which assessed the pump station noise at the nearest dwelling (R6). The memo concluded the pump station alone and combined with other noise from the site would be within the NIRV criteria for day, evening and night time noise, a position adopted by Mr Delaire.

Mr Delaire noted since the MDA report was prepared, the EPA has issued a new noise protocol (EPA Publication 1826.2 *Noise limit and assessment protocol for the control of noise from*

⁴¹¹ Document 43.

⁴¹² Document 284.

⁴¹³ Attachment B to Document 284.

⁴¹⁴ Document 284, page 4.

⁴¹⁵ He noted that he was a contributor to the MDA report (Appendix A010) and while that was relied on in the EES at Chapter 9, his evidence was based on the MDA work and not the EES.

commercial, industrial and trade premises and entertainment venues -the Noise Protocol) which came into effect on 1 July 2021.

He concluded on the Noise Protocol:⁴¹⁶

The recommended levels and assessment procedures of NIRV are consistent with the Noise Protocol. Demonstrating compliance with the NIRV recommended levels therefore also demonstrates compliance with the criteria of the Noise Protocol.....

He noted the EPA released new construction noise guidance (EPA Publication 1834 *Civil construction, building and demolition guide*), which came into effect in December 2020.

On this guide, his evidence was:⁴¹⁷

The assessment presented in the MDA report based on EPA Publication 1254 meets the assessment requirements of EPA Publication 1834. In particular, with respect to night-time construction work, the assessment in the MDA report adopts a more stringent definition of audibility than suggested by EPA Publication 1834. The construction noise findings of the MDA report therefore remain valid with respect to EPA Publication 1834.....

In relation to construction and operational noise, Mr Delaire reiterated the views in the MDA report in Appendix A010 that noise emissions can be managed to an acceptable level in accordance with EPA guidelines, with a higher level of management and control of construction noise at night being required in some circumstances.⁴¹⁸

Mr Delaire provided additional information around noise in relation to the operation of the Fernbank East rail siding. He noted information from V/Line suggested that a preliminary freight movement schedule at the siding could be undertaken between 7.00am and 10.00pm with daylight only loading and avoidance of night time noise.⁴¹⁹ He suggested noise from additional reach-stackers (for containers) should still meet daytime NIRV requirements.

Mr Delaire reiterated his view the use of B-double trucks on local roads would have a noise impact, particularly at night in terms of sleep disturbance, and should not be preferred on noise grounds.

He reiterated the conclusions in the noise assessment in Appendix A010 that noise will be an important consideration in Project development and will require careful consideration in design, management, and operation to ensure appropriate noise criteria are met.

Mr Delaire proposed several changes to the Mitigation Register based on the EPA submission and his agreement or otherwise was tabled in Document 310.

Mr Delaire was clear in his evidence that he is not an expert on the health impacts of noise or the impacts of noise on animals, whether domestic animals, livestock or native fauna.

He acknowledged under questioning from MFG the experience of noise is subjective and different for different noises and people. For example, a loud noise such as a flock of cockatoos will be experienced differently to a loud noise such as mining or industrial plant.

⁴¹⁶ Document 71, para 5.4.

⁴¹⁷ Document 71, para 5.39.

⁴¹⁸ Mr Delaire was critical of this outcome in a technical sense in that because of low background noise levels in the area, the EPA Publication 1254 method results in more stringent night time noise levels for construction rather than for operation even when using similar machinery, a result he suggested is counterintuitive.

⁴¹⁹ Document 71, Para 5.22 onwards. The IAC notes this appeared to be based on a Melbourne export proposal rather than Geelong export proposal and the implications of this are unclear.

Mr Delaire was clear that inaudibility of noise in Project development is not generally the expectation,⁴²⁰ rather it is about balancing what might be acceptable while allowing the Project to be developed.

The EPA submitted on noise and outlined key issues as:⁴²¹

- (a) ensuring noise and vibration emissions will be minimised as far as reasonably practicable, in accordance with the GED;⁴²²
- (b) ensuring noise modelling and mitigation strategies continue to be developed to respond to immediate and future changes to the Project and its design to implement best practice and minimise noise emissions; and
- (c) the need for substantial revision of the project documentation relating to noise.

The EPA recommended significant drafting changes to the Project documentation in its submission (514) and in the Hearing, culminating in suggested changes to the Mitigation Register (Document 764) and the EMF chapter of the EES (Document 766).⁴²³

The EPA expressed concern and made submissions about the issue of ‘unavoidable works’ at night and suggested wording to better reflect the need for an independent auditor (rather than EPA) determining what such works might be in any given circumstance.⁴²⁴

Significant submissions were put by the EPA around the regulatory regime under the new EP Act. The EPA, in submissions and questioning Mr Delaire, submitted that merely meeting noise criteria under the various guidelines and protocols is not consistent with the GED in the new Act.⁴²⁵ The GED requires minimising risks of harm to human health and the environment as far as reasonably practicable, which in some instances may require measures beyond meeting the minimum standards.

In closing the EPA noted many of the noise issues will require revisiting as the Project itself is refined and finalised:⁴²⁶

In addition, as Mr Delaire has explicitly acknowledged, the noise modelling and mitigation measures for noise will need to be refined and verified. These are matters the EPA submits would greatly benefit from having input and overview by an ITR with relevant noise expertise and experience. Likewise, further consideration should be given at the project design stage as to whether all reasonably practicable measures to reduce noise and vibration impacts have been implemented.

EPA submitted there are additional sensitive receptors (non-dwelling) that will need to be considered in the assessment under the new ERS associated with the new EP Act.⁴²⁷

⁴²⁰ Except in some night circumstances.

⁴²¹ Document 486, para 59.

⁴²² The operation of the General Environmental Duty under the new environmental legislation regime is discussed elsewhere in this report. Mr Delaire in questioning indicated he was not across the detail of the new regime. These are considered in Chapter 21.

⁴²³ The issue of applying the different noise guideline regimes to construction and operation attracted considerable comment in the Hearing with the Proponent preferring to apply the new Noise Protocol to all works, and EPA preferring a regime where EPA Publication 1834 is applied for night time construction noise and ‘unavoidable’ works. Section 25 of the EP Act.

⁴²⁴ Document 742, para 22.

⁴²⁵ EPA submitted the following now need explicit consideration: *tourist establishments, caravan parks, child care centres, kindergartens and primary schools*. Document 486, para 69.

Many individual submitters were concerned about noise from the Project as exhibited and expressed further concerns in relation to noise from the centrifuges. MFG covered many of these issues, including, in summary:⁴²⁸

- failure of the EES to address the scoping requirements for noise in many areas, particularly in relation to health and wellbeing and social impacts
- deficiencies in the noise assessment including lack of accounting for specific equipment and its characteristics and the use of data from the Proponent
- contestable assumptions about vehicle movements and noise emissions from equipment working different soil types
- negative consequences of noise from mining at other sites not properly addressed including tonality
- inappropriate reliance on acclimation as a mitigation measure
- human rights implications of noise; for example noise from the mining operation masking noises they need to hear such as stock in distress
- noise stress to domestic animals, livestock and native fauna
- failure to identify all sensitive receptors⁴²⁹
- lack of rigour in the assessment of traffic and transport, a key input to the noise and vibration assessment
- appropriate levels for night time noise
- proposed mitigation measures for noise.

In its supplementary submission on the centrifuges, MFG submitted:

- inadequate assessment of the machinery associated with centrifuge cake movement
- centrifuge data provided for the noise assessment is seriously flawed due to the limited operating conditions and the real world noise output of the centrifuges would be much higher
- contention the centrifuges will have a negligible effect is not credible and the effect on sleep deprivation will be significant.⁴³⁰

Individual concerns with noise from local residents stressed the quiet ambience of the Project area, and particularly at night, with some noting that noise propagation at night results in existing traffic and train noise being audible at 10 to 15 kilometres in the right conditions.⁴³¹

The concern was frequently expressed about a 24/7 operation in the quiet rural environment and the consequent effects on health and wellbeing and on livelihoods via impacts on livestock.

In its Part C submission, the Proponent provided a detailed rebuttal of issues raised in submissions.⁴³² It submitted there was no serious challenge to the validity of the noise assessment and the methodology was “*appropriate and thorough*”. It went on:⁴³³

As explained by Mr Delaire, the purpose of the NVIA was not to prescribe the only scenario in which mining can achieve acceptable noise outcomes, but to demonstrate the feasibility of conducting the mine on this site and producing acceptable noise outcomes.

⁴²⁸ Submission 813, commencing at Page 499.

⁴²⁹ This issue is addressed in Chapter 2.6.5.

⁴³⁰ Noise was not included in the Human Health Risk Assessment; this is discussed in Chapter 18.

⁴³¹ Mr Ross in his submission to the Hearing for MFG indicated that he could hear equipment from the Donald Mineral Sands Mine at 12km.

⁴³² Document 698.

⁴³³ Document 698, para 372.

The Proponent did not accept there is any inconsistency in the way the Project is put forward, the requirements of the new GED, and the risk-based approach taken in the EES is consistent with the GED.

The Proponent responded to the existence of the low ambient noise environment and noted the relevant noise guidelines take this factor into account.

9.3.4 Discussion

The IAC accepts the noise assessment put forward in the EES by MDA is appropriate to test the feasibility of whether appropriate noise standards can be met at sensitive receptors surrounding the Project Area. Based on this assessment the IAC is satisfied that noise from the Project should be able to be managed to an acceptable level in accordance with the criteria set out in the Noise Protocol and EPA Publication 1834.

Given the acknowledged conceptual nature of the assessment done to date, there remains significant work to be done through development and implementation of construction and operational noise management plans. This will require moving from a conceptual view of the Project to detailed planning including equipment selection, detailed mine planning and staging, specific noise mitigation measures (through at source physical control and mine operational measures) and effective monitoring and enforcement during operation.

In relation to transport noise, it is clear to the IAC that a haul road and Fernbank rail siding will be a far superior outcome to road haulage using B-doubles associated with the Bairnsdale transport option. While there are noise impacts from the rail siding (train movements, loading), using such a facility should provide a greater level of activity control, and thus the ability to manage noise in accordance with the relevant criteria.

The IAC notes the impacts of truck noise for settlements and sensitive receptors on the route to Port Anthony/Barrys Beach was not assessed, but notes this is no longer a preferred option.

Noise impact of the extension to the mining licence area has also not been assessed which may result in an increase in noise experienced at some receptors.

The IAC notes the EPA's submissions the requirements of the GED do not equate to simply meeting the criteria in the Noise Protocol and/or EPA Publication 1834. That would seem to be a 'business as usual' approach. The IAC notes that, if the Project proceeds, the new EP Act will require the Proponent to demonstrate that all reasonably practicable measures to reduce harm to human health and the environment from noise (and other) impacts have been taken. There is not enough evidence before the IAC to conclude this is currently the case, but it is noted that Attachment H (Mitigation Register) has been updated to include reference to the GED.⁴³⁴ The detailed design and development of the Project and noise mitigation strategies and measures will need to explicitly take this new requirement into account.

For noise, given the potential range of physical and managerial mitigation measures possible, the IAC considers that it should be *reasonably practicable* to put in place measures that achieve superior outcomes compared to just meeting the relevant criteria.

The IAC is not suggesting, however, that managing noise to an acceptable level in terms of legally enforceable criteria is the same as managing noise to an acceptable level from the perspective of

⁴³⁴ Document 775.

the local community. As Mr Delaire correctly observed, noise criteria are defined to attempt to find a balance between allowing projects to proceed and acceptable impacts on sensitive receptors. The IAC considers the mine, through construction and its operational life, will significantly adversely affect the noise environment in this quiet and serene rural environment.

Occasional heavy vehicle and machinery noise from agricultural machinery and trucks will be replaced by a foreign 24/7 noise imposition, which while unlikely to be loud enough to cause physiological effects,⁴³⁵ would change the perception of the area for residents and visitors. This will be a real, and in the IAC's view adverse, impact of the Project, in an area with a surrounding population density higher than for many mining projects in Victoria.

The implications of this are not clear but based on submissions to the IAC, it is likely that in some cases there may be adverse mental health responses, potentially some residents moving away and consequent impacts on community structure and cohesion.

Submitters have raised concerns in relation to noise including impacts on livestock and other animals. The IAC considers they are likely to be a lesser order of significance compared to the potential impacts on residents.

9.3.5 Findings

The IAC finds:

- The noise assessment undertaken for the EES is acceptable in terms of methodology and demonstrates that relevant EPA noise criteria should be able to be met.
- The approach to noise mitigation will need to be reviewed and revised to explicitly account for the introduction of the GED under the EP Act
- Even if relevant EPA noise criteria are met, there are likely to be adverse residual noise effects from Project construction and operation given the existing amenity of the surrounding environment.

9.4 Vibration

9.4.1 Background

The vibration assessment:

- identified vibration criteria and guidelines
- measured existing vibration levels at sensitive receptors and along potential transport routes
- predicted vibration levels at sensitive receptors and along the proposed transport route.

The different vibration criteria are outlined in Section 2.3 of Appendix A010 of the EES.

Existing vibration levels on site were measured and are very low. Vibration monitoring of existing conditions along the rail line and the Lindenow-Glenaladale Road⁴³⁶ showed higher vibration levels due to rail and road traffic respectively. The measure of vibration peak particle velocity (PPV) ranged from 5.8-7.0 mm/s for the rail line and 1.6-3.3 mm/s for the road, both measured at 5 metres distance.

⁴³⁵ Provided night time noise can be managed and sleep disturbance prevented.

⁴³⁶ Which could be used as a haul road; a non-preferred option.

The assessment noted there are no significant vibration generating activities proposed such as blasting or piling. The predicted vibration levels from machinery are summarised in Table 11.

Table 11 Predicted vibration levels⁴³⁷

	PPV, 10m, mm/s	PPV, 100m, mm/s
Loader	6-8	
Compactor	5-7	0.14
Bulldozer	2.5-4	

The assessment concluded in summary, that vibration from heavy machinery on site would meet the most stringent criteria at no more than 100 metres and there should not be impacts at sensitive receptors. For comparison, the most stringent long term regulatory goal is a PPV of 2mm/s.⁴³⁸

9.4.2 Centrifuge vibration

There was no review of centrifuge vibration impacts.

9.4.3 Evidence and submissions

Mr Delaire gave evidence on vibration consistent with EES Appendix A010. He advised the Project does not propose vibration generating activities such as piling or blasting. Vibration generated from heavy machinery use on site will be well within accepted criteria at offsite sensitive receptors.

Mr Delaire's evidence did not address the issue of vibration from centrifuges. In response to a question from MFG he indicated that he had no information on the vibration effects of the centrifuges at that time.

Mr Delaire's evidence did not address vibration from centrifuges. In response to a question from MFG, he indicated he had no information on vibration effects of the centrifuges.

Some submitters raised vibration from the Project and centrifuges as a concern. These included Mr Banks⁴³⁹ and Mr Banks⁴⁴⁰ who experienced centrifuges at a mine in Western Australia when working as tour guides. They submitted that workers are time limited near the centrifuges due to vibration impacts on human health.

Mr Dan Banks expressed concern that young children would experience 20 years of vibration from the mine and should be entitled to grow up without such impacts.

Other nearby landowners including Mr Ewan Waller⁴⁴¹ and the Alexanders⁴⁴² expressed concern about the impact of vibration on their farming operations.

⁴³⁷ Summarised from Tables 25 and 26 in Appendix A010.

⁴³⁸ ANZEC *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*, September 1990, Section 2.2.3.

⁴³⁹ Submission 303.

⁴⁴⁰ Submission 94.

⁴⁴¹ Submission 652.

⁴⁴² Submissions 157.

The Colemans⁴⁴³ raised issues about vibration in relation to the soil types in the area, noting they already have issues with vehicles and machinery and were unsure of the effect of centrifuges on soil stability might be.⁴⁴⁴

Several submitters raised issues about foundation stability and vibration for the centrifuges, and whether this may cause issues with soil liquefaction and risk to the centrifuges.

9.4.4 Discussion

The IAC considers that vibration from mobile mining machinery is unlikely to lead to significant environment effects offsite. Based on the evidence of Mr Delaire, the vibration will be well within applicable limits within a relatively short distance of the machinery and is unlikely to be perceptible offsite.

Given the increase in heavy road-based traffic for the life of the Project if a (non-preferred) road-based transport option is undertaken, further investigation of the impact of B-doubles at locations where they pass dwellings sited near roads should be carried out to determine if and where it is appropriate for dilapidation surveys to be undertaken.

Vibration from centrifuges requires further consideration, both in terms of foundation design for the centrifuges themselves and assessment of whether it is likely to require specific management measures to prevent offsite environmental effects.

9.4.5 Findings

The IAC finds:

- Vibration from mining operations should not lead to significant environment effects.
- The centrifuge units should be assessed for vibration to ensure they will not result in any off-site environment effects and that suitable foundations can be provided given the nature of soils on the site and their propensity to liquefaction in some areas.
- If a road transport option is selected for product, further assessment of the likelihood of damage to dwellings on local roads should be undertaken including the need for dilapidation surveys at dwellings near the roadside.

9.5 Overall conclusions on noise and vibration

The IAC concludes:

- Noise from the Project with appropriate mitigation measures can be managed within relevant criteria and standards and can be minimised in accordance with the evaluation objective.
- The application of the GED to noise requires further consideration in Project implementation.
- Given the quiet rural nature of the area, it is likely that adverse noise impacts will occur and the effect on the health and wellbeing of residents and local communities may be adversely affected to some extent.
- Subject to assessment of centrifuges, it is unlikely that vibration from the Project will have adverse effects beyond the Project boundary.

⁴⁴³ Submission 812.

⁴⁴⁴ Particularly in relation to the process of soil liquefaction.

10 Radiation

10.1 Introduction

Radiation issues are discussed in EES Chapter 9 and Technical Reports included in Appendix A011. Appendix A011 was prepared by SGS Radiation Services (SGS).

The Relevant draft evaluation objectives are:

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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

The mitigation measures in EES Attachment H relevant to radiation were, in summary:

- RD01: Radiation - standard operating procedures.
- RD02: Workers – role specific training.
- RD03: Exposure to gamma radiation - minimisation.
- RD04: Generation and inhalation of radioactive dust - minimisation.
- RD05: Operating in accordance with Radiation Regulations.
- RD06: Ingestion of radioactive material - minimisation.
- RD07: Runoff and erosion of soil (which could contain ore) – minimisation.
- RD08: Radiation exposure at the port through handling of HMC – minimisation.
- RD09 Radiation exposure to personnel – minimisation.
- RD10: Generation of dust and inhalation of dust by Project personnel and members of the public - minimisation.
- RD11: Loading of concentrate onto ships - operating conditions.

The Proponent provided the following TN relating to radiation impacts and issues:

- TN19: Evaluation of potential exposures to sensitive receptors associated with metals in dust particulates and fallout.⁴⁴⁵
- TN21: Response to IAC request for Information Dated 10 May 2021 (D294) Q1

A conclave of Radiation and Human Health experts was convened, as was ⁴⁴⁶ a conclave of experts for rehabilitation issues relevant to this theme⁴⁴⁷.

The IAC commissioned Dr Ken Joyner of Joyner and Associates to undertake a review of the radiation assessment, evidence and key submissions.⁴⁴⁸ The IAC also sought advice from the DOH in relation to the potential radiation impacts from the Project.⁴⁴⁹

The IAC benefited from submissions and evidence in its consideration of radiation related impacts. Table 12 lists the Radiation evidence.

⁴⁴⁵ Document 302.

⁴⁴⁶ Document 234 Radiation and Human Health Expert Meeting Statement 19 April 2021.

⁴⁴⁷ Documents 236 and 237 Rehabilitation Expert Meetings Statements.

⁴⁴⁸ Document 9 and Document 541.

⁴⁴⁹ Document 41.

Table 12 Radiation evidence

Party	Expert	Firm/Institution	Evidence
Proponent	Darren Billingsley	SGS Radiation Services	- Radiation Expert Witness Statement, 29 January 2021 ⁴⁵⁰ - Supplementary Radiation Expert Witness Statement, 5 February 2021 ⁴⁵¹
MFG	Assoc. Prof. Gavin Mudd	RMIT University	- Radiation Expert Witness Statement, 29 January 2021 ⁴⁵²
MFG	Assoc. Prof. Tillman Ruff	University of Melbourne	- Health and Radiation Expert Witness Statement, 1 February 2021 ⁴⁵³

10.2 Key issues

The issues are:

- establishing baseline conditions and impacts on the environment and people
- HMC handling, transport and export.

10.3 Baseline conditions

10.3.1 Background

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 on and off the Project Area.

The EES states that:⁴⁵⁴

The main heavy mineral constituents of these sands are the titanium-bearing minerals, predominately ilmenite, but also rutile and leucoxene, as well as zircon, and the rare earth bearing minerals monazite and xenotime.

Uranium and thorium are also present in these minerals, predominantly associated with the zircon and rare earth products. The concentrations of uranium and thorium are generally in trace amounts, except for one of the rare earth minerals, Monazite. Monazite typically contains 5% to 7% thorium and 0.1% to 0.3% uranium (IAEA 2007, p.145).

The EES went on to describe that ore mining and processing can cause elevated radiation exposure to workers and the public and that radiation control measures may be required. The specific pathways are:⁴⁵⁵

- External exposure from the ore body during the mining of ores, during separation of heavy minerals, or from bulk quantities of mineral concentrate;
- External exposure during transport of ore or mineral concentrates;
- Internal exposure from the inhalation of dusts containing elevated levels of radioactive materials;

⁴⁵⁰ Document 72.

⁴⁵¹ Document 125.

⁴⁵² Document 87.

⁴⁵³ Document 89.

⁴⁵⁴ EES Appendix AO11 page 9/89.

⁴⁵⁵ EES Appendix AO11 page 9/89.

- Internal exposure from the inhalation of radon gas released from the minerals during mining or processing operations, or from final products;
- Direct ingestion of material during handling of ores and heavy mineral concentrates and products.

Potential exposure pathways to members of the public include off-site releases of dust or radon gas, contamination of food and water supplies due to the migration of radionuclides from the mine site during mining operations or following the disposal of tailings. Radioactive material associated with the various heavy minerals or tailings may also have the potential to be dispersed in the environment during processing operations if mitigation measures are not implemented.

10.3.2 Evidence and submissions

The Proponent acknowledged that a range of background studies had been completed for the EES but that further radiation testing and monitoring was being undertaken during the Hearing.

Mr Billingsley gave evidence:⁴⁵⁶

- Substantial baseline data has been collected to date.
- The Fingerboards Project/Kalbar will need to comply with the requirements of the Victorian Radiation Act 2005.
- Estimated doses to workers and members of the public are well below regulatory dose limits, even with conservative assumptions applied.
- Impact on non-human species living in natural habitats concluded the radiological impact is insignificant.
- Whilst additional baseline data is warranted to supplement existing data, any results will not modify the outcomes of the impact assessment conducted.

Within the Project Area the studies determined higher existing radiation levels in the Perry Gully where the mineral layers to be mined are close to the surface and partially exposed.

There is a comprehensive regulatory framework relevant to the handling and use of radioactive materials that would apply if the Project were to proceed as outlined in the advice from DOH.⁴⁵⁷

The regulatory system requires the following plans to be approved by DOH:

- Radiation Management Plan (RMP)
- Radioactive Waste Management Plan (RWMP)
- Radiation Environment Plan (REP).

The consensus of the experts, and supported by the DOH, was the studies to date had characterised the materials to be expected in the land, and that current radiation within the environment was consistent within normal background levels.⁴⁵⁸

The key pathways for potential radiation exposure include through dust, water, processing and handling and transport of the HMC.

There was disagreement amongst experts in the conclave, particularly around whether the extent of field testing to date was comprehensive enough given the size of the Project, and in relation to radionuclide testing within the crops grown in the Lindenow Valley to establish a clear baseline for future monitoring.⁴⁵⁹

⁴⁵⁶ Document 305.

⁴⁵⁷ Document 41.

⁴⁵⁸ Document 234 Radiation and Human Health Expert Meeting Statement 19 April 2021.

⁴⁵⁹ Document 234.

DOH⁴⁶⁰, and as recommended by Mr Joyner⁴⁶¹, advised:

There is one additional radiation exposure pathway the department will insist be modelled pre-mining and quantified as far as practicable following the commencement of mining operations. This potential exposure of members of the public is associated with the consumption of meat products in areas that are shown to be impacted by relocation of naturally occurring radionuclides from the mine site to meat producing areas. Based on the department's experience with other mineral sand mining activities and understanding the assessment method and the scale of the potential doses involved, the department anticipates that this radiation exposure pathway will not contribute significantly to the radiation exposure of a member of the public. Nevertheless, the derivation of estimated public radiation doses from this radiation exposure pathway using internationally accepted best practice methods developed by the International Atomic Energy Agency will be required to be submitted to the department as part of a licence application.

Mr Billingsley identified further work that is still required:

- Finer grid gamma radiation survey of mining areas, and areas of exposed ore at the surface.
- Additional groundwater and surface water samples to identify Ra-226/228 concentrations.
- Air sampling for Total Suspended Particulates (TSP)
- Radionuclide content in local crops.
- Commitment to assess impact on livestock for human consumption.
- Preparation of all necessary Management Licence documents including RMP, RWMP and the REP.⁴⁶²

The Proponent agreed that finer grain surveys and frameworks for monitoring were necessary, but these would form part of a RMP and RWMP, should the Project proceed.

Under questioning, Mr Billingsley said he agreed that both radionuclide analysis and airborne dust monitoring could have been undertaken to inform the impact assessment, and that more work is to be done on radionuclide data in crops.

In his evidence for MFG, Dr Mudd said the following regarding SGS's assessment:

- Section 13, the 'Future Work Plan', notes the need for further gamma radiation measurements, including a finer resolution survey – yet I believe this work should have already been completed and presented through the EES process
- The work presented in SGS (2020) includes 10 soils tested for radionuclide content (page 16, Table 2). This is a very small number of tests for such a large project area. Given the variability shown (varying by a factor of almost one hundred), a much larger number of soil samples should have been collected for testing – especially considering rehabilitation criteria and the suitability of different soils and materials for proposed rehabilitation designs⁴⁶³.

Dr Mudd said:

...the 'Future Work Plan', notes the need for further assessment of radionuclides in soils, considering "locations relative to the Project area, crop type, cultivation methods, fertilizer use, and gamma survey field measurements" (page 68, SGS, 2020) – yet I believe this work should have already been completed and presented through the EES process.⁴⁶⁴

⁴⁶⁰ Document 41.

⁴⁶¹ Document 9 at 17.

⁴⁶² Document 305 slide 30 of 32 – Radiation Management Plan (RMP), Radioactive Waste Management Plan (RWMP), Radiation Environment Plan (REP).

⁴⁶³ Document 87 at paras 13, 18 and 20.

⁴⁶⁴ Document 87 at para 24.

In relation to radionuclides in crops Dr Mudd gave evidence:

This sub-section (5.3) [IAC note: of the SGS report Appendix A011] is very short and rather terse – plus the values given in Table 4 are calculated only and not directly measured. The transfer factors are not given, nor a basic explanation of the calculations undertaken to derive the values in Table 4. Although it is asserted the transfer factors are appropriate for the region, there is no direct evidence presented to support this – such as previous scientific studies nor direct sample analyses of crops from the Glenaladale region.

Section 13, the 'Future Work Plan', notes the need to assess radionuclides in vegetables in Lindenow – yet I believe this work should have already been completed and presented through the EES process.⁴⁶⁵

Dr Mudd argued that it was more appropriate for the RMP and RWMP to have been resolved in the EES process and for the IAC to have comprehensive data to rely on.

Mr Billingsley acknowledged the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) *Code of Practice and Safety Guide, Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing*⁴⁶⁶ states that a RWMP is an “integral part of a project” and “should be addressed from the inception of project planning”.

In re-examination Dr Mudd said that he had not seen versions of the RMP or the RWMP and went on to explain that one of the problems he always encountered was these documents were normally confidential between the proponent and the DOH, and that in his view they should be public to improve transparency.

The advice from Mr Joyner⁴⁶⁷ confirmed DOH’s position the RMP, RWMP and REP documents are treated as commercial in confidence and are not released publicly by DOH.

Dr Mudd gave evidence in relation to Post-Mining Criteria for Site Remediation and Rehabilitation that:

- the commitments made in Table 11.2 are generally good but often lack quantitative criteria, making implementation and assessment more difficult.
- “Surface water and groundwater quality reflect original (pre-mining) baseline chemistry” (Table 11.2, page 11-10) – yet there remains insufficient data upon which to define and quantify baseline chemistry (especially radionuclides, see point 28);
- there remains insufficient data to properly define and quantify baseline radiological conditions (see Section 3 previously).
- there appears to be no recognition of the length of time required to actively monitor and maintain the site to ensure the numerous rehabilitation targets and associated criteria are achieved. That is, will monitoring and site maintenance occur for 5 years after the cessation of mining and rehabilitation, or will this be for 25 years, or perhaps longer? There appears to be no discussion of this at all in the EES, despite it being widely recognised in the mining industry that rehabilitation may take several years to decades to achieve (e.g. Bell, 2006; Mulligan, 2006). As a contrasting example, the rehabilitation, monitoring and maintenance of the McArthur River zinc-lead-silver mine in the Northern Territory is expected to take 1,000 years (see METServe, 2017) – demonstrating the extreme acid and metalliferous drainage risks presented by that site⁴⁶⁸.

Dr Mudd maintained there is insufficient data to properly define and quantify baseline radiological conditions to properly define a robust monitoring program and effective management of risks. He

⁴⁶⁵ Document 87 at paras 26 and 27.

⁴⁶⁶ ARPANSA.

⁴⁶⁷ Document 541 at page 13.

⁴⁶⁸ Document 87 at paras 37 and 38.

gave evidence the Project would require very careful management and that dust would be the main issue.

Dr Ruff's evidence included, in summary:

- New evidence shows that radiation risks to health are greater than previously thought and are not adequately reflected in regulatory limits. Health risk exists below the maximum permissible doses for the public and for workers. Radiation health risks associated with chronic diseases approximately double the risks associated with cancer.
- Radiation health risks are 4 - 5 times greater for children than adults and 40% greater for women and girls than for men and boys at all ages. Young adults are more susceptible than older adults.
- I found no mention in any project documentation he reviewed regarding monitoring or radiation protection measures for sites particularly relevant to children, such as schools, kindergartens, child care centres, playgrounds or sports facilities.
- All aspects of project management should aim for radiation exposures for workers and the public which are as low as practicable and well below regulatory limits, and set action levels that would trigger prompt evaluation and response, with involvement of DOH. He would recommend the latter levels (including all exposure pathways) be set at around 1-2 mSv per year for workers and 0.1 - 0.2 mSv/yr for the public.
- Radiation protection measures should be informed by age and gender differences in radiation health risks, and should address settings particularly relevant for children.⁴⁶⁹

Dr Ruff argued there was no lower safe level for radiation exposure, and that as a matter of design and approach, the Project should seek to achieve the lowest potential exposure, not just the maximum allowed by current regulation.

The issue of current versus emerging standards was discussed at the radiation expert conclave.

Dr Ruff recommended that:

Current ICRP⁴⁷⁰ dose coefficients (ICRP 137, 2017) be applied to radiation dose assessment, monitoring and management for the Project

- reflecting 2009 ICRP and WHO⁴⁷¹ doubling of lung cancer risk estimate for radon, and halving of WHO recommended reference level for indoors to 100 Bq/m³⁴⁷².

The Proponent argued that all assessments and decision making should be based on the prevailing laws and regulation at the time.

Dr Ruff said that ARPANSA had issued guidance advice to regulators to the effect:

Regulators are advised to review the above documents and associated annexes [IAC note: referring to standards that have not been updated to impose lower thresholds reflecting the latest scientific research] against their licence holders monitoring programs and dose assessment methodologies. They should decide on an implementation plan for changes from currently used dose coefficients to ones published in this series. Changes should be considered as soon as the new data for the relevant radionuclides is available⁴⁷³.

10.3.3 Discussion

The IAC has heard evidence that risks posed by radiation are most acute when the mineral sands are exposed and in all stages of the HMC processing, handling, and transport.

⁴⁶⁹ Document 89, page 1.

⁴⁷⁰ International Commission on Radiological Protection.

⁴⁷¹ World Health Organisation.

⁴⁷² Document 445 Assoc Tillman Ruff Presentation.

⁴⁷³ Document 445 Assoc Tillman Ruff Presentation.

The retention of Monazite in the HMC increases the radioactivity of the HMC product, in comparison with other mineral sands operations where the Monazite is separated and returned to the ground.

The IAC accepts the evidence that control of dust is a critical issue due to the accumulation of potentially radioactive dust on houses and other structures, in water tanks and through uptake in plants and animals.

The IAC is concerned with the stockpiling of HMC and how it is managed. Stockpiles present the greatest concentration of radioactive material in the process and present a risk for potential dispersal of material through the impact of wind, or through leachate.

It is the IAC's view the assessments undertaken for the EES provide a good basis for conceptual understanding of characteristics of the mine area. However there would have been benefit in undertaking more comprehensive investigations and tests to demonstrate greater confidence that potential issues can be mitigated through subsequent plans that are yet to be developed and that are not subject to any public scrutiny.

The issue of a proposed demonstration pit is discussed in Chapter 1.3 of this report. It is the IAC's view that implementation of the demonstration pit in the preparatory stages of investigation for the Project could have provided further information on radiation exposure and far greater confidence and certainty.

The IAC notes the agreement between the Proponent and agencies the potential exposure of members of the public associated with the consumption of meat products grown in impacted areas should be fully assessed.

The establishment of a robust, reliable, and repeatable monitoring framework that is independently verifiable will be important should the Project proceed.

Whilst it is not normal practice, the IAC believes there is considerable merit in exposing draft radiation management plans to broader scrutiny. This is not to suggest a change to current legislative requirements, but rather to ensure there is greater confidence amongst the community and importantly the agricultural sector about what is proposed in the plans and whether it is likely to be effective.

Due to the radioactive elements being removed from the Project Area within the HMC, the IAC considers the tailings and other materials to be returned to the mine voids would not pose a significant radioactivity risk.

The IAC supports the view the establishment of trigger points within radiation risk management plans that cause review and investigation well before any measure gets close to, or potentially exceeds, relevant maximum dose levels, is prudent and consistent with the GED in the EP Act.

The important principle here is the risk of harm to human health and the environment from radiation must be reduced to the extent reasonably practicable, not just to a point where legal maximums are not exceeded.

The IAC notes the continuing evolution of policy and regulation in relation to the health impacts of radiation. Noting the direction from ARPANSA to regulatory agencies, whilst regulation has not yet caught up with emerging best practice, it would be prudent to update the radiation assessments for the Project, consistent with the advice from ARPANSA.

10.3.4 Findings

The IAC finds:

- The EES, and future work proposed, provide a reasonable basis for understanding the likely risks for radiation exposure and management.
- Additional detailed radiation assessment studies and agricultural and horticultural data collection that will be required by DOH for approval purposes should be completed prior to any overall Project approval being considered, to give certainty through actual data, rather than projections and modelling, the radiation risks to the external environment and human health can be adequately managed.
- Potential contamination off site through the movement of dust is an unresolved risk.
- Should the Project proceed, control of dust must be an absolute priority and be demonstrated to be achievable under all circumstances for the entirety of the Project life, to mitigate risks for accumulation of potentially radioactive dust in houses and other structures, and in water tanks, and through uptake in plants and animals.
- The RMP, RWMP and REP should be subject to public scrutiny whilst in draft form prior to their potential approval by relevant authorities, including engagement with Council, the VFF, PrimeSafe, SRW and EPA.
- The potential exposure of members of the public associated with the consumption of meat products in areas that are shown to be impacted by relocation of naturally occurring radionuclides from the mine site to meat producing areas, should be fully assessed prior to the conclusion any RMP, RWMP and REP and of the issue of any Project approvals, and the determination of the overall mining bond.
- Should the Project proceed, the RMP should include dose trigger points well below current maximum dose levels to drive early intervention and assessment if radiation levels trend upwards. This would represent a best practice approach.
- It would be prudent to update the radiation assessments for the Project, consistent with the advice from ARPANSA.

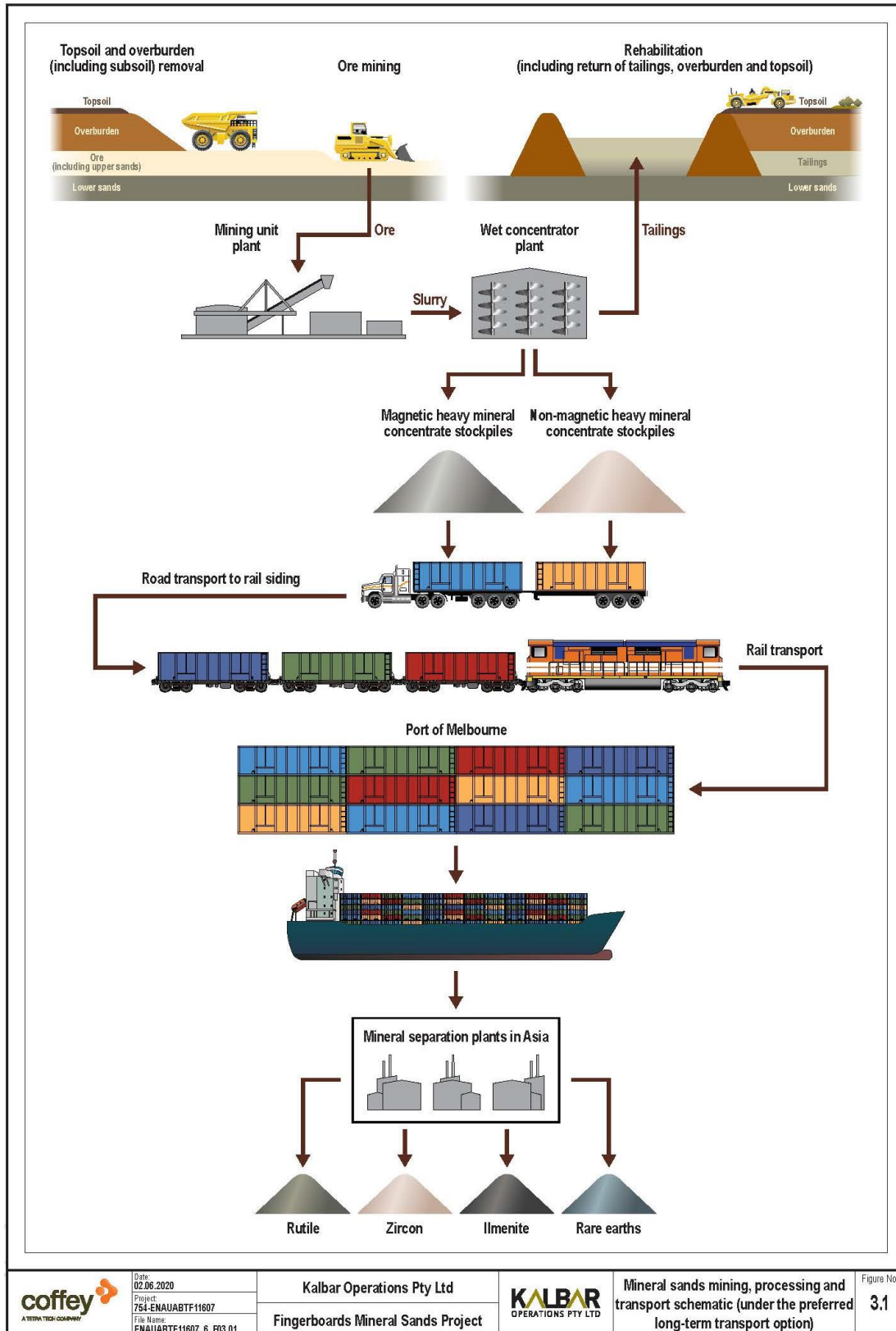
10.4 Heavy Mineral Concentrate handling, transport and export

10.4.1 Background

Materials extracted from the ground are processed through a series of separating processes leading to a stream of coarse and fine tailings to be returned to the mine void, and a magnetic and non-magnetic stream of HMC. The Project proposed the HMC would be transported by truck or rail to either Port Anthony or to the Port of Melbourne for export.

The EES in Chapter 3 – Project Description Figure 3.1 (Figure 20 below) shows the plan for extraction of the HMC and its movement primarily to the Port of Melbourne for export. After the HMC has been separated into the magnetic and non-magnetic components, it is proposed to be stockpiled. The Project is a closed system for movement of the HMC via transport in sealed containers.

Figure 20 Mineral sands mining, processing and transport schematic (under the Proponent’s preferred long-term transport option)⁴⁷⁴



	Date: 02.06.2020	Kalbar Operations Pty Ltd Fingerboards Mineral Sands Project		Mineral sands mining, processing and transport schematic (under the preferred long-term transport option)	Figure No: 3.1
	Project: 754-ENAUABTF11607 File Name: ENAUABTF11607_6_F03.01				

474 EES Chapter 3, page 2.

The Radiation Assessment Report discusses potential exposure to workers involved in transporting the HMC. In respect to the Port of Melbourne, the report says:⁴⁷⁵

Doses to wharf handling operators at the Port of Melbourne depend largely on the quantities of material handled, but also the handling operations. Doses can vary depending on whether containers are loaded 'roll-on-roll-off' (i.e. using a forklift) or using gantry crane and are dependant of wharf facilities available.

If the sealed containers of concentrate are loaded remotely by gantry crane on to the ship, as proposed, there will be no requirement for port workers to be near the containers.

Additionally, it is expected shift rotation will be high and consequently multiple handlers will be involved. Individual radiation doses are expected to be negligible.

The Proponent confirmed the preferred transport mode is via rail from a dedicated rail siding at Fernbank East. Final processing of the HMC will occur overseas.

The Project will generate about 8 million tonnes of HMC from 170 million tonnes of ore. It will export about 0.5 million tonnes of HMC per year during production phases.⁴⁷⁶

Over its life, the Project will export about 185 tonnes of uranium and 1,050 tonnes of thorium within the HMC; the radioactive components would not be separated prior to the HMC leaving the Project site.

The export of this volume of radioactive material has potential implications in relation to Australia's nuclear non-proliferation obligations under international agreements and is a matter that will require consideration and approval by the Commonwealth Government.

10.4.2 Evidence and submissions

Mr Wolmarans, whilst not providing evidence, was called by the Proponent to provide an overview of the Project and used a computerised model to explain the various stages in the ore extraction, processing and transport phases.⁴⁷⁷

Mr Wolmarans explained the HMC is separated into magnetic and non-magnetic materials. He said that uranium and thorium must be retained at specific levels for export reasons and that clean sand is added to achieve the right dilution.

Up to 500,000 tonnes of HMC may be stockpiled on a temporary basis adjacent to the WCP, depending on market demand for the concentrate. This potential stockpiling is confirmed in the amended Draft Work Plan dated 30 April 2021.⁴⁷⁸

The EES describes:

A loading facility will be constructed adjacent to the WCP to stockpile the concentrates awaiting transport to a port via road and rail. The volume of concentrate stockpiles will vary from 5,000 to 50,000 t and will be continuously depleted and replenished as concentrate is removed for transport and new material is added from the WCP. The stockpiled concentrates are dewatered to less than 5% moisture to allow for safe and effective management and handling during transportation and shipping.⁴⁷⁹

⁴⁷⁵ Document 234 Radiation and Human Health Expert Meeting Statement.

⁴⁷⁶ Document 197 – Amended draft work plan P128 of 191.

⁴⁷⁷ The generalized process is described in Chapter 1.1.4.

⁴⁷⁸ Document 197a Amended Draft Workplan April 2021, page 5-4.

⁴⁷⁹ EES Main Report Chapter 06 Project Description, 3/21. The IAC has not been able to resolve the stockpile difference between 5,000-50,000 tonnes in the EES and 500,000 tonnes in the draft Work Plan. 500,000 tonnes of HMC would appear to be a full year of production which would seem unlikely as a stockpile.

Dr Mudd's evidence was that the key issue is how the stockpile is managed rather than its size.⁴⁸⁰

In its Part A Submission, the Proponent submitted that while the schematic illustration of the WCP (extracted in Figure 13 in that submission) was generally representative and shows HMC being stockpiled, HMC is intended to be captured directly in silos and loaded from the silos into containers.⁴⁸¹

Experts at the conclave agreed in principle, the HMC represents the highest concentration of radiation exposure risk, noting that final transport options were still to be settled:

To minimise the public health and environmental impacts of both routine and accidental releases of HMC during handling and transport, every effort should be made to minimise multiple handling and especially dust generating loading of HMC onto and off trucks, and onto ships from wharves, and open storage of HMC at the mine or on wharves or anywhere else. Every effort should also be made to minimise the number and distance of truck movements required to transport the HMC, and preferably to eliminate them altogether. The ideal would be for the HMC to be loaded via as closed a system as possible (eg a closed conveyor or pipe) directly into train-borne containers at or immediately adjacent to the mine site, containers which are then sealed and transported by rail to be shipped offshore⁴⁸².

Dr Ruff, after noting that transport of HMC is the highest exposure risk, said that each step in the movement process is a chance for accidents and for exposure of workers and the public. He gave evidence the handling of the HMC must be minimised as far as feasible and controlled to stop dust generation.

Mr Billingsley gave evidence the HMC is heavy and is kept damp throughout its processing, and therefore did not pose a risk for wind borne dispersal. His evidence was the stockpile could be covered if required with tarpaulins or the like.

The BDEC presented photos of other mineral sands mines demonstrating both water and wind erosion of HMC stockpiles and movement off site of potentially contaminated dust.⁴⁸³

Mr Welchman for the Proponent responded to a question in relation to dust and wind and said the amount of HMC that is expected to be lost to wind had not been modelled. He said the major source of dust was from roads and the land in general.⁴⁸⁴

In response to a question from the IAC, Dr Ruff gave evidence that because the highest radiation risk is in the HMC, the HMC stockpile is a significant risk. He pointed out the Project is in a food growing region with many properties around it. It is not a mine in a remote location. He gave evidence the potential for offsite radiation impacts is increased due to the proximity of surrounding existing uses.

During cross examination of Dr Ruff late on Day 21 of the Hearing, the Proponent advised the HMC was to be exported via the Port of Geelong, with the HMC to be bulk stored at the Port of Geelong before being bulk loaded onto ships for export. This intention was subsequently confirmed in TN39⁴⁸⁵ in response to a Request for Information from the IAC⁴⁸⁶ which sought a succinct summary of what the Project now entailed.

⁴⁸⁰ Dr Mudd examination 2/6/21.

⁴⁸¹ Document 243 Kalbar part A submission – Para 41.

⁴⁸² Document 234 Radiation and Human Health Expert Meeting Statement.

⁴⁸³ Document 667 Submitter 429 - BDEC – Hearing Submission.

⁴⁸⁴ Hearing Day 9.

⁴⁸⁵ Document 537.

⁴⁸⁶ Document 401.

10.4.3 Discussion

The effectiveness of dust control within the overall Project will be a crucial factor in managing the risk for radiation impacts beyond the Project Area. Dust impacts are discussed in Chapter 8. In summary, the IAC finds there is a high likelihood the Project would generate significant offsite dust and given the large number of nearby dwellings and horticulture and agriculture operations, the dust impacts from the Project are likely to be very significant.

It considers that it is unrealistic to assume that all dust mitigation measures would be perfectly implemented and effective. Given this, the IAC considers the risk for nearby dwellings and existing horticultural and agriculture industries of potential radiation from the Project by way of dust remains unquantified and potentially significant.

The assessment of radiation risks in relation to processing and handling of the HMC demonstrates the HMC will be contained within largely closed systems in a damp condition. However, the IAC notes the Proponent's submissions and tabled documents are inconsistent as to whether there will be any stockpiling of HMC adjacent to the process plant and the scale of stockpile.

Whilst the Proponent described the use of onsite silos from which containers on the back of trucks would be filled with HMC and then transported to the proposed Fernbank East rail siding. There is no material before the IAC that confirms the scale of the silos, the volume of material they would store or their management. For example, the IAC does not have before it an assessment of the risks to workers who may need to service the silos (e.g. in the event of a blockage) and how those risks would be minimised.

Consistent with the advice of the radiation experts, the IAC believes that all stages of the HMC processing, storage, loading for freight and transport to ship should be via a closed system in a weatherproof structure designed to ensure total capture and treatment of any leachate or process water that may emerge from the HMC. Of particular concern is the need for stockpiling at the process plant if there are freight delays, and at the Port of Geelong prior to bulk loading of ships.

If outside stockpiles are used, separate to silos, the IAC considers any HMC should be in a weather-proof structures designed to prevent rainfall ingress and ensure capture and treatment of any leachate or process water that may emerge from the HMC. Movement of HMC into and out of a fully sealed stockpile facility should be via a closed system arrangement.

The EES and subsequent documents do not assess potential radiation risks of rail transport of HMC through Melbourne. The IAC notes with concern the Proponent defers these matters to future management plans yet to be developed, without having addressed at this stage the feasibility, appropriateness and impacts of what is proposed, particularly in the context the material to be transported will include monazite.

Whilst transport of the HMC via sealed rail containers presents a relatively safe option, there is always the potential for accidents to occur. Accordingly, the IAC believes it is important that an integrated emergency response plan be developed with all relevant agencies.

The IAC is concerned with the Proponent's late advice that bulk storage and export of the HMC would be via the Port of Geelong. This aspect of the Project was not:

- to the IAC's knowledge discussed in the Technical Reference Group
- assessed in the EES or in subsequent work presented during the Hearing
- subject to submissions or evidence by parties to the Hearing.

Bulk storage at port and bulk transfer to ships raises potentially significant new risks to human health and the environment including Port Phillip Bay that are not assessed in the EES. The radiation experts agree the HMC should be contained to minimise direct exposure or escape of the material during the transport process; this would be critical in design of a bulk transfer system.

The Proponent defers any consideration of these matters to future management plans, that it says, would be the responsibility of the port or the transport entity to settle with regulatory authorities. The IAC believes that this approach is inappropriate. The purpose of the EES was to consider all aspects of the Project to allow an informed and integrated assessment of the impacts. The Scoping Requirements are clear in this respect. The Proponent has not met the expectations set out in the Requirements for this issue.

The IAC understands the Port Anthony options are not being considered at the present time. If they were to be pursued impact assessment would be required, including for settlements along the route.

10.4.4 Findings

The IAC finds:

- The HMC should be managed in a closed system and kept in a damp condition to minimise risk of dispersal by wind and dust.
- While requiring further plans to be developed, the transport of HMC via containerised sealed systems and rail is appropriate.
- It is not clear whether silos or stockpiles or both will be used onsite for HMC storage.
- If HMC is stockpiled, it should be in a totally sealed system preventing water ingress and capable of containing and treating any water runoff and ensuring that HMC is not lost to wind erosion.
- An integrated emergency response plan will need to be developed with relevant emergency response agencies in the event of an accident within the rail system.
- The impacts and risks of transporting the HMC through Melbourne and its major rail stations and bulk storage and bulk loading at the Port of Geelong have not been assessed and have therefore not met the evaluation objectives.
- Bulk storage, handling and loading of the HMC for export via ship would need to adopt a closed/sealed approach at all stages.
- Subject to the adoption of best practice and use of a sealed systems approach throughout the HMC process, radiation risks to the environment and the public should be able to be managed effectively.

10.5 Overall conclusions on radiation

The IAC concludes:

- The assessment of radiation risk is appropriate, but incomplete.
- Additional radiation assessment studies and agricultural and horticultural data collection required by DOH for approval purposes, should be completed prior to any overall Project approval being considered.
- Potential radioactive contamination via movement of dust represents an unresolved risk to people and the environment.
- Should the Project proceed, the RMP should include dose trigger points well below current maximum dose levels to trigger early intervention and assessment of why

radiation is trending upward. This would represent a best practice approach rather than investigation when mandated trigger points are reached.

- Subject to the adoption of best practice and use of a sealed systems approach throughout the HMC handling and transport process, radiation risks to the environment and the public, associated with the movement of HMC, should be able to be managed effectively.
- The impact of rail transport through Melbourne and bulk shipping from the Port of Geelong has not been assessed.

11 Traffic and transport

11.1 Introduction

Traffic and transport are discussed in EES Chapter 7 and 9 and technical reports included in Appendix A0012 Traffic and Transport Impact Assessment (TTIA)⁴⁸⁷.

The Relevant draft evaluation objectives are:

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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

The EES proposes mitigation measures manage the traffic and transport impacts, in summary:

- TT01: Upgrade the intersection of Princes Highway and Lindenow-Glenaladale Road
- TT02: A traffic management plan
- TT03: Lighting at a range of intersections
- TT04: Flag lighting
- TT05: Audits and permits prior to the movement of oversize and over mass vehicles
- TT06: Oversize and over mass vehicle movements - avoid peak and school bus hour
- TT07: A channelised right-turn treatment
- TT10: Diverted and realigned road construction standards
- TT11: New intersections constructed to Austroads standard
- TT12: No overtaking line markings
- TT13: Boom installation at the level crossing on Lindenow-Glenaladale Road
- TT14: Rumble or shaker strips provision
- TT15: The proposed new Fingerboards roundabout design
- TT17: Road closure alternative routes identification
- TT18: New intersections construction management
- TT19: Roadworks and temporary traffic management approval
- TT20: Informing Emergency services of potential road delays
- TT21: Timing for roadworks affecting the Princes Highway
- TT22: Construction environmental management plan and environmental management plan.
- TT23: B-double operating time limitations
- TT24: B-doubles queuing onto the level crossing at Maryvale rail siding
- TT25: Heavy mineral concentrate haulage via Lindenow South timing
- TT26: Pavement damage repair
- TT28: B-double movements to Fernbank East rail siding
- TT29: B-double movements to Bairnsdale rail siding – Racecourse Road
- TT30: B-double movements to Bairnsdale rail siding – Forge Creek Road
- TT31: B-double movements to Bairnsdale - Princes Highway and Racecourse Road roundabout.

⁴⁸⁷ EES Appendix A012 Traffic and Transport Impact Assessment.

Relevant TN in whole or in part to Traffic and Transport issues included:

- TN39: Project overview
- TN32: Change to the mining Licence Application Area
- TN25 Compliance enforcement and complaint handling process
- TN4 Sensitive Receptors.

The IAC benefited from submissions and evidence in its consideration of transport related impacts. Table 13 lists the transport evidence.

Table 13 Traffic and transport evidence

Party	Expert	Firm	Evidence
Proponent	Paul Carter	ARUP	- Traffic and Transport Expert Witness Statement, 2 February 2021 ⁴⁸⁸ - Supplementary Traffic and Transport Expert Witness Statement, 8 February 2021 ⁴⁸⁹
Council	Stephen Hunt	Ratio	- Traffic Engineering Expert Witness Statement 1 February 2021 ⁴⁹⁰

A traffic and transport expert meeting statement was also produced.⁴⁹¹

11.2 Key issues

Traffic and transport issues largely revolve around road deviations and design associated with the immediate Project Area, transport of the HMC to port for export, and amenity and safety consequences associated with the changed conditions expected.

The issues are:

- baseline conditions and network capacity
- construction versus operational phases
- road deviations
- haul road and Fernbank East proposed rail siding
- Bairnsdale Freight Terminal
- HMC transport to port.

11.3 Baseline conditions and network capacity

11.3.1 Background

The TTIA:

- Identified the primary transport options and routes proposed to be used
- Assessed current and projected traffic volumes
- Assessed the functionality, safety and amenity impacts associated with the potential transport options.

⁴⁸⁸ Document 83.

⁴⁸⁹ Document 137.

⁴⁹⁰ Document 98.

⁴⁹¹ Document 233 Traffic and Transport Expert meeting Statement (Direction21) 16 April 2021.

The key assumptions underpinning the TTIA included in summary:

(i) Construction activities

- Construction period of two years, with up to 130 workers on site on a typical day, with 75 per cent working during the day and 25 per cent working during the night.
- Generation of 150 return trips a day at the peak of construction activities, consisting of 20 heavy vehicle and 130 light vehicle return trips. Daily traffic generation is expected to be consistent across a 7-day week.
- The 20 return truck movements per day during construction is expected for construction plant and materials, including deliveries of crushed rock and concrete, pipes and building materials.
- It is assumed 75 per cent of materials sourcing vehicles trips will be from the east and 25 per cent from the west.
- Workforce are expected to be accommodated in nearby towns of Lindenow, Bairnsdale, Briagolong, Stratford and Sale.

(ii) Operation activities

- The mine is expected to be operational for up to 20 years (minus construction time).
- Total operations workforce is approximately 200 people working shifts, with a workforce of approximately 120 on site on a typical day.
- Two shifts, with a maximum of 90 people during the day shift and remaining 30 people during the nightshift.
- Traffic generation is expected to be consistent across a 7-day week and assumed conservatively that the workforce will travel by light vehicle with the same distribution as the construction workforce (same workforce origins).
- Transport of product will require B-doubles, expected to generate approximately 40 return trips per day, operating 24 hours a day, seven days a week⁴⁹².

(iii) HMC Transport

The TTIA considered a range of road transport options for movement of the HMC to an export port broadly including 50 per cent to Port Anthony or the Barry Beach Marine Terminal via the South Gippsland Highway, and 50 per cent by road to rail siding at Maryvale via the Princes Highway then rail to the Port of Melbourne.

The assessment was focussed on the preferred option of HMC movement via a new rail siding at Fernbank East, with the second option being from the existing Bairnsdale rail siding.

Alternative routes to the Bairnsdale rail siding are considered in the TTIA for two sections:

- Between the site and Princes Highway, Bairnsdale
 - via Lindenow – Glenaladale Road – Princes Highway, and
 - via Bairnsdale - Dargo Road
- Between Princes Highway and the siding
 - via Racecourse Road, Forge Creek Road South and Bosworth Road
 - via Main Street, Collins Street and Bosworth Road
 - via Main Street, Forge Creek Road North and Bosworth Road.

⁴⁹² Note the evidence of Mr Carter indicates that B Double trucks would also be used if HMC road transport was only via the proposed private haul road.

(iv) TTIA conclusion

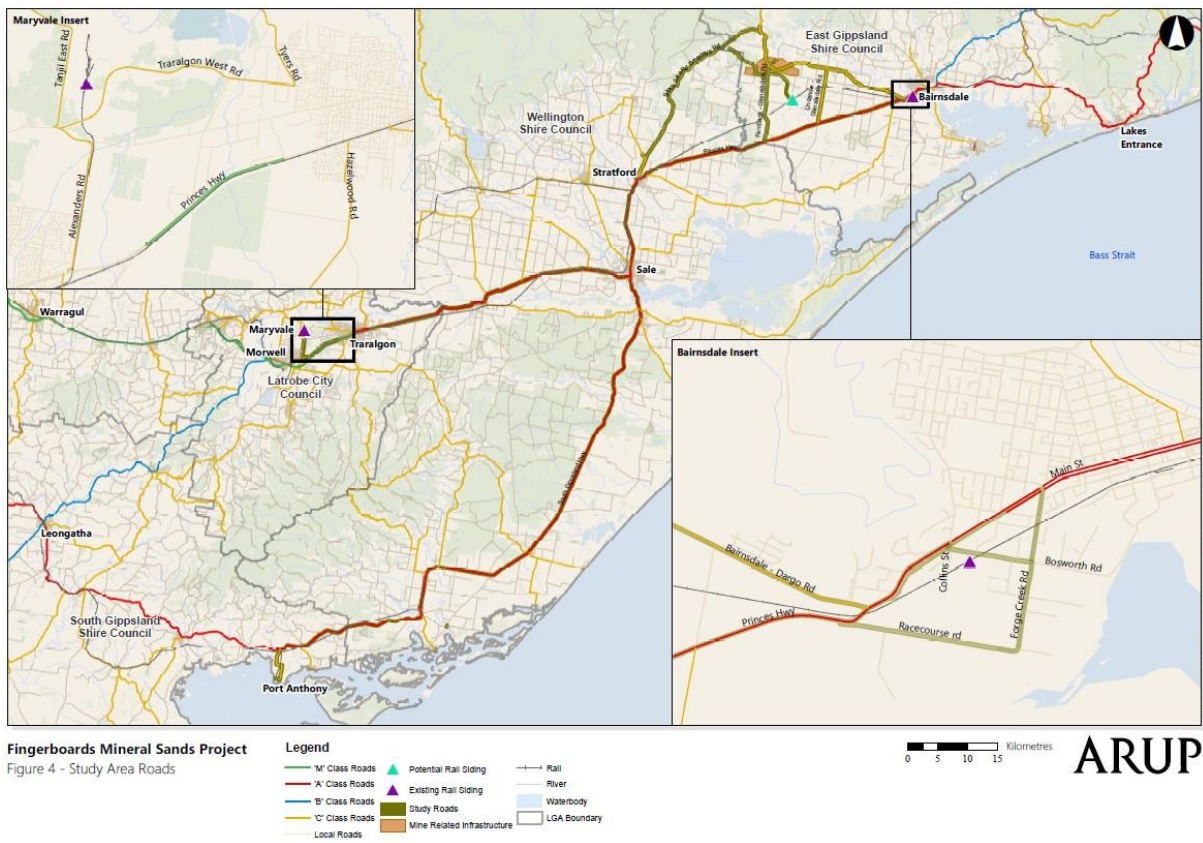
The TTIA concluded in summary the road network has the capacity to deal with the projected increases in traffic volumes, and the range of intersection and other treatments proposed would achieve acceptable safety and transport functionality outcomes.

11.3.2 Evidence and submissions

Mr Carter gave evidence the existing conditions assessment encompassed all the product transport options.⁴⁹³ The study placed particular emphasis on the impact to local roads and the connections between the Project Area and Princes Highway. It focused less on Princes Highway and South Gippsland Highway due to their current classification as B-double approved roads of a high standard.

The roads considered in the assessment are shown in the diagram below.

Figure 21 Study Area Roads⁴⁹⁴



There was consensus between the experts that the study process and methodology generally satisfy the requirements of the EES. It was not agreed by the experts there was sufficient traffic count and characterisation data for all the roads likely to be impacted to fully understand the amenity and potential safety, functionality and feasibility issues that might arise.⁴⁹⁵

Mr Carter’s evidence was:

493 Document 83.
494 EES Appendix A012, page 17.
495 Document 233.

- The majority of roads are declared roads, approved for B-double usage with the exception of Racecourse Road for which East Gippsland Shire Council is the responsible authority.
- The assessment indicates all intersections and road links are expected to have no issues from a capacity perspective during normal school term periods during hours when the project workforce is expected to commute. Given the distribution of B-double traffic throughout the day (3-4 on way movements per hour), no significant impacts are expected from product transport during normal weekday periods⁴⁹⁶.

In its submission, DOT said:

The Department is unable to support the delivery of this project as the transport and traffic impacts have not been adequately assessed, mitigated or responded to and would have a negative impact on the safe and operational management of the transport network⁴⁹⁷.

DOT said:

On balance, the road safety outcomes that are achieved from removing the potential for conflict with the Fernbank siding is preferable. However, it is acknowledged that this option will result in significant cost, assessment, design and rail agreement, which may render this option unfeasible. The Department maintains that both options must be fully examined and further discussions are required with the Proponent and the transport system managers⁴⁹⁸.

DOT said the conclave of traffic experts had focussed on traffic volumes, not the functionality of the road system. DOT was concerned about the potential impacts on functionality of the Princes Highway, particularly with B Double trucks entering the highway at the intersection with the Lindenow - Glenaladale Road, where the Highway has a 100 km/h speed limit. DOT believed the roundabout proposed by the Proponent would impact the functional objective for a Highway, and importantly there was insufficient land within the road reserve to establish a roundabout to accepted standards.⁴⁹⁹

Mr Hunt during his evidence said:

The existing conditions base is cursory at best and does not provide a sound basis for understanding operational impacts. Data used does not distinguish what sort of traffic is currently using the roads – eg no distinction between farm vehicles, big trucks etc.

Assessment of additional traffic volumes and distribution is rigorous, but we do not understand what the traffic use currently is. We do not know how many B Doubles are currently going through Glenaladale South for example. Currently we cannot understand relative changes that will occur. Conclave – needs to be a comprehensive 7 day tube counts undertaken to form a proper base line. It is required anyway in order to get later approvals⁵⁰⁰.

During examination of Mr Hunt, the Proponent argued that additional traffic counts, detailed design, mitigation measures and the like could all be dealt with through a Traffic Management Plan. Under examination Mr Hunt was asked “*subject to option 1 (Fernbank East rail siding) are there any fundamental show stoppers*”. Mr Hunt replied there were not.

In response to a question from the IAC Mr Hunt said, in summary, it is unclear what is being approved and what the actual impacts will be; it is for other to decide whether enough is known about the true impacts.

⁴⁹⁶ Document 83, pages 14 and 18.

⁴⁹⁷ Submission 632.

⁴⁹⁸ Document 376.

⁴⁹⁹ Document 376 Submitter 632 – Department of Transport – Hearing Submission.

⁵⁰⁰ Document 394 Traffic Engineering Advice Stephen Hunt – Ration Consultants.

Mr Wheeler in his submission said the potential traffic and noise impacts if HMC was transported by road to Maryvale or Port Anthony had not been assessed. He said there are very few B Double trucks going through towns such as Yarram, and the Project could cause significant new impacts for towns on the proposed route. He showed photos of current traffic conflicts in Sale with B Double trucks, roundabouts and school traffic. He said these issues were not assessed in the EES.⁵⁰¹

A number of local farmers submitted that they use roads in the Project area for frequent driving of livestock between different properties, and this could no longer occur during the life of the mine.⁵⁰²

11.3.3 Discussion

The TTIA presents a high-level assessment of the impacted transport network and the likely scale of increased traffic resulting from the construction, operational and rehabilitation and decommissioning stages of the Project.

The IAC accepts the evidence and consensus the overall volumes of traffic involved are manageable within the capacity of current road infrastructure.

There is not consensus the TTIA fully assesses the feasibility of several of the traffic measures that may be required depending on what option is progressed. For example, there is doubt that roundabouts that are expected to be required can actually be achieved within the available road reserve. Whilst the Proponent has given assurances that it will purchase any land required, the methods and feasibility of that are uncertain.

There is consensus the proposed Fernbank East rail siding has the best overall outcomes in terms of traffic and amenity impacts. However, as DOT noted, it is not a certainty that the option would be approved or is feasible.

The IAC notes that TTIA has not assessed the potential impacts associated with the possible transport of HMC by truck to Maryvale or Port Anthony. It is noted however the Proponent through the course of the Hearings, was very clear the preferred option for HMC transport is rail, either from a dedicated new rail siding at Fernbank East or from the existing Bairnsdale rail freight terminal.

If the option of HMC rail freight from Bairnsdale was adopted, there would be consequences for the functionality of the Princes Highway as it is highly likely that roundabouts would need to be installed for safety reasons, with a consequential impact for the high-speed flow of other traffic on the Highway.

The IAC notes the TTIA presented a basic level of information about the likely impacts of the Project but has not collected or assessed the full consequences. More detailed traffic counts and impact assessment would be required for a Traffic and Transport Management Plan (TTMP) and detailed approvals should the Project proceed. The IAC's view is it is essential the full traffic impacts of the Project are understood sufficiently to have the confidence the mitigation measures proposed would be effective.

⁵⁰¹ Submission 34.

⁵⁰² The IAC observed sheep being moved along Fernbank – Glenaladale Road near the Fingerboards during one of its visits.

The TTMP should include appropriate measures to ensure local livestock movements can be accommodated via alternative routes or truck transport.

11.3.4 Findings

The IAC finds:

- The Project should not adversely affect the overall transport system capacity.
- The least traffic and amenity impact is achieved if the Fernbank East rail siding is feasible and approved for HMC transport to Port.
- The TTIA has not provided sufficient current traffic count data to fully inform understanding of impacts, changes in the characteristics of traffic using different roads and the consequences for different communities and parts of the road network to effectively inform primary approval decisions.
- New roundabouts on the Princes Highway would adversely impact the flow characteristics of the current highway.

11.4 Road deviations

11.4.1 Background

The EES proposes that, in conjunction with the Project, a number of roads will be realigned or diverted. The road deviations proposed are described in Table 14.

Table 14 Proposed road alignment, diversions and upgrades in project area throughout key project stages⁵⁰³

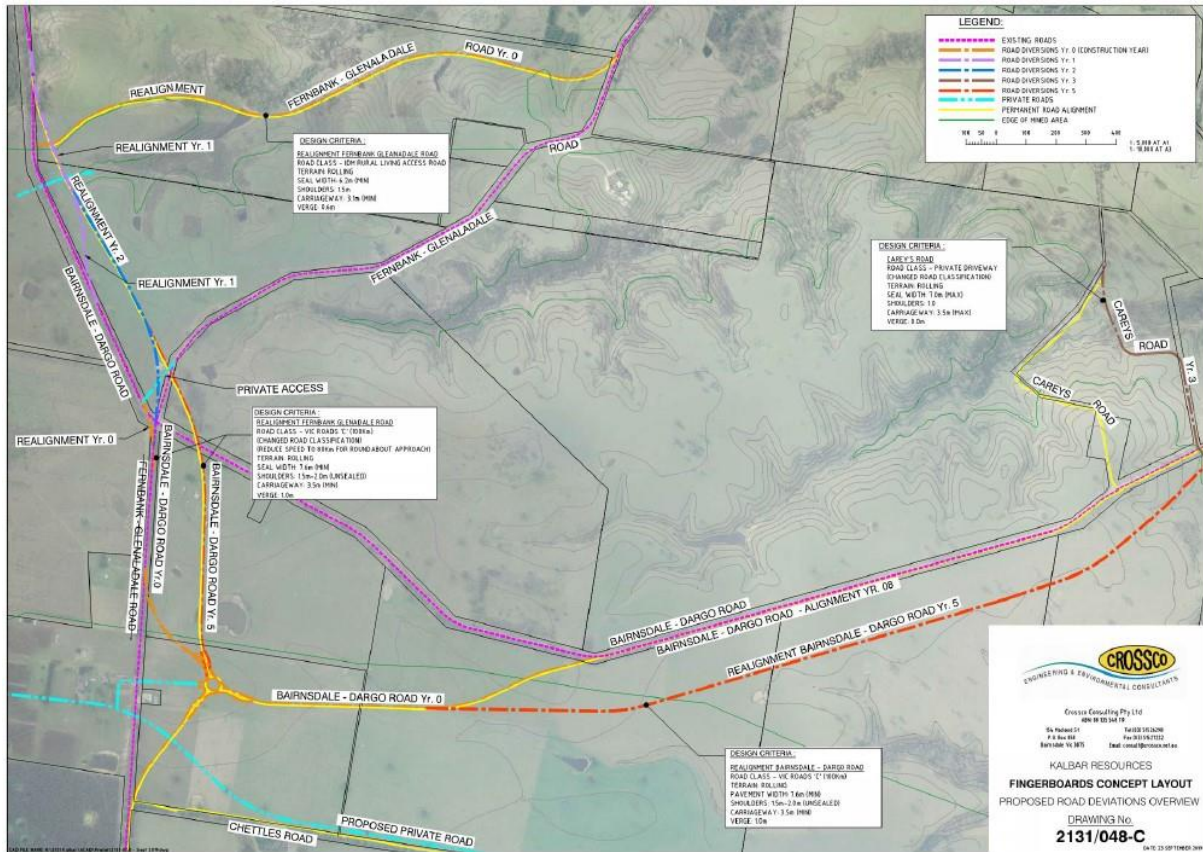
Timing	Proposed upgrades
Year 0 – Construction	<ul style="list-style-type: none"> • Construction of new Fingerboards roundabout 1 km south of existing Fingerboards intersection. • Partial permanent diversion of existing Bairnsdale-Dargo Road to intersect Fernbank-Glenaladale Road at the new Fingerboards roundabout. • Relocation of Fernbank-Glenaladale Road at Chettles Road to intersect Bairnsdale-Dargo Road at the new Fingerboards roundabout. • Removal of existing Fernbank-Glenaladale Road north of the new Fingerboards roundabout. • Permanent relocation of Fernbank-Glenaladale Road to intersect the existing Bairnsdale-Dargo Road 1 km north of existing Fingerboards intersection. • Construction of private haulage road parallel to Chettles Road. • Construction of heavy vehicle underpass beneath Bairnsdale-Dargo Road approximately 800 m north of existing Fingerboards intersection.
Year 1	<ul style="list-style-type: none"> • Diversion of Bairnsdale-Dargo Road 500 m north of the existing Fingerboards intersection.
Year 2	<ul style="list-style-type: none"> • Diversion of Bairnsdale-Dargo Road between the existing Fingerboards intersection and heavy vehicle underpass.
Year 3	<ul style="list-style-type: none"> • Diversion of existing Careys Road to 250 m east of its current alignment.
Year 5	<ul style="list-style-type: none"> • Diversion of existing Bairnsdale-Dargo Road from west of the new Careys Road to the previously diverted section (see year 0). • Diversion of Bairnsdale-Dargo Road between the previously diverted section (see year 2) and the new Fingerboards roundabout. • Realignment of the new Fingerboards roundabout to include alignment with Bairnsdale-Dargo Road (see above). • Extension of new Careys Road to intersect diverted Bairnsdale-Dargo Road.

⁵⁰³ EES Chapter 3, pp 37-38.

Year 8	<ul style="list-style-type: none"> Reinstatement of diverted Bairnsdale-Dargo Road to original alignment between Careys Road and permanently relocated Bairnsdale-Dargo Road (see year 0).
Year 10	<ul style="list-style-type: none"> Reinstatement of Careys Road to original alignment.

The proposed road deviations as exhibited are shown below.

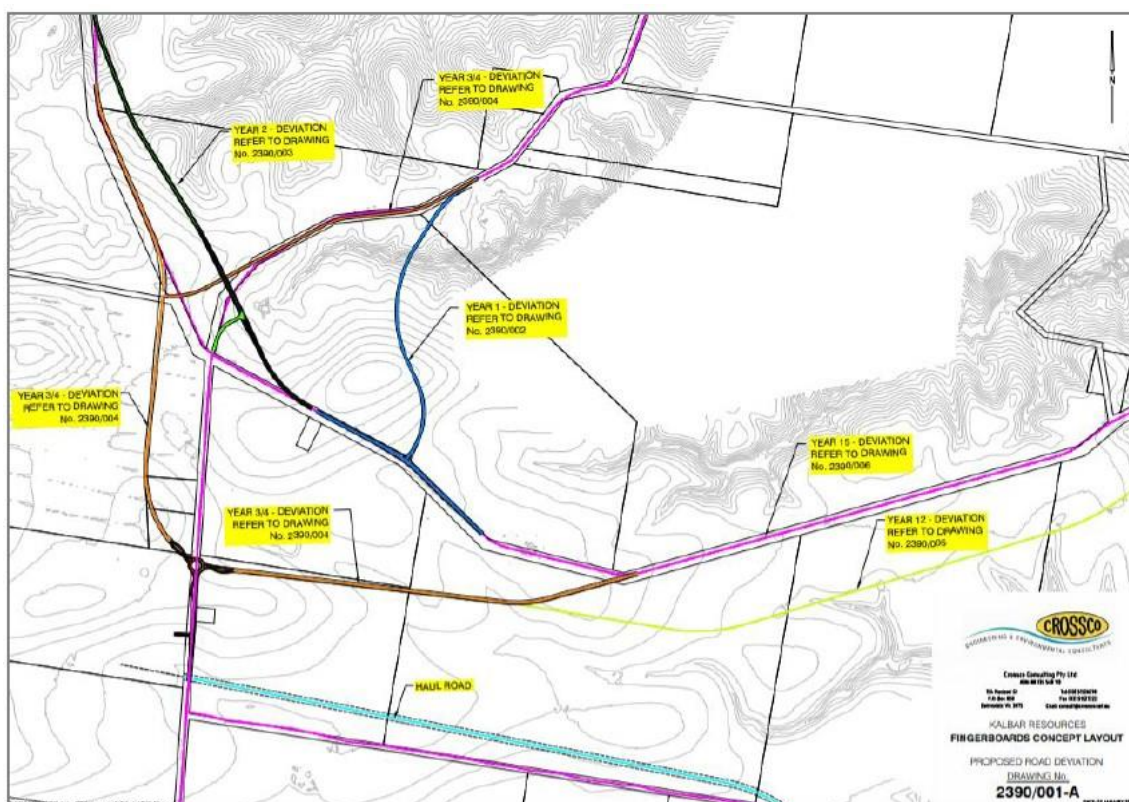
Figure 22 Overview of proposed road network diversions and staging⁵⁰⁴



In January 2021 the Proponent advised DOT of updated road deviation diagrams and the rationale for the changes to what was exhibited in the EES.⁵⁰⁵ In summary the reasons were to achieve better alignment with land the Proponent had control over, to avoid topographical features, better align with the likely mining sequence, and to achieve better conformity with the Austroads design guidelines.

The updated road deviations and general layout are shown below.

504 EES Appendix A012, page 30.
 505 Document 44 Email from Kalbar to DOT.

Figure 23 January – proposed network plans – diversions and staging⁵⁰⁶

11.4.2 Evidence and submissions

The Proponent said that proposed deviations as exhibited in the EES and the revised January 2021 deviations achieved about the same functionality. The Proponent submitted the revised deviations are the preferred road layout for staging and efficiency reasons whilst acknowledging the road authorities will likely require refinements.⁵⁰⁷

The DOT said that Bairnsdale - Dargo Road is an existing declared arterial road that is on land the Project seeks to mine and said in its submission after the January 2021 deviations:⁵⁰⁸

- Importantly it is not yet clear to the Department what land the Proponent has been able to secure for the new Dargo Road and whether any such land access arrangement is either temporary or permanent.
- The Department will not act as an acquiring authority for any of the required land for a road purpose to support the mine operation. It is the responsibility of the Proponent to ensure the planning, ownership/lease arrangements, design, construction and eventual remediation of the Dargo Road occurs.
- The Department is also concerned about the potential to create new/increased number of access from rural properties on to Dargo Road, thus increasing the potential transport user conflict. The Department requires further detail on how these issues will be managed.
- Based on the information in the EES, the Project involves the temporary relocation of sections of the Dargo Road, a declared arterial road under *the Road Management Act 2004*. Once the Project is complete, the temporary road will be removed, Dargo Road will be reinstated, and land will be rehabilitated.

⁵⁰⁶ Document 537 Technical Note 39, page 3.

⁵⁰⁷ Document 539 Technical Note 39 Project Overview.

⁵⁰⁸ Document 376 Department of Transport Hearing Submission.

- The Department supports this approach on the condition the Proponent provides security in the form of an unconditional bond or bank guarantee to cover the cost of any works required to remove temporary roads, reinstate Dargo Road and rehabilitate land in the event the Proponent defaults on its agreement to carry out this work to the satisfaction of and at no cost to the Head, Transport for Victoria.

DOT also said:

The Department submits the level of investigation informing the EES and PSA has provided minimal detail regarding:

- the proposed road and intersection alignments and design;
- the rail siding location and design;
- the land required for the proposed road and rail infrastructure, ownership of such land and how the use of such land will be secured;
- the type of materials and construction method for the backfill of the mine for the areas where the Dargo Road is to be reinstated whether the proposed road infrastructure is temporary or permanent;
- the decommissioning and remediation required following the closure of the Project; and
- the potential requirement for short term road haulage of product, or alternative road haulage routes if the preferred transportation method of rail is disrupted.

The IAC asked DOT if it had previous experience at this scale in relation to the relocation of a declared arterial road. The DOT response was:

- The Department is not aware of a similar project that has required the temporary relocation of a declared arterial road within Victoria, particularly at the scale proposed as part of the Fingerboards Mineral Sands Project.
- The Department has received requests to permanently deviate sections of declared arterial road associated with external projects.
- In the Gippsland region, this has included sections of the Strzelecki Highway and Hyland Highway (declared arterial roads) that were permanently deviated to allow for the expansion of mining activities for the Hazelwood and Loy Lang open cut mines respectively.
- The associated land tenure for the deviation of these sections of arterial road where resolved by the proponent, where the mines owned the land which was subsequently vested as road to the Department of Transport.

Council said that:

Consistent with Mr Hunt's evidence, it is not the Council's case that it is impossible to produce a safe and workable traffic outcome.

...

The Council's concern is the EES, taking in the additional material and considerations now proposed, sets up such a wider range of options and possible outcomes which have been assessed at such varying levels of detail, that it is not possible to understand what an approval of an EES would mean in terms of traffic and roads within and outside the Project area.

As identified by Mr Hunt, further work needs to be done to identify the existing traffic impacts. Fundamental matters such as pedestrian and traffic counts and the design of significant intersections remain outstanding. This is not fundamentally opposed by the Proponent.

The Council notes that both experts have made it clear that all works required to be undertaken would need to be funded by the Proponent at no cost to the Council. Further damage and dilapidation of surrounding roads need to be subject to existing conditions plans and a requirement for the Proponent to pay for damage done and clear and unambiguous mechanism to ensure this occurs. This would need to be carefully articulated and considered

as a condition of any approval in a manner which ensures that this is done without the need for additional resources to be spent by the Council and at the expense of the proponent⁵⁰⁹.

In his evidence Mr Hunt said:

- I consider that, given the proposed spacing of intersections along Ferndale –Glenaladale Road south of the relocated Fingerboards junction and vertical alignment issues, consideration should be given to grade separating the Private Haulage Road crossing.
- This will provide a significantly improved outcome in road safety terms compared with at-grade treatments contemplated in the TTIA and the EES.
- I also note that road diversion plans already contemplate grade separation of internal roads with Bairnsdale –Dargo Road.
- It was agreed at the conclave that further investigation is required as to the means of control of the (now) 3-leg Fingerboards intersection, in particular if the proposed roundabout control is appropriate or necessary.
- It was also agreed that vertical alignment considerations, and subsequent spacing of intersections required further detailed investigation.
- In my opinion, this should be undertaken in conjunction with preparation of an updated TTIA in consultation with Council and DoT⁵¹⁰.

The Proponent said:

The rationale for the changes in the January Plans was explained in Tabled Document 44. In short, these revisions facilitate more efficient mine sequencing, reduce the extent of ‘interim’ roads and locate the northern interim section of Fernbank Glenaladale Road (see blue in Figure 2) over less challenging topography.

Both sets of plans were assessed by Mr Hunt and Mr Carter in their evidence. Ultimately, the functionality achieved by both options is similar and acceptable, but would require road geometry refinements in accordance with Austroads design standards and detailed design to the satisfaction of the Department of Transport and East Gippsland Shire Council. Both options are either within the mine project area or infrastructure options area under the Specific Controls Overlay. Having regard to these factors, Kalbar is not asking the IAC to make a finding as to which of the road alignments is preferred, but rather to find that either would be acceptable, subject to the mitigations outlined in the EES and evidence, and subject to the controls proposed (i.e., the Traffic and Transport Management Plan requirements provided in the DoT’s version of the Incorporated Document)⁵¹¹.

11.4.3 Discussion

The IAC accepts the evidence that technical solutions are available to enable the proposed road deviations to be implemented.

The feasibility of securing the land to enable the deviations is unclear. DOT is clear that it will not act as the acquiring agency for the land necessary to build the roads. The Proponent intends to rely on powers under the MRSD Act.

The IAC notes DOT’s concern to ensure there is a robust legal arrangement in place that fully compensates the costs to the Crown for reconstructing the Bairnsdale - Dargo Road back onto its permanent alignment should the Project cease or through other future changes in circumstance.⁵¹²

⁵⁰⁹ Document 407 at para313, 316, and 317.

⁵¹⁰ Document 394 East Gippsland Shire Council – Stephen Hunt Presentation – Traffic Engineering.

⁵¹¹ Document 537, TN39 Project Overview.

⁵¹² The stability of landforms post closure is considered in Chapter19.

11.4.4 Findings

The IAC finds:

- The road deviations proposed in the exhibited EES and alternate deviations outlined in January 2021 are broadly similar in nature and impact.
- The Project is capable of achieving a functional road network subject to detail design considerations.
- DOT will not be an acquiring agency for roads associated with the Project and a suitable alternative statutory mechanism will be needed.
- Legally bindings agreements and bonds should be mandated to cover the full cost to the Crown for reinstating Bairnsdale - Dargo Road and other impacted roads to their final/original reservation, and to cover costs for possible damages to other roads resulting from the Project and their repair.

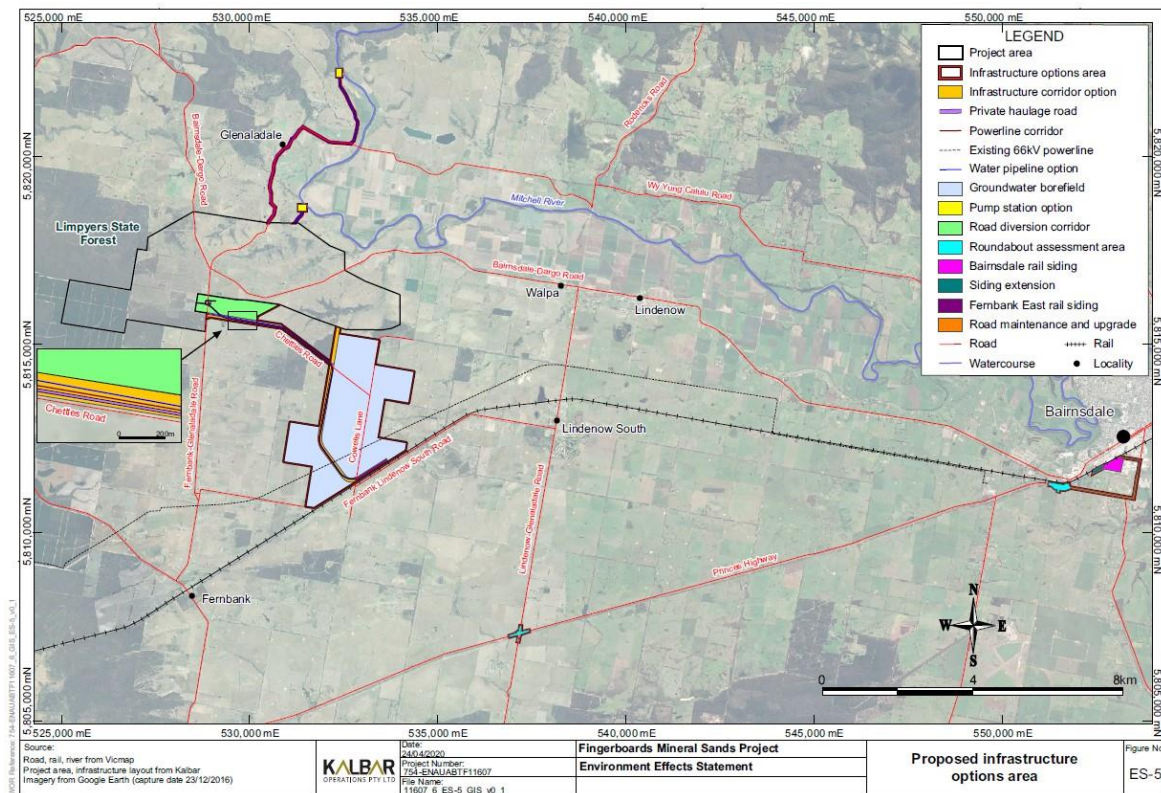
11.5 Haul road and Fernbank East proposed rail siding

11.5.1 Background

The Proponent’s preferred transport option for HMC is for the construction of a private sealed haul road terminating at a new purpose-built rail siding at Fernbank East. Haulage on the proposed road would be from 7.00am to 6.00pm.

The approximate location is shown in the diagram below.

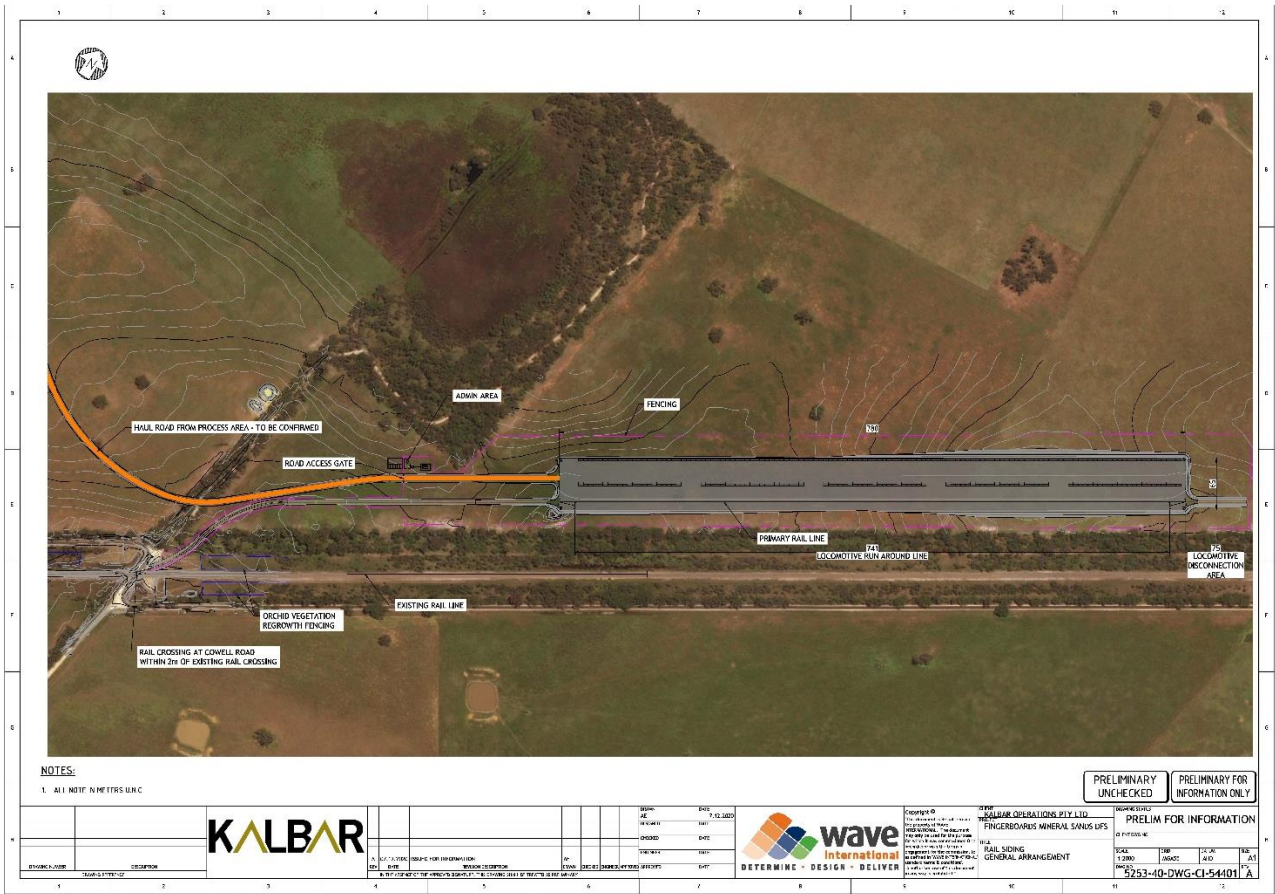
Figure 24 Proposed infrastructure options area⁵¹³



The schematic layout of the proposed rail siding is shown below.

513 EES Executive Summary, page vii.

Figure 25 Rail siding general arrangement⁵¹⁴



11.5.2 Evidence and submissions

The consensus of traffic and transport experts is the construction of a private sealed haul road and a dedicated rail siding at Fernbank East, offer the best transport outcome in that it removes heavy transport traffic from local roads and avoids transport of the HMC into Bairnsdale.⁵¹⁵

Council also supported this option and submitted:

It is apparent from that both Mr Hunt and Mr Carter the preferred option 1 is clearly preferable in traffic terms. Having further regard to Mr Delaire’s views, the IAC can find security in endorsing this other assessment.

Similarly, in the event of approval and if there was a need to for a route haulage into Bairnsdale (which ought in the Council’s submission be discouraged) this should be accommodated by using the existing B-double route via Collins Street on the basis of the evidence before the IAC, and only on an interim basis.⁵¹⁶

DOT made the following submission regarding rail siding preference:

In terms of the Department’s position regarding which rail siding is preferable, it is acknowledged the Fernbank and Bairnsdale sites have different constraints and opportunities. This includes the need build new infrastructure at Fernbank vs utilisation of an existing facility at Bairnsdale but greater potential for transport user conflict.

514 Document 67, page 10.

515 Document 233 Traffic and transport Expert Meeting Statement (Direction 21) 16 April 2021.

516 Document 407 East Gippsland Shire Council Closing Submission at paras 318 and 319.

On balance, the road safety outcomes that are achieved from removing the potential for conflict with the Fernbank siding is preferable. However, it is acknowledged that this option will result in significant cost, assessment, design and rail agreement, which may render this option unfeasible. The Department maintains that both options must be fully examined and further discussions are required with the Proponent and the transport system managers.⁵¹⁷

Mr Wolmarans for the Proponent described the proposed rail siding as needing to accommodate trains that were about 700 metres long comprising 2 locomotives and 36 train flatbeds. He said containers would be loaded onto the trains and then freighted to port. He forecast 3-4 scheduled services per week.⁵¹⁸

DELWP-FFR submitted that it preferred the potential use of the Bairnsdale rail siding, noting that since the EES was prepared, DOT has completed improvements works in Bairnsdale and using that existing freight terminal was preferable in terms of potential vegetation impacts.⁵¹⁹

DELWP-FFR submitted:

FFR has significant concerns with the location of the Fernbank East railway siding and considers the following threatened flora and vegetation communities at risk

- *Prasophyllum correctum*, Gaping Leek-orchid. This is likely to be the only extant population of this species.....The species is listed as endangered in Victoria and under the EPBC Act 1999 and is listed under the FFG Act 1988.....The population is within 50m of the proposed railway siding and modelled habitat is directly impacted. FFR considers the current proposed location of the railway siding and connector to the existing railway line too close to be confident the species can survive and flourish at the site into the future;...
- ...at the intersection of Cowells Lane with the railway reserve FFR has recorded and monitored a population of *Diuris punctata* Purple Diuris (see Appendix 2.2 page 201). The population is located at the site where the siding joins the Bairnsdale-Melbourne line and hence appears to be directly impacted.....
- ...between Buntines Lane and 1.5km west of Cowells Lane native grassland listed under the EPBC Act 1999 as GRGGW and Associated Native Grasslands and the FFG Act 1988 listed as Central Gippsland Plains Grassland Community.....FFR does not support the proposed impacts due its rarity.
- There is also examples of grassy woodland FFG Act 1988 listed FRGGW along the proposed haulage road easement including at the proposed Cowells Lane crossing and railway reserve.
- Saplings Morass Flora and Fauna is adjacent to the proposed railway siding. This Parks Victoria managed reserve contains excellent examples grassy woodland (unassessed) and the wetland area contains a significant population of Swamp Everlasting (listed under EPBC Act 1999 as Vulnerable and FFG Act 1988 listed as threatened in Victoria)....⁵²⁰.

Lyn Johnston⁵²¹, whose farm is directly impacted by the proposed haul road, said the haul road could be constructed on the unused road reserve to the east of the Project Area. This issue was not otherwise explored in any options presented during the Hearing.

In the updated road deviation diagrams⁵²², the site entry was moved from the proposed new Fingerboards roundabout south down the Fernbank - Glenaladale Road towards where the proposed haul road crosses the Fernbank - Glenaladale Road.

⁵¹⁷ Document 376.

⁵¹⁸ Mr Wolmarans for the Proponent during project overview – 3 May 2021.

⁵¹⁹ Document 377.

⁵²⁰ Submission 521, at para 27.

⁵²¹ Submission 268, during verbal presentation.

⁵²² Document 539.

Mr Hunt for the Council said:⁵²³

Site access now appears to be contemplated from Fernbank - Glenaladale Road via T junction, located 220m south of the roundabout and 130m north of the haulage road intersection.

While the revised road alignment reduces to extent of deviations required and appears to remove the issue of land acquisition from other landowners, it does not in my opinion resolve the issue of the separation of intersections along the Fernbank - Glenaladale Road or the control of the intersection of the private haulage road and the Fernbank Glenaladale Road.

Mr Hunt was concerned about sight distances between intersections, questioned why the site access had moved from the roundabout and recommended the haul road should be grade separated from the Fernbank - Glenaladale Road.⁵²⁴

The Proponent's view was grade separation of the haul road was not necessary from a traffic risk management perspective, but it would do so if required and that it should be a matter for the transport agencies to resolve.

11.5.3 Discussion

The IAC agrees the proposal for a dedicated sealed haul road and a dedicated rail siding has merit in that it separates heavy vehicle traffic from the existing road network and has minimal impact for the primary functioning of the Princes Highway.

The IAC notes the haul road is proposed to be in largely cleared land, and the rail siding area is also largely cleared. However, there are rare plants near the rail siding footprint, particularly in the area where the rail track would enter the rail siding. The rare plants are located on the existing rail reservation and are currently partially protected.

The proposed road deviations exhibited in the EES and the January 2021 updated proposals are currently live, noting however the preference expressed by the Proponent for the updated proposals.

The functionality of the Fernbank - Glenaladale Road will be impacted by the proposed site access intersection and the private haul road intersection.

The IAC heard the road is used by farmers and horticulturalists for freight delivery to market. It is an access route to regional attractions, including the Mitchell River National Park, particularly for visitors approaching from the west. The IAC was also informed that the Fernbank - Glenaladale Road was used as a bypass to access Bairnsdale when the Princes Highway was closed due to recent floods.

The IAC considers there is significant merit in retaining the site access at the proposed new roundabout and the private haul road should be grade separated at the Fernbank - Glenaladale Road intersection. The Project has a life of at least 20 years and therefore achieving the least number of intersections and control points will achieve the best functionality for all road users.

11.5.4 Findings

The IAC finds:

⁵²³ Document 98, 30.

⁵²⁴ Document 98.

- The proposal for a sealed private haul road and dedicated rail siding at Fernbank East has merit and best resolves potential heavy vehicle traffic issues for other parts of the road network.
- The Site access should be retained at the proposed new Fingerboards roundabout.
- The private haul road should be grade separated at the Fernbank - Glenaladale Road intersection.
- Detailed design plans should be developed in consultation with and subject to DELWP-FFR agreement for the access into the proposed rail siding, to ensure optimal protection for rare plants associated with the rail easement area.

11.6 Bairnsdale rail siding

11.6.1 Background

In the absence of a dedicated rail siding at Fernbank East, the EES proposed rail freight of the HMC from the existing Bairnsdale rail siding.

Option 2 as it was described in the EES was to haul the HMC by B Double truck to the existing Bairnsdale rail siding via Lindenow South, Princes Highway and then two options, closer to Bairnsdale, to access the siding, via Main Street / Collins Street, or via Racecourse Road.

The TTIA expressed a preference for the use of Racecourse Road.

11.6.2 Evidence and submissions

In his evidence Mr Carter⁵²⁵ identified several consequences associated with the movement of HMC via the Bairnsdale rail siding including:

- Increased crash risk at Lindenow - Glenaladale Road level crossing
- Potential safety impacts to school buses and increased risk of crashes around schools and involving pedestrians
- Pavement deterioration
- Increased crash risk at Racecourse Road as B Double trucks turn right off the Princes Highway.

The Council said that if HMC was to be freighted to the Bairnsdale rail siding, then truck access should be via Collins Street as it was the existing B Double declared road.

DOT said:

The Department has noted the proposed Post-Avon River Bridge – Option 2 includes new intersections to be built at:

- Princess Highway and Lindenow-Glenaladale Road; and
- Princess Highway and Racecourse Road.

Both roundabout treatments are required to ensure there is safe access during the operational phase of the project, as a result of B-double trucks accessing the alternative rail siding at Bairnsdale.

The Department remains concerned there has been insufficient consideration of:

- The design of the roundabout treatments, whether any additional land outside the road reserve is required for their construction and what alternative treatment would be considered if additional land was unable to be secured. This is a particular issue when

⁵²⁵ Document 324.

designing roundabouts for large vehicles such as B-doubles and in high speeds environments.

- Whether the treatments are required, even if the preferred option is achievable, as either an interim measure before the siding is constructed at Fernbank (if selected) or to offer an alternative in the event of rail disruption.⁵²⁶

The Proponent submitted during closing arguments that should it be necessary, it would secure whatever land was necessary for the construction of roundabouts and other road works that may be required. It also said that whilst it believed Racecourse Road offered advantages, it was equally happy to use Collins Street as per the Council's preference.

11.6.3 Discussion

The IAC finds the option of freighting HMC to the Bairnsdale rail siding is feasible but would have amenity and safety consequences. While the Lindenow-Glenaladale Road currently has heavy vehicles using it, the Project would result in a significant increase in B double traffic.

There is significant community activity associated with the settlements along the route. The potential traffic conflicts have been noted by Mr Carter and Mr Hunt in their evidence. Notwithstanding that mitigation measures are identified; the reality is there will be a substantial increase in heavy vehicle transport with increased risk of accident or injury.

Establishing roundabouts on the Princes Highway at the intersections with Lindenow - Glenaladale Road and Racecourse Road should be feasible but is unproven due to the likely need for land acquisition.

11.6.4 Findings

The IAC finds:

- The option of freighting HMC via the Bairnsdale rail siding has amenity and safety consequences as well as greater potential for road damage.
- The feasibility of roundabouts that would be required is unproven until land needs are resolved.

11.7 Heavy mineral concentrate transport to port

11.7.1 Background

The EES as exhibited, proposed either road or rail freight of HMC to Port Anthony or the Port of Melbourne.

During the Hearing the Proponent indicated the preferred option is now to freight the HMC by rail container, preferably from a new dedicated rail siding at Fernbank East, or from the existing Bairnsdale rail siding to the Port of Geelong where it would be bulk stored prior to bulk loading onto ships for export.⁵²⁷

11.7.2 Evidence and submissions

DOT supported the use of rail to transport the HMC to port.⁵²⁸

⁵²⁶ Document 376.

⁵²⁷ Document 537 Kalbar Technical Note 30 (TN39) - Project Overview.

⁵²⁸ Document 376 Department of Transport Hearing Submission.

Submitter Mr Wheeler questioned the feasibility of rail freight, citing potential load limits on existing rail bridges including the Thompson River Rail Bridge and the Latrobe River Rail Bridge at Kilmany.⁵²⁹

11.7.3 Discussion

There was no evidence or other opinions offered on the issue raised by Mr Wheeler; it is one that should be settled by the DOT if the Project proceeds.

Radiation risk from transport and bulk handling of HMC are discussed in Chapter 10. As outlined in that chapter there has been no assessment in the EES of the risks and potential impacts of the proposed freighting of the HMC through Melbourne and to Geelong, or the implications of bulk handling at the Port of Geelong. These risks and emergency response planning would need to be considered prior to any Project approvals being issued.

11.7.4 Findings

The IAC finds:

- Rail is the preferred method for transporting the HMC to port for export.
- The viability and safety of the entire route should be determined prior to any Project approvals being granted.
- There has been no assessment of the risks and impacts associated with the proposed use of the Port of Geelong and the methods proposed for HMC handling.

11.8 Overall conclusions on traffic and transport

The IAC concludes:

- The Project will not adversely impact the overall transport system capacity.
- The TTIA has not provided sufficient traffic data to fully inform understanding of Project impacts, proposed changes in road categories and the consequences for different communities and parts of the road network to inform primary approval decisions.
- The proposal for a sealed private haul road and dedicated rail siding at Fernbank East has merit and best resolves potential heavy vehicle traffic issues for other parts of the road network.
- Site access should be retained should the new Fingerboards roundabout proceed, and the private haul road should be grade separated at the Fernbank - Glenaladale Road intersection.
- Legal bindings agreements and bonds should be mandated to cover the full cost to the Crown for reinstating Bairnsdale - Dargo Road and other impacted roads to their final/original reservation, and to cover costs for possible damages to other roads resulting from the Project and their repair.
- Prior to any approvals being granted further assessment is required to demonstrate amongst other things the feasibility of road treatments proposed including land acquisition and roundabouts, the viability and safety of the entire rail route, the risks and impacts associated with the proposed use of the Port of Geelong and the methods proposed for bulk HMC handling.

⁵²⁹ Submitter 34 – John Wheeler.

- Detailed design plans should be developed in consultation with, and subject to DELWP agreement for, the access into the proposed rail siding, to ensure optimal protection for rare plants associated with the rail easement area.
- The option of freighting HMC via Bairnsdale has amenity and safety consequences as well as greater potential for road damage.
- Rail is the preferential method for transporting the HMC to port for export.
- Subject to the further assessments identified in this report, a TTMP should be developed to the satisfaction of the Responsible Authority and the Head Transport for Victoria.

12 Land use planning

12.1 Introduction

Land use effects were discussed in EES Chapter 9.9 and Appendix A013. The Land Use and Planning Impact Assessment (Appendix A013) was prepared by Matrix Planning Australia Pty Ltd (August 2020) (**Matrix Assessment**).

The relevant draft evaluation objective is:

Social, land use and infrastructure - To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

Table 15 lists the land use evidence that was called.

Table 15 Land use evidence

Party	Expert	Firm	Evidence
Proponent	John Glossop	Glossop Town Planning	<ul style="list-style-type: none"> - Planning Expert Witness Statement, 29 January 2021⁵³⁰ - Planning Supplementary Expert Witness Statement, 8 February 2021⁵³¹

Mr Glossop's Supplementary Statement considering centrifuges did not change his original report in any material respect.

The EES proposed one mitigation measure directly related to land use planning in Attachment H:

- LUP08: Landholder compensation accordance with the MRSD Act.

Several other mitigation measures are also relevant:

- AG14: The amount of land clearance will be minimised
- AG15: Progressive rehabilitation to restore agricultural land in the Project Area to productive use as soon as possible
- SE18: Current levels of access to national parks and other natural assets will be maintained
- SE32: Local landholders engaged on land rehabilitation and future stocking requirements

12.2 Key issues

The key issues are:

- The Project's consistency with relevant land use policy, in particular whether the (temporary) change of land use within the Project Area from agriculture and private forestry to mining has policy support.
- The extent to which the Project would have unacceptable impacts on adjacent or nearby land uses, including from noise and dust.

⁵³⁰ Document 80.

⁵³¹ Document 134.

12.3 Consistency with planning policy

12.3.1 Background

EES Chapter 9.9 states the Project is consistent with relevant state planning policies:

- The project is consistent with the Gippsland Regional Growth Plan. The plan identifies mineral sands mining as contributing to the economic development and diversity of the Gippsland region.
- The project will facilitate access to earth resources and extract natural resources in accordance with acceptable environmental standards.
- The project will not result in the loss of any areas of agriculture, forestry or productive farmland that are of strategic significance, with the exception of the proposal to permanently return 200 ha of forestry and grazing land to nature conservation.
- The project will ensure no net loss to biodiversity from loss of vegetation through avoidance, mitigation and the provision of offsets (see Section 9.1: Terrestrial and aquatic biodiversity).
- Appropriate measures will be implemented to manage erosion, landslip and other land degradation processes (see Chapter 11: Closure).
- Appropriate mitigation measures will be implemented to manage noise impacts from the project and maintain noise levels within acceptable limits at dwellings (refer to Section 9.6: Noise and vibration).
- Suitable separation distances will be established between the project and surrounding sensitive land uses to avoid impacts from reduced air quality (see Section 9.4: Air quality).
- The project will not adversely affect the quality of surface water or groundwater resources and will not reduce water availability for other beneficial uses (refer to Section 9.2: Groundwater).⁵³²

The EES noted that land in the Project Area is not identified as being of strategic importance for agriculture or forestry.⁵³³ The Project Area (other than the Bairnsdale - Dargo Road) is in the Farming Zone.⁵³⁴

12.3.2 Evidence and submissions

Mr Glossop gave evidence the Project is strategically justified from a town planning perspective.⁵³⁵ He acknowledged the statutory framework provides, due to the EES process in this case, the mining component of the Project would not require a planning permit, and that activities outside the Project Area would be dealt with under the proposed Amendment (discussed in Chapter 20).⁵³⁶

Mr Glossop undertook what he termed a ‘first-principles’ review and concentrated his evidence on C14⁵³⁷ at a State and Regional planning policy level and C21.06 at a Local level, being the relevant clauses relating to natural resource management which includes mining. Mr Glossop referred to C14.03-1S (Resource exploration and extraction) which has the following objective:

⁵³² EES Chapter 9.9, section 9.9.2.1.

⁵³³ EES Chapter 9.9, section 9.9.4.

⁵³⁴ Appendix A013, page 33 (PDF page 31).

⁵³⁵ Document 80, page 4.

⁵³⁶ Document 80, pages 5-15.

⁵³⁷ Clause 14 of the Planning Scheme provides: “Planning is to assist in the conservation and wise use of natural resources including energy, water, land, stone and minerals to support both environmental quality and sustainable development. Planning should ensure agricultural land is managed sustainably, while acknowledging the economic importance of agricultural production.”

To encourage exploration and extraction of natural resources in accordance with acceptable environmental standards.⁵³⁸

He also looked at relevant agricultural policies including C14.01-1S, C14.01-2S, C14.01-1R, C21.06 noting the Project Area is within the ‘Agricultural Hinterland’ as defined at C21.12 (Strategies for sub-regions, towns and localities), but does not constitute “*prime or high quality agricultural land*”.⁵³⁹

After consideration of these policies, Mr Glossop gave evidence that he did not consider there to be a conflict between policies supporting resource extraction and those supporting agriculture, but rather the Planning Scheme supports both activities.⁵⁴⁰ His evidence was that where the policies are balanced, it is up to a proponent to choose which they wish to pursue. He noted, however, the agricultural land policies use the word ‘protect’, whereas policies about mining use the word ‘encourage’. Mr Glossop gave evidence that this indicated a higher level of support for mining.⁵⁴¹

Mr Glossop gave evidence that in any case, decision-makers must decide in favour of net community benefit and sustainable development (referring to C71.02-2).⁵⁴² After acknowledging that an assessment of much of the material in the EES was outside his scope of expertise, Mr Glossop concluded the net community benefit “*falls comfortably in favour of natural resource extraction*”.⁵⁴³ He gave evidence the loss of an average of 443 hectares per year of agricultural land over the 20-year mine life would be acceptable “*particularly given the substantive economic benefits the project will deliver*”.⁵⁴⁴ He also gave evidence the Project was acceptable from a sustainable development perspective:

I say this as the proposal seeks to extract mineral resources which is directly encouraged by the planning scheme in a manner which in the long term will not affect the agricultural productivity of the land. From a planning scheme perspective, this is clearly a sustainable outcome whereby the competing objectives of planning policy are appropriately balanced and achieved for the benefit of current and future generations.⁵⁴⁵

In submissions, the Proponent accepted that what it called the “*high level of strategic support for mining activities*” in the Planning Scheme is qualified by the need for acceptable environmental outcomes, and argued the acceptability of outcomes is to be judged by reference to the draft evaluation objectives.⁵⁴⁶ The Proponent further submitted there was no requirement for there to be *no* impacts.⁵⁴⁷ After referring to the IAC’s Terms of Reference, the principles of ecologically sustainable development and Victoria’s new EP Act, the Proponent submitted:

⁵³⁸ Document 80, pages 7-8. These included C14 (Natural Resource Management), C12 (Environmental and landscape values), C13 (Environmental risks and amenity), C17 (Economic development), C18 (Transport) and C19 (Infrastructure) at the State and Regional planning policy level; and C21.06 (Natural resource management), C21.04 (Environmental and landscape values), C21.05 (Environmental risk), C21.09 (Economic development) and C21.10 (Transport) at the Local planning policy level which provide local support to their State/ Regional planning policy clause counterparts. Clause 52.08 was also noted (at page 39) which provides: To encourage land to be used and developed for exploration and extraction of earth and energy.

⁵³⁹ As per Map 4 at C21.06. Document 80, page 9.

⁵⁴⁰ Document 80, page 10.

⁵⁴¹ Oral evidence, Day 2, under cross-examination by Counsel for Council.

⁵⁴² Document 80, page 10.

⁵⁴³ Document 80, page 11.

⁵⁴⁴ Document 80, page 13.

⁵⁴⁵ Document 80, page 13.

⁵⁴⁶ Document 358, page 6.

⁵⁴⁷ Document 358, page 7 referring to the observations in Osborn J in *Rozen v Macedon Range Shire Council* (2010) 181 LGERA 370, [171]. regarding ‘acceptability’, where his Honour stated:

The overall effect ... is the decision-making framework evinces a policy and regulatory position that valuable minerals should be extracted where economically viable mining can occur, provided it is possible ('can') to achieve acceptable economic, social, and environmental outcomes.⁵⁴⁸

The Proponent concluded, therefore, *"the acceptability of the proposed mining activity falls to be assessed by reference to its actual impacts and their manageability, rather than questions of consistency with general applicable policy"*.⁵⁴⁹

Council submitted that given the wording of C14 of the Planning Scheme, policy support for natural resources management is conditioned on acceptable environmental considerations.⁵⁵⁰ Council also relied on C21.06-4 of the Planning Scheme which focuses on encouraging exploration for and development of mineral resources *"in appropriate areas"*.⁵⁵¹ It did not agree the Planning Scheme favours mining over farming or agriculture in this location.⁵⁵²

Council also submitted that it cannot be concluded the Project Area has little agricultural value simply because the land is not protected agricultural land under the Planning Scheme or has not been exempted from licensing under the MRSD Act. It submitted that it is not only the most productive agricultural land which requires consideration under the Planning Scheme.⁵⁵³ As a result, Council invited the IAC to take caution in accepting Mr Glossip's evidence of the value of the Project Area as agricultural land because, it submitted, he had apparently devalued it *"simply because it is not the highest or most recognised farming land in this municipality, notable for the value of the entirety of its farming districts"*.⁵⁵⁴

Council also referred to:

- (a) At a State level, the encouragement of clause 14.01-2S for sustainable agricultural land use;
- (b) At a local level, clause 21.02 and 21.06 identifying agriculture as part of the considerable natural resources of the Shire, with clause 21.06-1 focusing on the, "Protection of Agricultural Land", and clause 21.12-3 specifically recognising the value of the agricultural land in the Lindenow district and supporting the existing agricultural roles of the Lindenow district;
- (c) Aligned policies, including in respect of scenic roads and landscape values (cl 21.04-2), vegetation (ESO1 and VPO1), and so on.⁵⁵⁵

Council acknowledged the overall impacts of the Project need to be assessed considering the rehabilitation of the mine area.⁵⁵⁶

The test of acceptable outcomes stated in the clause is informed by the notions of net community benefit and sustainable development. An outcome may be acceptable despite some negative characteristics. An outcome may be acceptable because on balance it results in net community benefit despite achieving some only of potentially relevant planning objectives and impeding or running contrary to the achievement of others.

The submission notes at footnote 8: "These observations were endorsed in *Boroondara City Council v 1045 Burke Road Pty Ltd* (2015) 207 LGERA 153 by Warren CJ at [32]; and Garde AJA at [102]-[103]".

⁵⁴⁸ Document 358, page 10.

⁵⁴⁹ Document 358, page 11.

⁵⁵⁰ Document 251, page 11.

⁵⁵¹ Document 251, page 12. Document 407, page 86.

⁵⁵² Document 251, page 12.

⁵⁵³ Document 407, page 7.

⁵⁵⁴ Document 407, page 85.

⁵⁵⁵ Document 407, page 86.

⁵⁵⁶ Document 407, page 87.

Council submitted that Mr Glossop did not carry out a Net Community Benefit (NCB) analysis and had clearly conceded that he made no assessment of a range of matters such as vegetation removal, loss of road side vegetation, visual amenity, loss of amenity generally, dust, noise or tourism.⁵⁵⁷ Council submitted that his expert evidence “*simply proceeds on the basis that a benefit will follow, either as a result of information in the EES about economic benefit, or because of the existence of policy support for mines generally*”.⁵⁵⁸ As a result, Council submitted, Mr Glossop’s evidence added little to the analysis of the EES and cautioned the IAC about accepting it.

Council submitted:

Even taken at its highest as the Proponent would put it, the encouragement in the Planning Scheme for mining is not complete and is not expressed to override the need for mining to take place in the right environment or, of course, to achieve net community benefit.⁵⁵⁹

MFG’s submission on this issue aligned with Council’s in many respects including that Mr Glossop had not undertaken NCB assessment as required by C71.02-3 and that Mr Glossop’s evidence should be given little weight.⁵⁶⁰ MFG submitted the relevant planning policies indicate that ‘acceptable’ environmental effects and outcomes will be those that protect and maintain the existing environmental, landscape, social and economic values.⁵⁶¹

MFG also took issue with the weight Mr Glossop put on the fact the agricultural land within the Project Area was not nominated as being of high significance in the Planning Scheme. It submitted, that he had placed little weight on the fact the Project Area is not nominated in the Planning Scheme as being an appropriate location for a mine, despite the fact that C14.03-01S expressly protects the brown coal resource in Central Gippsland.⁵⁶²

MFG submitted the following aspects of the Project Area suggest that it is not appropriate for a mine:

- a. the significant amount of remnant vegetation in an otherwise cleared area that would require removal, as indicated in clause 21.04;
- b. the nomination of the Bairnsdale - Dargo Road (which runs through the project area) as a scenic road in clause 21.04; and
- c. the application of the ESO and the VPO to areas within the project area.⁵⁶³

Several submitters also pointed out that Council’s Lindenow and Community Plan does not foresee a mine in the area.⁵⁶⁴

⁵⁵⁷ Document 407, page 85.

⁵⁵⁸ Document 407, page 84.

⁵⁵⁹ Document 748, page 19.

⁵⁶⁰ Document 451 pages 5-7.

⁵⁶¹ Document 451 pages 5-6. These included: Biodiversity (Cl. 12-01), including Protection of biodiversity (Cl. 12.01-1S) and Native vegetation management (Cl. 12.01-2S); Waterbodies and wetlands (Cl. 12-03), including River corridors, waterways, lakes and wetlands (Cl. 12.03-1S); Climate change impacts (Cl. 13-01), including Natural hazards and climate change (Cl. 13.01-1S); Soil degradation (Cl. 13-04), including Contaminated and potential contaminated land (Cl. 13.04-1S) and Erosion and landslip (Cl. 13-04-2S); Air quality management (Cl. 13.06), including Air quality management (Cl.13.06-1S); Amenity and safety (Cl. 13.07), including Land use compatibility (Cl. 13.07-1S); Agriculture (Cl. 14.01), including Protection of agricultural land (Cl 14.01-1S); Water (Cl. 14-02), including Catchment planning and management (Cl. 14.02-1S); and Earth and Energy Resources (Cl. 14.03), including Resource exploration and extraction (Cl. 14.03-1S).

⁵⁶² Document 451 page 6.

⁵⁶³ Document 451 pages 6-7.

⁵⁶⁴ Document 25b referring to Submissions 81, 267, 373, 601, 680, 703, 713, 745, 765, 747, 812, 814 & 838.

12.3.3 Discussion

The IAC considers the Planning Scheme does not necessarily favour mining over agriculture (or vice versa). The Planning Scheme makes clear that mining is only ‘encouraged’ where it has acceptable environmental outcomes and in an appropriate location. In other words, the Planning Scheme’s support for mining is context dependent.

The IAC agrees, therefore, with the Proponent’s submission the acceptability of the Project must be assessed by reference to its actual impacts and their manageability, rather than questions of consistency with relevant planning policies.

The IAC agrees that a fulsome NCB analysis is required, and this is undertaken by the IAC in Chapter 17. The IAC considers that Mr Glossop did not undertake a fulsome NCB analysis because he did not take into consideration the broader environmental and other impacts of the Project, a matter on which his evidence was clear. He also relied on the economic benefits of the Project as set out in the EES when undertaking his limited NCB assessment. The IAC considers the BAEconomics analysis of the economic benefits of the Project should be given little weight and cannot be relied on (refer to Chapter 17). This impacts on the reliability of Mr Glossop’s conclusion that the Project has strategic support. Accordingly, the IAC places little weight on these aspects of his evidence.

12.3.4 Findings

The IAC finds:

- The Planning Scheme does not necessarily favour mining over agriculture (or vice versa).
- The Planning Scheme’s support for mining is context dependent.
- Mr Glossop did not undertake an adequate NCB analysis.

12.4 Land use impacts

12.4.1 Background

Approximately 443 hectares per year of land currently used for agricultural and private forestry production is expected to temporarily change to mining over the life of the mine (construction, operation and closure).⁵⁶⁵ According to the EES, the Project is not expected to result in any direct loss of land for other land uses outside the Project Area, including in the Infrastructure Area.⁵⁶⁶

The Project would require construction of various infrastructure including pipelines, a new 66kV powerline, haul roads and new intersections, and under the preferred transport option, the Fernbank East rail siding, impacting land both inside and outside the Project Area.⁵⁶⁷

The Project Area would be rehabilitated progressively and at the end of the mine’s life the area of land available to agriculture and forestry would be returned except for the proposal to permanently return 200 hectares of forestry and grazing land to nature conservation, or where alternative post-mine land uses are agreed upon.⁵⁶⁸

⁵⁶⁵ EES, section 9.9.2.1.

⁵⁶⁶ EES, section 9.9.2.1.

⁵⁶⁷ EES, section 9.9.2.1.

⁵⁶⁸ EES Chapter 9.9, sections 9.9.2.1 & 9.9.4.

The EES refers to the potential impact of noise, dust, sedimentation, and landscape and visual impacts on surrounding uses, identified as “*dryland agriculture, forestry, farm dwellings and rural living dwellings*”.⁵⁶⁹ The EES assumes that all offsite impacts will be adequately mitigated as detailed in the relevant Chapters of the EES.⁵⁷⁰ The Matrix Assessment notes:

One aspect of the project area’s location is that it is generally remote from urban settlements and individual dwellings in rural areas. Even by rural standards dwelling density is low within and around the project area.⁵⁷¹

The EES identified the Project could have impacts on the amenity and rural lifestyle of the area over the life of the mine, which in turn could lead to impacts on individual and community wellbeing, including from noise and vibration, dust, vegetation clearing and visual changes.

The EES assessed the risk of adverse impacts on amenity and rural lifestyle for residents:

- adjacent to the Project Area from noise emissions associated with ground disturbance and construction related vehicle movements
- along the proposed HMC transport route from noise associated with Project related vehicle movements.

The risk was assessed as high with standard mitigation measures, and moderate with additional mitigation measures applied. The amenity impacts of vibration were assessed as low.⁵⁷²

In terms of dust from ground disturbance, the EES assessed the impacts on amenity and rural lifestyle for residents adjacent to the Project Area as being high with standard mitigation measures, and moderate with additional mitigation measures applied, but considered that amenity impacts from dust on residents not adjacent but within 10 kilometres of the Project Area as being low.⁵⁷³

The Socio-Economic Impact Assessment (SEIA) explained the potential dust impacts on amenity as follows:

Residents adjacent to the project area have the greatest potential to experience a change in amenity from dust emissions associated with the project. This change could in turn, lead to impacts on their lifestyle. Individuals are likely to respond differently to any changes in amenity from dust emissions but it may lead some residents adjacent to the project area to keep their windows closed, spend less time outdoors on their property and/or to dry washing indoors. For other adjacent residents, concerns relating to dust emissions may contribute to them making greater lifestyle changes such as leaving their property.⁵⁷⁴

The SEIA made similar comments concerning the potential behavioural changes resulting from the noise impacts of the Project.⁵⁷⁵ The SEIA also acknowledged that people’s perceptions of the negative health impacts of dust (potentially contaminated) could trigger concerns and lead to associated lifestyle impacts.⁵⁷⁶

The EES concluded the amenity impacts resulting from adjacent residents’ views of the Project, including night lighting and the loss of landscape values, would be high with standard mitigation measures, and moderate with additional mitigation measures applied, but as only moderate falling

⁵⁶⁹ EES Appendix A013, page 38 (PDF page 47).

⁵⁷⁰ EES Chapter 9.13 and Appendix A013, pages 38-40 (PDF pages 47-49).

⁵⁷¹ Appendix A013, page 40 (PDF page 49).

⁵⁷² EES Chapter 9.13, table 9.79.

⁵⁷³ EES Chapter 9.13, table 9.79.

⁵⁷⁴ Appendix A018, page 114.

⁵⁷⁵ Appendix A018, page 108.

⁵⁷⁶ Appendix A018, page 114.

to low with additional mitigation measures for people living in the towns and settlements within 10 kilometres of the Project.⁵⁷⁷ The EES indicated that people may respond in a variety of ways to the change in visual amenity including spending less time outdoors or leaving their property.⁵⁷⁸

The SEIA noted that changes in amenity could lead to increased stress and affect individual wellbeing, even where regulatory standards were met.⁵⁷⁹

In this context, the EES proposed the following mitigation measures:

- All adjacent landholders will be engaged prior to construction and operations to discuss any concerns these residents have, and dust emissions will be minimised (SE15).
- The use of low beam lights on vehicles will be promoted except in emergencies or for safety reasons (SE16).
- Site-specific visual impact management will be discussed with affected residents located close to the project area (SE17).⁵⁸⁰
- ...Additional mitigation, such as ceasing project activities on certain days and restricting noisier activities, will be implemented to manage potential impacts to adjacent residents.⁵⁸¹

The EES concluded, overall, that residents adjacent to the Project Area would experience amenity impacts, but that other residents living within 10 kilometres of the Project Area “*are not expected to experience changes in amenity*”.⁵⁸²

12.4.2 Evidence and submissions

Mr Glossop gave evidence that he was “*entirely comfortable the location is acceptable for the Project*”,⁵⁸³ noting that an average of 443 hectares per year of agricultural land would be removed from capable agricultural production, for a short (in a planning sense) period of 20 years. At the end of this 20-year period, the land would be rehabilitated to be at least, if not more, productive than the current situation. In reaching his conclusion he gave weight to the “*substantive economic benefits the project will deliver*”.⁵⁸⁴

The Proponent submitted the key planning policy issue is the potential conflict between the use of the land for mining and the use of the land for productive agriculture, but the mine could coexist with surrounding land uses.⁵⁸⁵

The Proponent relied on two key points. The first was that a large area of the Mitchell River flood plain (the Lindenow Valley flats) has been exempted from the grant of licences under the MRSD Act due to its highly productive horticultural and agricultural businesses,⁵⁸⁶ but the Project Area

⁵⁷⁷ EES Chapter 9.13, table 9.79.

⁵⁷⁸ EES Chapter 9.13, section 9.13.3.1, page 9-351.

⁵⁷⁹ EES Chapter 9.13, section 9.13.3.1, page 9-348.

⁵⁸⁰ EES Chapter 9.13, section 9.13.3.1, page 9-354.

⁵⁸¹ Appendix A018, section 9.13.3.1, page 9-355.

⁵⁸² EES Chapter 9.13, section 9.13.3.1, page 9-355.

⁵⁸³ Document 80, page 12.

⁵⁸⁴ Document 80, page 13.

⁵⁸⁵ Document 358, page 11.

⁵⁸⁶ “*The exempted area, stretching from Glenaladale to Hillside, is highly valued for its horticultural produce, with farm gate production estimated to be worth over \$100 million per year and providing up to 2000 ongoing and seasonal jobs.*”: <https://earthresources.vic.gov.au/about-us/news/safeguarding-the-mitchell-river-floodplain> accessed 13 August 2021.

was not exempted.⁵⁸⁷ The second was the MRSD Act provides a mechanism for addressing land use incompatibility, namely that an owner or occupier of agricultural land can seek to have their land removed from the area to which a mining licence applies on the basis there would be greater economic benefit to Victoria in continuing the agricultural use of the land than in carrying out the proposed work under the licence.⁵⁸⁸

The Proponent further submitted that mineral sands mining is compatible with horticulture, referring to examples in Western Australia which it said, “*illustrates well the co-existence of mineral sands mining with nearby population, significant national parkland (including Ramsar wetlands) and high value horticulture*”.⁵⁸⁹ It provided information regarding three avocado growing properties being operated successfully nearby to mineral sands mines in that area, despite the avocado being “*highly intolerant to dust as this can lead to fungal infection*”, due to the application of “*industry standard dust mitigation*”.⁵⁹⁰

The Proponent also submitted that some of the relevant planning policies are qualified by reference to ‘permanent’ removal of land from agricultural use. Here, the Proponent would be legally obliged to rehabilitate the Project Area once mining is complete, at least to the standard of being able to carry out the same activities on that land as could previously have been carried out. In that sense, the Project would avoid permanent removal of agricultural land from production.⁵⁹¹

MFG submitted the Proponent had not demonstrated the Project Area would be restored to agricultural within 20 years (being the period that Mr Glossop referred to):

MFG does not accept that 20 years is a short-term horizon. Nor does it accept that it has been demonstrated the project area will be restored to agricultural land within 20 years. For example, the agricultural land currently features natural soil and topography, extensive shade trees for stock, spring fed dams, etc.⁵⁹²

MFG submitted:

This mine proposal will create a loss to the community in the way landowners currently use the land, the loss of future opportunities related to the use of this land and the good reputation of the existing sustainable industries.

With 1675ha encompassed in the mine footprint and with 433ha out of production at any one time, this is a substantial loss of productive farmland. This will result in reduced income for those whose land has been impacted, reduction in earnings for farm workers, shearers, and services providers to these enterprises including stock agents, farm supplies, rural machinery and equipment and supporting industries.

Rates revenue to local Councils will decrease as mining companies do not pay rates. The financial shortfall for costs of services funded by the rates and municipal charges will have to be met by the remaining ratepayers.

If an appropriate bond figure is not set, the ratepayers will be left to pay the shortfall in rehabilitation costs and endure long-term legacies of a compromised road infrastructure following mining. The risk of this is very real.

⁵⁸⁷ In July 2019, the Executive Director of Earth Resources Regulation, as delegate of the Minister under the MRSD Act, exempted a large area of the Mitchell River flood plain from the grant of exploration and mining licences under the MRSD Act.

⁵⁸⁸ Document 358, page 11 referring to Division 4 of Part 2 of the MRSD Act.

⁵⁸⁹ Document 338, page 1.

⁵⁹⁰ Document 338, page 2.

⁵⁹¹ Document 358, page 12.

⁵⁹² Document 451 page 7.

Opportunities of further expansion of our tourist industry (in the areas of Ecotourism and adventure tourism) would have to be forfeited within the impacted municipalities. This beautiful area is a tourist and adventure magnet.⁵⁹³

Council submitted that it is not possible to properly assess the acceptability of the disruptions of and alterations to land use from the Project because the Project as a whole is not sufficiently certain to understand its benefits and disbenefits.⁵⁹⁴

Mr Sheridan, a resident of Wuk Wuk 8 kilometres from the Project Area, made submissions regarding his experience of farming cattle and sheep in the buffer zone, downwind of the Loy Yang coal mine in the Latrobe Valley and adjacent to coal mining and topsoil and overburden stripping.⁵⁹⁵ He acknowledged that he was not a dust expert but submitted that his first-hand experience of farming in this context had relevance in terms of management of dust impacts on agricultural activities. Mr Sheridan explained that at Loy Yang coal mine, there is a 1.5 kilometres buffer for dust and in some areas the buffer is up to 3 kilometres wide. Based on his experience:

Despite good intentions and various strategies to reduce dust, when the wind blows, the dust lifts. This occurs regularly and results in animal welfare issues (eg. increased incidence of pink eye in cattle), contamination of products (wool downgraded) and an unsafe workplace. Work has to cease on some days because of the dust. Luckily for us this is just a labour cost. For vegetable growers, it could mean the loss of harvest.⁵⁹⁶

He expressed great concern there was no buffer zone proposed for the Project, particularly given the westerly winds and its proximity to the Lindenow Valley horticultural area. He submitted that it was unacceptable the Lindenow Valley would be the dust deposition area for the mine. Based on his experience of being on various committees for the Loy Yang mine and dealing with monitoring and enforcement there, he submitted the dust management measures proposed for the Project were not practical as they would require a massive amount of work to be effective given the size of disturbed areas (350 hectares at a time) and the dispersive soil types. Mr Sheridan also submitted that workplace health and safety issues from dust need to be considered. From his experience he did not see how the many workers in the fields in the Lindenow Valley could be adequately protected, particularly given it was often not an option to call off work for the day as he had been able to do when very dusty, due to the short-term crops grown in the Lindenow Valley that need to be picked daily.

Overall, he submitted that while he had been able to farm cattle and sheep successfully adjacent to the Loy Yang coal mine with its generous buffer zones and a mine operator who was quick to respond. He did not believe the proposed Fingerboards mine and horticulture in the Lindenow Valley would be compatible.

Except for Mr Sheridan, submitters did not generally refer to the adequacy of ‘buffers’ around the Project Area and Infrastructure Area,⁵⁹⁷ but a great number of submitters, including MFG and Council, submitted the Project is in the wrong place and would be incompatible with surrounding land uses.

A few submitters, including Mr Hine, a Lindenow Valley vegetable grower who had visited some of the mineral sand mines in Western Australia, took issue with the Proponent’s comparison to

⁵⁹³ Submission 813, page 461.

⁵⁹⁴ Document 407, page 84.

⁵⁹⁵ Submission 502, page 2; oral submissions Day 30, 12 July 2021.

⁵⁹⁶ Submission 502, page 2.

⁵⁹⁷ Ms Johnston, Submitter 268, Day 30, 12 July 2021, submitted that there should be a buffer area around the mine to protect agricultural uses.

mineral sands mining in Western Australia, submitting the situation there with nearby avocado farms is very different to that with the Project and the Lindenow Valley horticultural area.⁵⁹⁸ In particular, it was submitted that dust deposition on crops grown in the Lindenow Valley such as broccoli would be more difficult to manage than dust on avocados.

Various submitters also raised concerns about the incompatibility of mining and tourism in this location, in particular the impacts of the Project on landscape values, views, amenity (dust, noise), East Gippsland's 'clean green' image and the image of the area as a peaceful place to get away and enjoy the quiet. Council submitted the introduction of new or increased heavy traffic from the Project, including B-double traffic, would have amenity and social impacts such as noise, vibration, safety and access.⁵⁹⁹

MFG submitted the Project's impacts on amenity would be unacceptable and unable to be mitigated and include *"the wholesale destruction of a large area of valued landscape and the fundamental change to the amenity of local residents"*.⁶⁰⁰

Many submitters expressed concern the Project would operate 24/7, particularly given the noise and dust impacts. For example, Mr Geoff Banks, who lives within 2 kilometres of the Project Area, submitted the impacts of the Project will be all pervasive:

[the mine] will add a huge mental impact on our lives day and night, 24/7 – 365 days a year, this mine will be operating in our face every moment of our lives, when we walk outside, when we sit in our lounge room when we are working, this will be a constant blight on us and our environment."⁶⁰¹

Mr Ewan Waller, who lives adjacent to the Project Area and is a fifth-generation farmer of the land, submitted the loss of amenity would be significant. He expressed concern the Project's noise, dust and vibration would make it hard to continue to live on his property, particularly as he is downwind of the Project Area.⁶⁰² Ms Yvette Waller submitted that her family home was the heart of the family and she was worried that her father (Mr Ewan Waller) would have to choose between the family home and his health if the mine were to proceed.⁶⁰³

As anticipated by the EES, many submitters indicated that if the Project proceeds, they would be unable to continue to live in their homes and would move, or consider moving, from the area. For example, Ms Cameron, who lives with her family on the edge of the retention licence area, submitted that she and her family would not be able to continue to live there if the Project proceeds.⁶⁰⁴ The Alexanders, fourth and fifth generation farmers of land adjacent to the Project Area (and part within the extended mining licence area), submitted they would have to leave their homes as the noise and dust would make their homes unliveable and they had concerns for the health of their young (grand)children.⁶⁰⁵ Mr Hamilton, a fifth-generation farmer who lives within 2.5 kilometres of the Project Area, submitted the dust impacts of the Project would have significant impacts and he would not be comfortable to continue to live here if the Project were to

⁵⁹⁸ Submitter 896, Day 26, 29 June 2021; Submitter 875, Day 30, 12 July 2021; Submitter 837, Day 33, 15 July 2021.

⁵⁹⁹ Document 407, page 82.

⁶⁰⁰ Document 451, page 1.

⁶⁰¹ Submission 94.

⁶⁰² Day 28, 1 July 2021.

⁶⁰³ Submitter 781, Day 28, 1 July 2021.

⁶⁰⁴ Submitter 564, Day 27, 30 June 2021.

⁶⁰⁵ Submitters 157, Day 27, 30 June 2021; Submitter 375, Day 31, 13 July 2021.

proceed.⁶⁰⁶ Ms Coleman expressed concern that many would move away from the area as a result of the Project, particularly if they lost income due to the mine's impacts.⁶⁰⁷

Ms Reefman submitted:

Our children would not wish to bring their children to visit us so close to a dangerous mine. We would need to consider moving out of the area to continue to be part of our grandchildren's lives.⁶⁰⁸

Similarly, Ms Grant, who lives and operates a tourism business 9 kilometres from the Project Area, submitted that she would not be able to live there or operate her business because the ambience would be irrevocably negatively impacted by the Project.⁶⁰⁹

Ms Seymour, who owns land 4 kilometres east of the Project Area, submitted that she has had to put on hold her plans to build a house there because she does not want to live so close to the mine with its dust, noise and traffic.⁶¹⁰ She submitted her whole way of living would be threatened if the Project were to proceed. On one of the site visits, the IAC visited land owned by the Roses⁶¹¹ where they too had planned to build a home but have put their plans on hold because they would not want to live so close to the Project.

Ms Wagner, a seventeen-year-old who had created a petition for youth against the mine, submitted the Project would be a scar in the landscape with dust and toxic health impacts leading her to ask whether people would want to live in the area in future.⁶¹²

12.4.3 Discussion

Ensuring land use compatibility and avoiding land use conflict is fundamental to Victoria's planning system.⁶¹³ Applying the agent of change principle, it is up to the Proponent to establish that its (new) use will be compatible with existing uses. The IAC considers the fact that an exploration licence or retention licence has been issued under the MRSD Act does not provide any endorsement the Project is appropriately situated from a land use planning perspective. Nor does the fact the Project Area has *not* been exempted from the MRSD Act (in the manner the Lindenow Valley horticultural area has been) demonstrate, in the IAC's view, the Project location is suitable for mining. Rather, the IAC considers that because the Lindenow Valley horticultural area has been exempted from mining due to its horticultural significance. The offsite impacts of the Project must be assessed considering this significance and protection to ensure the Lindenow Valley can continue to operate effectively as an important food growing location and major contributor to regional employment.

During the life of the mine, the current land use of an average of approximately 443 hectares per year⁶¹⁴ of agriculture and private forestry production within the Project Area would change to mining. The mining area will be progressively rehabilitated to its former use. In the longer term, the extent of the land use impacts within the Project Area will depend on the success of the rehabilitation program to return the land to productive agricultural uses. The IAC concludes in

⁶⁰⁶ Submitter 889, Day 24, 16 July 2021.

⁶⁰⁷ Submitter 679, Day 27, 30 June 2021.

⁶⁰⁸ Document 588, page 3.

⁶⁰⁹ Submitter 546, Day 28, 1 July 2021.

⁶¹⁰ Submitter 598, Day 28, 1 July 2021.

⁶¹¹ Approximately 1.5km north of the Project Area.

⁶¹² Submitter 767, Day 33, 15 July 2021.

⁶¹³ Planning Practice Note 92 "Managing buffers for land use compatibility".

⁶¹⁴ This figure is based on the evidence of Mr Glossop: Document 80, page 12.

Chapter 19 the capacity for rehabilitated areas to sustain future productive land uses has not been demonstrated at this time. Therefore, the IAC has concerns that in the longer term, the Project would have an adverse impact on the agricultural use of the Project Area.

Outside the Project Area, the IAC's conclusions in Chapters 14 and 17 are the Project would cause unacceptable offsite impacts on local agriculture, horticulture and tourism and would not be adequately managed by the proposed mitigation measures. Potential offsite impacts include dust, noise, competition for water supply, impacts on water quality, amenity impacts, impacts on the 'clean green' image of the Lindenow Valley, and traffic and safety. These issues are canvassed across this report. As a result, the IAC considers there is a real risk that Project's offsite impacts, and dust in particular, would put at risk the viability and extent of the existing agriculture, horticulture and tourism land uses.

The IAC notes the Proponent's submissions that horticulture (avocado farming) and mining can co-exist, drawing on the experience in Western Australia. The IAC considers that it does not have enough information before it to draw any conclusion from the Western Australian examples. The IAC does have first-hand submissions before it that management of the offsite impacts of the Project, and dust in particular, will be unlikely to be able to be adequately managed and would impact on the existing land uses nearby to the Project Area.

The IAC considers the severity of the offsite impacts is to a large degree due to the proximity of the Project to the existing agricultural, horticultural and tourism uses together with existing rural residential uses. Although the EES states that suitable separation distances will be established between the Project and surrounding sensitive land uses,⁶¹⁵ it is not clear how this would be achieved, particularly given that at its nearest point, the Project Area boundary is 350 metres from the Lindenow Valley horticultural area. The IAC notes the experience of Mr Sheridan as noted above farming adjacent to the Latrobe Valley coal mine which has considerably larger separation distances than the current proposal. While the situations may not be directly analogous, the lack of a substantive buffer zone to the horticultural and agricultural industries for this Project concerning to the IAC.

The combined impact of noise, dust, loss of vegetation, increased traffic (creating noise, vibration and safety concerns), the change of the land use from rural to a mine with its industrial activities, and for many, the knowledge that mining is taking place against their wishes, would all detract from the amenity of the existing landscape and land uses. These impacts would be experienced 24/7 (with some mitigation at night) for an estimated 20 years and fundamentally change the nature of the existing rural amenity. Powerlines, pipelines, and haul roads in the Project and Infrastructure Areas will add to the loss of landscape and land use amenity. Impacts would be experienced by nearby residential and farming properties, natural areas, towns, and the Lindenow Valley horticultural area.

The IAC considers the concerns local residents have about these impacts on landscape and land use are reasonable given the relevant planning provisions, discussed in the previous section, that clearly indicate that mining is only 'encouraged' where it has acceptable environmental outcomes and in an appropriate location. The IAC also notes the Council's Lindenow and Community Plan does not foresee a mine in the area.

⁶¹⁵ EES Chapter 9.9, section 9.9.2.1.

12.4.4 Findings

The IAC finds:

- The Project's temporary change in land use within the Project Area from agriculture to mining for the life of the mine would be acceptable.
- The longer-term impacts on the agricultural uses of the Project Area are uncertain and the Proponent has not demonstrated at this time the Project Area would return to productive agricultural use.
- The Project would be incompatible with nearby agricultural, horticultural, tourism and rural lifestyle uses because the offsite impacts of the Project cannot be mitigated to a level that would allow these uses to continue without experiencing significant detriment.
- The Project would have very significant impacts on the amenity of the immediate area and more broadly.

12.5 Overall conclusions on land use planning

The IAC concludes:

- The Project's temporary change in land use within the Project Area from agriculture to mining for the life of the mine would be acceptable.
- The longer-term impacts on the agricultural uses of the Project Area are uncertain and the Proponent has not demonstrated at this time the Project Area would return to productive agricultural use.
- The Project would be incompatible with nearby agricultural, horticultural, tourism and rural lifestyle uses because the offsite impacts of the Project cannot be mitigated to a level that would allow these uses to continue without experiencing significant detriment.
- The Project would have very significant impacts on the amenity of the immediate area and more broadly.

13 Landscape and visual

13.1 Introduction

Landscape and visual effects were discussed in EES Chapter 9.10 and Appendix A014. Additional material was provided in TN10⁶¹⁶ (RFI response and graphics package) and TN12.⁶¹⁷

The relevant draft evaluation objectives are:

Landscape and visual - To avoid adverse effects on the landscape and recreational values of the Mitchell River National Park and minimise visual effects on the open space areas.

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.

The landscape and visual impact assessment (Appendix A014) was conducted by Urbis Pty Ltd (Appendix A014) (LVIA).

The EES proposes mitigation measures in Attachment H to address landscape and visual impacts:

- VL01: Visual bunds and screen plantings around the perimeter of the Project Area.
- VL02: Fixed lighting on plant and buildings designed to reduce the potential for light spill.
- VL03: Buildings and roofs clad with non-reflective materials of appropriate colour.
- VL04: Wherever practicable, works scheduled during daylight hours.
- VL05: Progressive rehabilitation of mined areas.
- VL06: Fixed buildings located behind existing vegetation screening. Additional vegetation screening.
- VL07: Landscape restoration to reduce visual impacts from elevated viewpoints.
- VL08: Regular slopes and/or sharp transition angles rounded to provide a natural appearance to the final landform.
- VL09: Disturbed areas (e.g., road reserves) will be revegetated with local indigenous vegetation.
- VL10: Displaced plantation timber and vegetation will be replaced around properties in consultation with relevant landholders.
- VL11: Topsoil will be managed and maintained throughout rehabilitation activities to promote successful re-grassing and tree planting.
- VL12: Containers will be stacked at the rail siding to the maximum height of adjacent screening vegetation and/or topography.
- VL13: Temporary visual bunds will be placed to screen operations within the mine void.

Three socioeconomic mitigation measures are relevant to landscape and visual impacts:

- SE16: The use of low beam lights on vehicles will be promoted except in emergencies or for safety reasons.
- SE17: Site-specific visual impact management will be discussed with affected residents located close to the Project Area.

⁶¹⁶ Document 147 and 148.

⁶¹⁷ Document 149 - Note part of TN12 was redacted from the public due to it containing the names and addresses of residential viewpoints that could experience potential visual impacts and adjacent residences within 2 kilometres of the Project Area.

- SE58: Road works will be avoided on roads used to access areas such as Den of Nargun including Wy Yung Calulu Road and Friday Creek Road.

The IAC was assisted by submissions as to expected visual impacts, but no formal landscape and visual evidence was called. The IAC also undertook site visits to the Project Area and its surrounds.

The key issues are:

- the adequacy of the landscape and visual assessment
- the landscape and visual impacts on nearby residences
- the landscape and visual impacts on open spaces areas
- the landscape and visual impacts on the journey to the Mitchell River National Park/impacts on the tourism experience
- the landscape and visual impacts of night lighting.

13.2 Adequacy of the landscape and visual assessment

13.2.1 Background

Chapter 9.10 addressed landscape and visual impacts of the Project, relying on the LVIA.

The LVIA identified twenty-three “*typical representative sensitive viewpoints*” across the Project Area and its surrounds, including viewpoints from rural residences and settlements, recreational and tourist attractions, and along tourism routes (notably Fernbank - Glenaladale Road and Bairnsdale - Dargo Road).⁶¹⁸ The views from these selected viewpoints were assessed taking into account the viewing distance, visual setting, landscape character, potential visual modification, visual sensitivity, number of viewers, and duration of view to reach a potential visual impact rating.

One or two photographs of each viewpoint were provided, with photo simulations provided for some viewpoints.⁶¹⁹ The LVIA included 3D model views to demonstrate the landscape character of three viewpoints along diverted roads (RD1, RD3 and RD4) as well as at 12 – 15 years post rehabilitation.⁶²⁰ No photomontages were provided, even when requested by the IAC for viewpoints with potentially high impacts, although the Proponent did provide additional photo simulations for three high impact locations.⁶²¹ In response to the IAC’s request, the Proponent provided an assessment (undertaken by Urbis) of the impact on the viewing experience while travelling along the Fernbank - Glenaladale Road and Bairnsdale - Dargo Roads, adding to its initial assessment of static viewpoints along these roads.⁶²²

The LVIA assessed the effectiveness of the proposed mitigation measures by comparing the initial situation with the residual impacts that would be experienced after the proposed landscape measures had mostly matured, which Urbis considered to be 10 years after initial establishment of vegetation.⁶²³

⁶¹⁸ Appendix A014, page 37.

⁶¹⁹ Appendix A014, page 47. Where photo simulations were provided, the LVIA typically a photograph of each of the following was provided in the LVIA: (1) view from Receptor to Project; (2) photo simulation of Mining Operations – Overburden Stockpiles; (3) photo simulation of Post Mining

⁶²⁰ Appendix A014, Appendix D.

⁶²¹ TN10 graphics package.

⁶²² TN10, graphics package.

⁶²³ Appendix A014, page 7.

13.2.2 Submissions

The MFG submission was highly critical of the Urbis assessment and its methodology. The key issue raised in its submission was that Urbis failed to appreciate or understand how the landscape was valued by the local community, farmers and workers who choose to work in the area to enjoy the views, and by visitors to the area.⁶²⁴ This led to an undervaluing of the existing landscape and views, as well as a diminishing of the potential landscape and visual impacts of the Project:

Urbis's report presents an impression of land which currently has limited visual appeal. It does not reflect the reality of the landscape. ... The vistas of the eastern highlands are exceptional, forming an important backdrop for the area. Likewise, the views over the Mitchell River valley from the Industrial mine site are spectacular and rate as some of the best views in rural Victoria.

The current agricultural landscape is varied and always interesting. There is a mix of old trees, winding roads and farm housing, shearing sheds and yards and many farm dams in the working environment. The ever-changing cropping of the Mitchell Valley is anything but boring and gives a vista of a highly productive landscape.

Numerous comments on the report are particularly subjective, or outright incorrect. Rather than sequentially list them, indicators of these themes are as follows.

For example, a subjective assessment [on] page 18 [of the LVIA states] ... "River Plain Horticultural landscapes are found in the flat areas adjacent to the Mitchell River. They consist of large crop fields which have a distinctive geometric pattern in aerial view. But because of the large scale of these field and the flat topography, the landscape tends to appear monotonous when viewed from the ground".

The Lindenow Flats are a patchwork of changing colours.⁶²⁵

MFG also submitted the LVIA failed to address the impact of the change of character of the Project Area landscape from rural to industrial and the resulting impacts on the rural surrounding landscape and views:

... Urbis had a narrow focus on the concepts of Landscape and Visual Impact, tending to give most attention to the physical topography, particularly around the proposed mine site ... They were inclined to minimise or disregard concerns around changes to landscape as it changes from Rural to Industrial. This includes increased traffic flows, including frequent Double-B trucks on roads, dust, mining machinery and the mine pit itself. The issue of emotional connection to landscape wasn't mentioned in the report, with physiological benefits well researched and documented pertaining to green space and wellbeing.⁶²⁶

Dust generated during the Project is not mentioned at all, and this is pronounced.⁶²⁷

In addition, MFG submitted that Urbis took a static approach, assessing the landscape and visual impacts by assessing a number of identified viewpoints without assessing the dynamics of moving through the landscape.⁶²⁸ MFG was also critical of the static viewpoints selected by Urbis for assessment⁶²⁹ and that a topographic profile was not produced, which it submitted, was needed to give context to those reading the EES who may not be familiar with the region.⁶³⁰

MFG also took issue with the LVIA's assumption the proposed landscaping mitigation measures (i.e. vegetation planting) would reach maturity in 10 years, submitting that a great many trees to

⁶²⁴ Submission 813, Chapter 16.

⁶²⁵ Submission 813, page 580.

⁶²⁶ Submission 813, page 560.

⁶²⁷ Submission 813, page 588.

⁶²⁸ Submission 813, Chapter 16.

⁶²⁹ Submission 813, page 564.

⁶³⁰ Submission 813, page 562.

be removed pre-date European settlement and it would take many more years for the landscape values and views to be restored to their current state.⁶³¹ The other issue for MFG was the failure of the LVIA to consider the impacts on landform of what is a complex topography, with areas such as Perry Gully and Simpsons Gully being filled.⁶³²

In its submissions, Council highlighted the Proponent did not call any landscape or visual evidence and submitted that as result, the LVIA and TN10 were not tested, nor were the proposed landscape and visual mitigation measures. Council submitted the IAC should make its own assessment of the relevant landscape and visual amenity values based on its own experience having visited the area on several occasions and the various submissions on the value submitters place on the visual and landscape elements of the mine site and its surrounds and which provided visual representations of the landscape.⁶³³

Ms Carruthers submitted there had been no visual and landscape assessment of the two relocatable centrifuge buildings.⁶³⁴

13.2.3 Discussion

The IAC considers the scope of the LVIA was limited. It examined a series of static viewpoints but gave limited attention to the landscape as a whole. For example, the visual and landscape impacts experienced when not inside (or very close to) sensitive receptors, such as when working outside, travelling through or undertaking recreational activities in the area, were not adequately assessed.

In terms of tourist routes and the approach to the Mitchell River National Park, the LVIA looked only at several individual sites along the Fernbank – Glenaladale Road and Bairnsdale – Dargo Roads (noting the latter is designated as a scenic route under the Planning Scheme), and only assessed the landscape and visual impacts *along* these routes at the request of the IAC. Some of these inadequacies were addressed in TN10 and the accompanying graphics package. The IAC also accepts that some viewpoints may not have been included by Urbis due to not having access to certain properties to which the IAC was given access.

The LVIA gave limited justification for the choice of individual viewpoints for assessment beyond they were representative,⁶³⁵ with the result that it was not clear to the IAC whether the viewpoints selected provided a good representation of the views impacted. The IAC notes that views from highpoints across the Lindenow Valley to the Project Area, for example, were not included in the LVIA which appears to be a significant gap.

The IAC did not find the photo simulations provided in the LVIA helpful in gaining a good understanding of the visual impact for the relevant viewpoints as they limited were in number and breadth, and the post-Project simulations were overly simplistic.

As a result of these deficiencies, the IAC considers the LVIA and TN10 were of limited usefulness and undertook its own observations.

The IAC undertook inspections of various views referred to in the LVIA and submissions. The IAC also inspected views from across the Lindenow Valley which were not identified in Appendix A014 to assist in understanding the Project Area within its context and how the changed topography of

⁶³¹ Submission 813, pages 581 & 598.

⁶³² Submission 813, page 586.

⁶³³ Document 407 page 87 & 90.

⁶³⁴ Document 644, page 5.

⁶³⁵ Further detail was provided in TN10, page 5.

the area would impact on views. It has reached its own conclusions about the issues raised by submitters, including the accuracy of the impact assessments and the veracity of any subjective judgements that informed those assessments.

The IAC agrees with the submissions of MFG the LVIA undervalued the landscape and visual values of the existing environment and downplayed the potential impacts of the Project on these values. There appears to be no consideration of the visual impacts the proposed dams would make on the landscape. As a late addition, the centrifuge buildings were not part of the original LVIA and their impacts were only modelled.⁶³⁶ No cumulative visual assessment was undertaken. For example, the visual and landscape assessment of the traffic generated by the Project and general industrial movements in and around the mine site, the visual impacts of additional dust created by the mine were not adequately assessed. The extension to the mining licence area was also not assessed

The current landscape currently is topographically diverse and visually dominated by very large, old trees scattered across rural land uses. In this context, the IAC considers that Urbis' assumption that it will only take 10 years for landscape mitigation planting to (mostly) reach maturity is overly optimistic. The timeframe to recreate the current landscape including large tree cover, would likely be well more than 100 years.

13.2.4 Findings

The IAC finds:

- The LVIA and TN10 (and graphics package) were of limited usefulness and downplayed the landscape and visual impacts of the Project.

13.3 Impacts on nearby residences

13.3.1 Background

There are 64 residences within 2 kilometres of the Project (including the Project Area (mine and processing), proposed haul road, Fernbank East rail siding and Mitchell River Pump Station).⁶³⁷

Most residences are situated within a landscape characterised by medium-tall vegetation with varying levels of density, some with vegetation that would screen (fully or partially) views of the Project from the residence.⁶³⁸ The LVIA considered generally that given the progression of mining and restoration of mined areas over the Project's life, the visual impact of the Project would be transitional, with each viewpoint only being exposed to visual impact for a relatively limited time.

The EES assessed that 10 residences could experience visual impacts from the Project⁶³⁹ but after mitigation, only three residences would experience a residual visual impact being assessed as low-moderate, low and very low.⁶⁴⁰

⁶³⁶ TN10, page 6 states "The centrifuges are located at 'inboard' locations within the site, and are not modelled to be visible from dwellings within 2.5km of the Project Area".

⁶³⁷ TN04. Of those residences, 37 are within 2km of the Project Area and 27 are within 2km of only the haul road, rail siding and pump station.

⁶³⁸ Appendix A014, page v. VP17 (receptor 1).

⁶³⁹ EES, Chapter 9, Table 9.63.

⁶⁴⁰ EES, Chapter 9, Table 9.64.

13.3.2 Submissions

The Proponent accepted in its closing submissions the Project will create an “acute” level of visual change from locations close to the mining activity but submitted these impacts would be reduced over time “if rehabilitation is successful”.⁶⁴¹

In response to the IAC’s RFI, the Proponent submitted that although it has had informal discussions with nearby landowners regarding appropriate mitigation measures for visual impacts, the procedures for these would be developed as part of, and included in, the Visual Amenity Management Plan in the Work Plan. The Proponent proposed the Visual and Landscape section of the Mitigation Register (EES Attachment H) be expanded to include the following measure:

VLx: A program of voluntary landscape mitigation works must be offered, and if accepted, made available, to the owners of dwellings within 1km of the mine. The offered mitigation works must include planting and/or other works on the owner’s land to reduce direct views of mining activity from dwellings.⁶⁴²

The Proponent submitted the Visual Amenity Management Plan should make provision for the following:

- timing for the offer to be made (e.g., within 3 months of commencement of construction) to landowners and how long it must remain open for;
- if accepted, the landscaping plan to be prepared in consultation with the relevant landowner;
- the landscaping to be carried out on the landowner’s property at the cost of the Proponent;
- details concerning:
 - plant species and expected height and spread of plants at maturity; and
 - maintenance requirements (e.g., maintenance by the Proponent for up to two years from planting).⁶⁴³

The Proponent noted that ‘defendable space’ would need to be maintained around dwellings and a bushfire risk assessment for proposed landscaping would be required.

MFG was critical of the proposed landscape screening mitigation measures:

Screen planting of trees and other vegetation has been clearly identified as from tube stock, thus the plants will be very immature. There’s an expectation from Urbis that screening foliage, which replaces the removed established and ancient trees, along with lower vegetation, will be at maturity within 10 years. Such a suggestion is folly in East Gippsland. Urbis also acknowledge this maturation rate is dependent on natural rainfall. “given the local climate, speed of revegetation will be dependent on natural rainfall” (7.1.2 pg 97).⁶⁴⁴

Of the three residences the EES assessed as having a residual visual impact, only one of those made a submission but did not refer specifically to views from the residence.⁶⁴⁵

Ms Johnston, whose property is in the Project Area and would be directly impacted by the Project, was critical the LVIA had assessed the visual impact from residences by considering the home yard of rural homes often contain sheds and equipment that can block views around a house and

⁶⁴¹ Document 698, page 4.

⁶⁴² TN10, page 7. Included in Document 775 (Final consolidated mitigation register) as VL14.

⁶⁴³ TN10, pages 7-8.

⁶⁴⁴ Submission 813, page 598.

⁶⁴⁵ TN012. Mr Banks, whose property is approximately 2 km from the mine, submitted that his views would be impacted but that the EES had not adequately assessed this impact because his house had not been included on the sensitive receptor map.

thereby have a greater contributing influence on visual modification than other more distant elements. She also submitted that revegetation would take longer than 10 years to establish.⁶⁴⁶

Ms Reefman of Reefman Arts Estate Retreat submitted the “*stunning views*” enjoyed at her hospitality business (B&B cottages and guest rooms in the main house) will be impacted and visitors will no longer be able to enjoy the views as they will be looking at the “*scar of an open mine site*” and marred by dust.⁶⁴⁷ The Reefman property is located in Calulu, above the Lindenow flats, approximately 13 kilometres and in direct sight of the Project Area. Ms Reefman submitted that past guests have indicated that, should the Project proceed, they would not return, due to concerns about the Project’s impacts.⁶⁴⁸

13.3.3 Discussion

The IAC considers that while there may be impacts on the views from nearby residences, they are likely to be mitigated by the proposed screening vegetation in most circumstances. However, the IAC considers the Proponent’s estimate that visual screening and rehabilitation vegetation would be mostly mature within 10 years is overly optimistic. The IAC also notes that many rural residents prefer wider views than a house surrounded by screening vegetation, as would be the result if visual screening is effective, and residents will still experience (unwanted) change.

The Proponent did not provide a draft of the Visual Amenity Management Plan for review. The IAC considers that if the Project were to proceed the matters suggested by the Proponent to be included in the Visual Amenity Management Plan are appropriate.

Given the length of time for vegetation to mature to a level to provide sufficient screening, the IAC considers that it is critical the Work Plan contain a requirement that visual screening be planned and implemented as early as possible to get the maximum height and density possible prior to mining commencing in any given location.

The IAC considers the option of mature planting (i.e. advanced planting stock) should be offered at sensitive receptors (with the landowners consent).

In respect of proposed mitigation measure VL01 “*Visual bunds and screen plantings will be established at locations around the perimeter of the Project Area to visually screen Project activities from sensitive viewpoints*”, the IAC recommends that Visual Amenity Management Plan include management measures (including consultation with adjoining residents) to ensure the visual bunds are appropriately designed and located to minimise visual impacts of the Project.

13.3.4 Findings

The IAC finds that:

- Visual impacts on residents can be adequately managed.
- If the Project proceeds, the Work Plan should contain:
 - a requirement that sufficiently mature screening native vegetation is established at sensitive receptors (with the owner’s consent)
 - detailed plans including locations for early implementation of visual screen planting prior to mining commencing to mitigate visual impact

⁶⁴⁶ Submission 268, page 54.

⁶⁴⁷ Document 588, pages 1-3.

⁶⁴⁸ Submission 784.

- management measures (including consultation with adjoining residents) to ensure the proposed visual bunds are appropriately designed and located to minimise negative visual impacts of the Project.

13.4 Impacts on open space areas

13.4.1 Background

The LVIA described the Project Area and wider context as follows:

The existing landscape surrounding the Project is a highly modified agricultural and forestry landscape, with powerlines, major and minor roads and scattered buildings. The land use is a mixture of grazed paddocks and cropping, with small groups of trees creating an open landscape character, backdropped to the north and west by forests in varying stages of maturity.⁶⁴⁹

...

The setting is primarily comprised of broad scale agriculture, predominately grazing and cropping, with vegetable production at Lindenow. Forestry plantations of pine and eucalypt cover extensive areas of land to the west between the project area and the Briagolong State Forest. The Mitchell River and Mitchell River National Park are located to the north of the project.⁶⁵⁰

...

The townships of Lindenow and Lindenow South are located approximately 4 km and 6 km, respectively, to the east of the project and are therefore less visually sensitive.

Recreation and tourism uses are mostly located to the north of the project, such as the Mitchell River National Park. Visitor nodes and scenic attractions are located at the southern end of the park, including the Den of Nargun, 9km to the north, and the lookout over the site of the Old Weir on the Mitchell River, 7 km to the north. Tourist accommodation is located at a bed and breakfast business, 5 km to the south of the project.⁶⁵¹

The LVIA concluded that overall, the visual modification level of the Project would be low to moderate due to the relatively low vertical profile of the components of the Project, the siting of key items of fixed plant (such as the WCP and administration and works compound) within existing screening vegetation, and the transitional nature of the impacts resulting from the progressive mining and rehabilitation proposed.⁶⁵² Urbis considered the disturbance to the landscape setting would be like the disturbance created by broadscale soil cultivation associated with agriculture which is often visible for a number of years until surface vegetation establishes.⁶⁵³

However, the LVIA assessed that for some sensitive viewpoints within 2.5 kilometres of the Project, the visual impact would be high to moderate when mining is immediately adjacent to the viewpoint and be at its highest for approximately 30 months from the commencement of operations. This impact would progressively reduce as operations move further away.⁶⁵⁴

The LVIA concluded the visual impact on views from along Chettles Road, looking north towards the Project Area, would be moderate to high due to the 66kV and 22kV powerlines and the two-

⁶⁴⁹ Appendix A014, page 9.

⁶⁵⁰ Appendix A014, page iv.

⁶⁵¹ Appendix A014, page iv.

⁶⁵² Appendix A014, page iv-v.

⁶⁵³ Appendix A014, page v.

⁶⁵⁴ Appendix A014, page v.

metre-high acoustic mound, but would reduce to low as surface vegetation is established on the mounding.⁶⁵⁵

The LVIA concluded the visual impact of the Fernbank Rail Siding will be low due to the siding and associated infrastructure being screened by existing vegetation from the closest, high sensitivity residential receptor (receptor 23).⁶⁵⁶ The visual impact of the powerlines and noise mounds would be moderate to high, reducing to low as surface vegetation is established on the mounding.⁶⁵⁷

In terms of mitigation measures, the LVIA concluded:

The longevity of the operation creates the opportunity to plan ahead and allow for measures to ameliorate visual impacts of fixed plant and facilities prior to operations occurring. Opportunities for amelioration include screen plantings and the construction of vegetated visual bunding at strategic locations around the perimeter of the project area and will apply particularly to sensitive locations subject to a high visual impact within the local and near sub-regional view sheds.⁶⁵⁸

The area is not identified in the Planning Scheme as a ‘significant regional landscapes’ within East Gippsland.⁶⁵⁹ The EES did not identify that any scenic roads under the Planning Scheme would be impacted.

13.4.2 Submissions

The Proponent accepted in its closing submissions the Project will create an “*acute*” level of visual change from locations close to the mining activity but submitted these impacts would reduce over time “*if rehabilitation is successful*”.⁶⁶⁰ While accepting “*the mine will clearly have a visual impact and result in a change to the landscape character of the area*” and arguing the proposed mitigation measures will minimise the impacts to the extent possible,⁶⁶¹ the Proponent submitted that landscape and visual considerations do not present an absolute or overriding impediment to the proposed mine⁶⁶² and invited the IAC to form the view that, on balance, the landscape and visual impacts of the Project are acceptable subject to the mitigations proposed.⁶⁶³

Council submitted the Project would cause “*the loss of the beauty of the countryside*”⁶⁶⁴ in the Project Area and described it thus:

The proposed mine site [is] nestled between a heritage river, ephemeral waterways, and part of the Gippsland Lakes Ramsar site catchment. The site contains large communities of Environment Protection and Biodiversity Act 1999 (EPBC Act) listed threatened species and habitat for such species, State listed flora and fauna and vegetation with landscape value which are easily appreciated and enjoyed by those using the area including cyclists, drivers and other people in the public and private domain.⁶⁶⁵

Council submitted the EES had not identified or considered the Bairnsdale - Dargo Road is a scenic road under C21.04 of the Planning Scheme.⁶⁶⁶

⁶⁵⁵ Appendix A014, page v.

⁶⁵⁶ Appendix A014, page v.

⁶⁵⁷ Appendix A014, page v.

⁶⁵⁸ Appendix A014, page v.

⁶⁵⁹ C21.04 Map 2.

⁶⁶⁰ Document 698, page 4.

⁶⁶¹ Document 698, page 174.

⁶⁶² Document 698, page 174.

⁶⁶³ Document 698, page 179.

⁶⁶⁴ Document 407, page 10.

⁶⁶⁵ Document 407, page 6.

⁶⁶⁶ Document 407, page 85.

MFG submitted the area is characterised by:

... the heritage listed Mitchell River with its clean clear water, the beauty of the Mitchell River National Park on their doorstep, the tranquillity of their panoramic surroundings, clean air and open spaces all make it a beautiful and productive location to produce food and fibre and enjoy the unspoilt landscape.⁶⁶⁷

...

The Glenaladale Region ... comprises rolling hills, fertile multi generational farming land, deep and steep gullies, magnificent and ancient Gums, important roadside vegetation corridors, along with unique microclimates that support a range of rare and endangered Flora and Fauna. Plantations of Eucalypt and Pine are within the Project footprint, and stand in stark contrast to the surrounding landscape. ... Distant hills of the Great Dividing Range provide a majestic backdrop. The clarity of the air enables snow to be visible on distant peaks during the Winter months.⁶⁶⁸

MFG submitted the high level of recreational use of the area demonstrated its scenic values.⁶⁶⁹

On Day 21 of the Hearing, MFG referred the IAC to the concept of ‘cognitive mapping’ as discussed in *Gloucester Resources Ltd v Minister for Planning and Another* [2019] NSWLEC 7 (*Gloucester* case) and argued the submissions in this EES process about the value of the landscape were part of the local people’s process of cognitive mapping.⁶⁷⁰ Whilst accepting that “*matters of principle from that case were fairly put by Counsel for MFG*”, the Proponent made submissions distinguishing the case on its facts.⁶⁷¹

Numerous submissions expressed concern about the mine’s impact on landscape and visual amenity.⁶⁷² For example, Ms Johnston submitted the landscape of the area is important as it provides a shared resource and a setting for flora and fauna, for living, working and recreation, opportunities for aesthetic enjoyment, sense of place and a sense of identity that in turn contribute to identity, continuity with the past and acting as a cultural record and a source of memories, inspiration for learning and for art and creativity.⁶⁷³ She submitted the Project will have a high level of impact on the landscape and impact on its aesthetic appeal, including from changes to the topography.⁶⁷⁴

Ms Clerke, a resident of Glenaladale 2.4 kilometres from the Project Area boundary, submitted, “*The beauty of Glenaladale and surrounds is breath taking*”.⁶⁷⁵ Ms Knights submitted the “*ancient gums, which pre-date European settlement*” at the Fingerboards, together with the landscape more generally, are “*visually spectacular*”.⁶⁷⁶ She described “*the sheer joy the landscape brings*” her as a cyclist:

The winding roads of the Flats, the long, slow climb from Glenaladale up to The Fingerboards, then resting at the top and listening to the wind in the treetops, whilst birds

⁶⁶⁷ Submission 813, page 13.

⁶⁶⁸ Submission 813, pages 562 - 563.

⁶⁶⁹ Document 407, page 561. For example by Cycling Australia for their Tour of East Gippsland and Towards Zero Victorian Road Series, and events staged by the Wellington Cycling Club and Bairnsdale Cycling Club. The route is also promoted on www.discovereastgippsland.com.au and Gippsland Cycling Facebook page. Ulysses motorcycle club regularly tour the area, several times a month.

⁶⁷⁰ Cognitive mapping is discussed at page 299 of the case.

⁶⁷¹ Document 698, page 174.

⁶⁷² Document 25 identifies 308 submissions with “General concern about impacts on farmers and nearby towns, and on the rural and natural environment and visual amenity”, pages 15-16.

⁶⁷³ Submission 268, page 47.

⁶⁷⁴ Submission 268, page 55.

⁶⁷⁵ Document 686, page 1.

⁶⁷⁶ Submission 831, pages 2 & 3.

call. Gnarled gums with birds peeking from hollows, and the gentle calls of stock. And the lure of a delicious cake from The Long Paddock café in Lindenow which makes the last climb up to the café much easier.

No wonder 'The Fingerboards Loop' is such a valued cycling route, and part of Cycling Australia Road races.⁶⁷⁷

Mr Power, a local resident for 27 years within 2 kilometres of the Project Area, submitted the location of the Project would be inappropriate given its "*beautiful natural topography*". He submitted that it would be "*impossible to restore the hills and valleys and small creeks*" of the Project Area.⁶⁷⁸

Ms Carruthers submitted the proposed rehabilitation of the Project Area will not replace the existing landscape saying:

the photographs in the EES depicting changes in the landscape after mining do not reflect the massive loss of trees and woodlands and presented a cartoonist representation of the landscape that bore no reality to the current complex environment.⁶⁷⁹

Ms Carruthers also submitted the two relocatable centrifuge buildings would have negative landscape and visual impacts given their height and which had not been assessed from a visual and landscape perspective.⁶⁸⁰

13.4.3 Discussion

The IAC considers that Project will have a significant and long lasting impact on the landscape values of the Project Area and its surrounds.

Although highly modified by agriculture, the Project is within a varied rural landscape that contains significant and protected threatened native species and habitats, valuable remnant roadside vegetation (native and non-native) and many large hollow-bearing trees (native and non-native), dotted across the landscape, all of which add to its scenic value. The topography is varied with undulating country giving way to steep gullies and escarpments. Further, the Project Area is near the well-populated and used Lindenow Valley flats, which themselves have scenic values and interest adding to the overall scenic value of the wider landscape within which an open cut mine is proposed. The Project is located approximately 10 kilometres to the south of the Mitchell River National Park and with the densely vegetated mountains of the National Park as a backdrop. The impacts on the approach to the National Park are discussed in the next section [13.5].

The IAC considers the EES and the Proponent's submissions sought to down-play the beauty of the area, while, on the other hand, the presentations and photos of many submitters focussed on the most beautiful areas and views. Taking this into consideration and relying on the IAC's own experiences of the landscape, the IAC considers the landscape is an attractive treed rural setting that would be fundamentally impacted by the Project. Even taking into account the proposed rehabilitation and other mitigation measures, the residual impact would be a loss of that character, particularly due to the extent of loss of vegetation and large trees and changes to the topography.

While the Project Area is proposed to be screened by vegetation and mounds, the IAC considers the screening vegetation would take many years to be effective and questions whether it would

⁶⁷⁷ Submission 831, page12.

⁶⁷⁸ Submission 849, page 1 (PDF 2).

⁶⁷⁹ Document 644, page 12.

⁶⁸⁰ Document 644, page 5.

have sufficient variety to replicate the current vegetation. The IAC accepts that progressive mining and rehabilitation will reduce the landscape impacts to some extent, and the return of land to pasture may be relatively quick with the result that visually (if not productively) paddocks may return to their former state (less the large trees that now dot the landscape). Further, the IAC accepts the centrifuge buildings, although 11.5 metres high, will be clad in neutral-coloured materials and are unlikely to significantly add to the overall visual and landscape impacts.

However, the IAC considers during mining operations, the nature of the landscape in the immediate vicinity of the Project Area, and to a lesser extent the Infrastructure Area, will change from a rural landscape to an industrial landscape with associated noise, dust, increased traffic (B-doubles and heavy machinery) and other amenity impacts. There will also be dams and spillways which will read as horizontal lines in the landscape. The difference between the form, pattern, texture and colour of the mining landscape as compared to the existing landscape will be stark.

In the longer term, the IAC considers the combination of loss of the natural array of the existing vegetation (native and non-native), particularly the larger paddock trees and the mosaic of species and variety of ages of vegetation, together with the changes to the current complex topography would not be adequately mitigated by the proposed rehabilitation. In relation to Urbis' conclusion the disturbance to the landscape setting would be like the disturbance created by broadscale soil cultivation associated with agriculture which is often visible for a number of years until surface vegetation establishes, the IAC considers that agricultural disturbance, would not include removal of all the vegetation and old trees. As a result, the IAC rejects this conclusion as overly simplistic. In the IAC's opinion, the proposed rehabilitated landscape would be much less visually articulated, with visually interesting areas such as the Perry Gully being lost.

As a result, the IAC considers that views from surrounding areas, such as areas immediately adjacent to the Project Area, the Lindenow Valley flats and surrounding higher land will be negatively impacted by the Project, to different extents depending on the location and where mining is taking place at the time. The IAC considers the impact of the Project on the distinctive landscape values of the area will be very high, at least until screening vegetation around the mining areas begins to ameliorate the stark visual impact of cleared land. The IAC also notes the Project Area, and therefore the spatial scope of potential landscape impacts, is extensive at 1,675 hectares (the playing surface of the MCG is approximately 1.772 hectares so approximately 945 MCGs), of which 1,350 hectares is proposed to be disturbed by mining activities (approximately 761 MCGs).⁶⁸¹

The IAC also considers it highly likely that dust from the mine will be visible, despite the implementation of dust mitigation measures, and will add to the adverse impact of the Project on the scenic qualities of the area.

Further, the IAC accepts the findings of the *Gloucester* case, which were based on expert landscape evidence, that people build a cognitive or mental map of a particular locality which extends beyond the visibility of activities taking place from individual viewpoints. Even where an activity such as mining is not seen, if people know that it is there, they incorporate it into their cognitive map of the area, and it becomes part of the character of the landscape of the setting.⁶⁸² Applying this principle (as distinct from the decision in *Gloucester*), the IAC accepts the submissions

⁶⁸¹ EES Chapter 3.

⁶⁸² Cognitive mapping is discussed at page 299 of the case.

of MFG and others the if the Project were to proceed, the local community would build the mine into their cognitive map of the area as an unwelcome feature in the landscape.

13.4.4 Findings

The IAC finds:

- The landscape of the Project Area and its surrounds has a scenic quality that would be fundamentally changed by the Project.
- Even considering the proposed rehabilitation and other mitigation measures, the residual impact would be a loss of character, particularly the extent of loss of vegetation and large trees and changes to the topography that would result from the Project.
- The loss of landscape values would create an unwelcome feature in the local community's cognitive map of the area.

13.5 Impact on the journey to the Mitchell River National Park

13.5.1 Background

The Mitchell River National Park is situated to the north of the Project Area and can be reached via the Bairnsdale - Dargo Road (from the Project Area or Bairnsdale) or the Fernbank - Glenaladale Road and the Bairnsdale - Dargo Road (from the Princes Highway to the south). The EES proposes that Bairnsdale – Dargo Road will be diverted south at approximately year 5 of the mine life before returning to its original alignment in year 8 while Fernbank – Glenaladale Road would be realigned to the east in year 5.⁶⁸³

The LVIA assessed the Project as having no visual impact on the Mitchell River National Park itself on the basis the Project Area is not visible from the viewpoints selected for assessment, being the accessible tourist nodes in the Park, although it did acknowledge that night time lighting could be visible as a slight glow.⁶⁸⁴

The LVIA assessed the visual impacts along the Bairnsdale - Dargo Road by undertaking an assessment of three viewpoints along the road (RD1, RD3 and RD4). It noted the diversion of roads will result in alignments with a very different landscape character from that which currently exists with the most obvious difference being lack of roadside vegetation and the prominence of mining related activities.⁶⁸⁵ A viewpoint on Fernbank - Glenaladale Road (RD2) situated just south of the Fingerboards intersection was also assessed.

The LVIA assessed the initial impact on the diverted tourist roads as being high, with a residual impact as being low.⁶⁸⁶ Urbis considered the visual impact would begin to reduce reasonably quickly after grass cover is established on exposed soils along these routes, with further reduction in impact to low after the establishment of trees throughout the landscape after about five years.

⁶⁸³ Appendix A014, page 92.

⁶⁸⁴ These locations are the Mitchell River (looking south to the Project Area) (VP1), Deadcock Den (VP2), Den of Nargun (VP3), Bluff Lookout (VP4), and Den of Nargun Cat Park and Picnic Area (VP5) and shown on the map in Figure 19, LVIA Appendix A014, p 39 and discussed at pages 47-56 & 96

⁶⁸⁵ Appendix A014, page 92.

⁶⁸⁶ Appendix A014, page 100 (Table 8).

Overall, the EES assessed that people working in or travelling through the Project Area or living in the broader landscape would experience moderate residual impacts on lifestyle due to views of the Project Area from roads such as Bairnsdale - Dargo Road and Fernbank - Glenaladale Road.⁶⁸⁷

13.5.2 Submissions

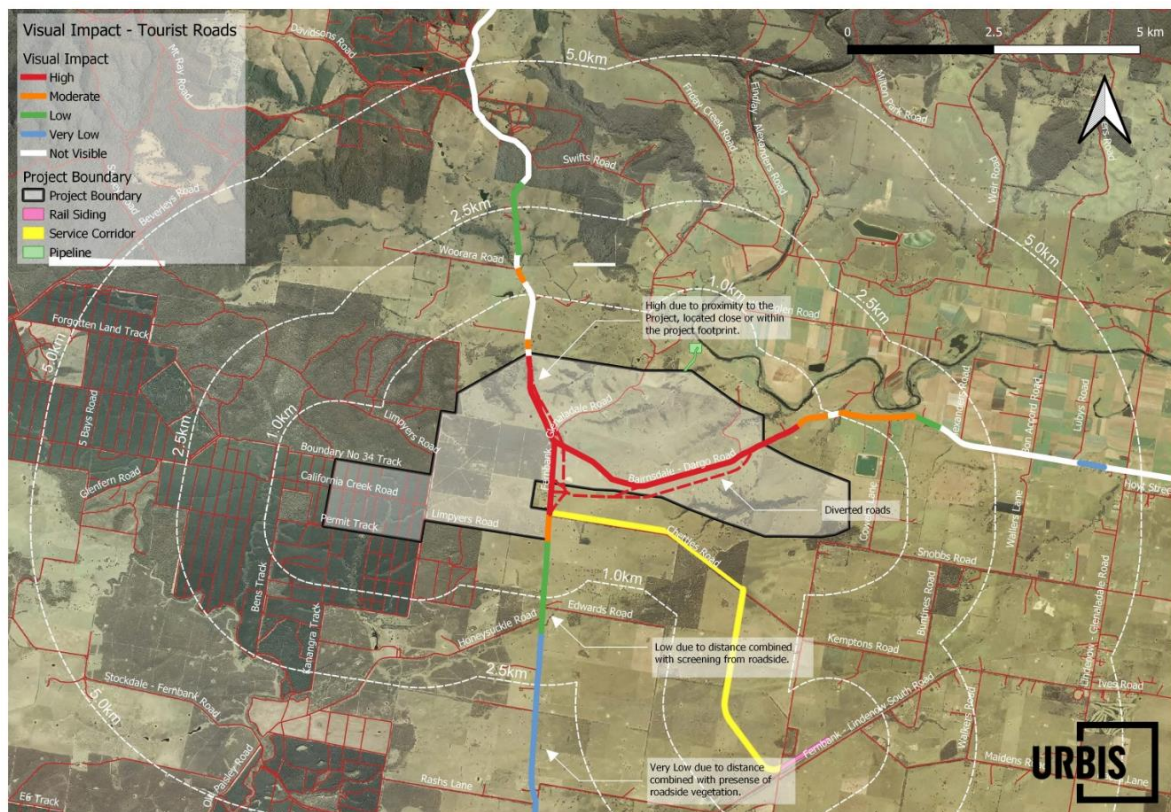
The Proponent accepted in its closing submissions the Project will create an “acute” level of visual change from locations close to the mining activity but submitted these impacts would be reduced over time “if rehabilitation is successful”.⁶⁸⁸

The Proponent submitted that elevated areas in the Mitchel River National Park that may have a view of the Project Area are low usage walking tracks set within tall and dense forest with limited outward views. It suggested:

Given this setting, and the distances to the Project (greater than 5km), any such views would be assessed as having a low visual impact according to the methodologies in the LVIA.⁶⁸⁹

In the further landscape and visual assessment provided in TN10, the tourist route visual impact map prepared by Urbis identifies a high visual impact on Fernbank - Glenaladale Road and the Bairnsdale - Dargo Road within (or immediately adjacent to) the Project, there were relatively short areas of road that would have a medium visual impact (mainly on the Bairnsdale – Dargo Road as it approaches the Project Area from the east) or low visual impact from the Project. There would be no impact on the remainder due to roadside vegetation screening or topography.

Figure 26 Visual impact - Tourist roads⁶⁹⁰



687 EES Chapter 9, section 9.13.3.1, table 9.79.

688 Document 698, page 4.

689 TN10, page 4.

690 Document 148, page 20.

MFG took issue with the choice of viewpoints in the Mitchell River National Park submitting they were all located in gullies. It also submitted the LVIA had failed to examine the views travelling to and from the Mitchell River National Park or to produce a topographic profile to give context to those reading the EES who may not be familiar with the region.⁶⁹¹ MFG submitted the Bairnsdale Dargo Road, along with many other nearby roads, is very popular for tourist and recreational activities, particularly on weekends and during holidays.⁶⁹²

More generally, MFG expressed concern about the impact of the industrial nature of the mining activity and resulting impacts such as the loss of roadside vegetation, increased heavy traffic, and dust on the scenic values of the landscape and in particular, the journey through the Project Area to the Mitchell River National Park and other local destinations.⁶⁹³

Ms Barnes submitted the Project's footprint would impact several tributaries integral to the Mitchell River catchment, destroying the landscape and visual amenity of the area.⁶⁹⁴

Mr Waller submitted:

Putting an open cut mine in the entry end of the region virtually destroys this ['clean green'] image. As well, with adding in the offsite impacts of dust, noise and heavy truck movements compounds the problem. Travellers to the natural and culturally significant Mitchell River National Park will have to travel through the industrial activity of the mine and avoid heavily laden trucks. The many and increasing number of visitors to Dargo and the Alps will also have to drive through the mine area.⁶⁹⁵

Ms Carruthers submitted the centrifuge buildings would have negative landscape and visual impacts given their height and would be visible from the Mitchell River National Park.⁶⁹⁶

13.5.3 Discussion

The IAC notes the LVIA took a very static and somewhat narrow approach to the landscape and visual assessment and did not take account of the lived experience of the landscape. Although an assessment of the impact on the tourist drive experience was provided, at the request of the IAC, no consideration of impacts on the journey to the Mitchell River National Park was undertaken.

On one of its site visits, the IAC drove through the Project Area and on to the Mitchell River National Park to the Den of Nargun. The IAC experienced the way the road twists and turns through the undulating countryside of the Project Area, with its road-side vegetation and considered the impact the change of the Project Area from its current state to an operating mine would have on the journey to the Mitchell River National Park.

The IAC considers that while there would be very limited, if any, impact on the views *from* the key tourist destinations in the Mitchell River National Park due to the topography and vegetation screening, the tourist experience of journey to the Park would be negatively impacted and would detract from the overall tourist and recreational experience of visiting the Park. The IAC considers some visitors might be put off by the thought of travelling through a mine site to get there, and so there could also be negative impacts on tourist visitation to the Park.

⁶⁹¹ Submission 813, page 562.

⁶⁹² Submission 813, page 564-565.

⁶⁹³ Submission 813, page 564-565.

⁶⁹⁴ Document 488, page 18.

⁶⁹⁵ Submission 652, pages 7-8.

⁶⁹⁶ Document 644, page 5.

The IAC considers there is insufficient information to assess whether the Project Area would be visible from walking tracks within the Park. However, it considers that given the IAC's conclusions on the local community's cognitive mapping of the area, the cognitive map of the area formed by bushwalkers and other users of the Park is also likely to be impacted.

13.5.4 Findings

The IAC finds:

- The Project would have a significant impact on the landscape values of the journey to the Mitchell River National Park and therefore may detract from the visitor experience to the Park itself.
- The Project could have an impact on the cognitive mapping of the area for recreational users of the Park.
- The Project would not have a significant impact on the views *from* the Mitchell River National Park.

13.6 The impacts of night lighting

13.6.1 Background

The Project would operate 24 hours a day within an otherwise dark rural setting. Night lighting would be required for on-site Project infrastructure such as the main administration complex, equipment storage compounds and processing facilities. There would also be stationary work lights associated with mining activities as they progress through the Project Area, which may be shielded or obscured from view in the mining voids. In addition, there would be vehicle mounted lights (headlights and hazard lights) which at times will be visible on the surface of the Project Area and other times in the mine void. Lighting may also be required at road intersections.⁶⁹⁷

The EES states the overall impact of night lighting throughout the Project will be low, although it did acknowledge that impacts were in part dependent on individual perceptions and sensitivities:

Lighting of the fixed plant components of the proposed mine will be visible from a number of locations with direct views of the site, such as the surrounding and adjacent road network. For residences with surrounding, screening vegetation, the lighting of the project components will generally be seen as a soft glow during darkness. Refraction off clouds, when present, will make lighting more apparent in cloudy conditions than during clear meteorological conditions. The overall impact of the night lighting is expected to be low throughout the project.⁶⁹⁸

The LVIA did not model lux levels for the Project.⁶⁹⁹

The LVIA suggested that lighting at surface level (as opposed to in the mine void) could be targeted and appropriately baffled or shielded, with specific lighting design, to minimise impacts.⁷⁰⁰

13.6.2 Submissions

The Proponent submitted that no dwellings would have direct views of fixed plant or buildings (i.e., the WCP, centrifuges, Fernbank siding, water pump station) that will use lighting at night (i.e., after

⁶⁹⁷ Appendix A014, page 95-96.

⁶⁹⁸ EES Chapter 9.10.4.

⁶⁹⁹ TN10, page 7.

⁷⁰⁰ Appendix A014, page 98.

10pm).⁷⁰¹ The Mitchell River pump station would have only a security light and/or motion sensing light which would be minimal and baffled to reduce light spill. The rail siding will not operate in the night time period (after 10pm).

The Proponent submitted that light spill would be minimised in accordance with best practice and the proposed Visual Amenity Management Plan.⁷⁰² Light spill from fixed sources would be minimised in accordance with mitigation measure VL02 (Mitigation Register, EES Attachment H), which provides:

Fixed lighting on plant and buildings will be designed to reduce the potential for light spill through measures such as focussed/targeted lighting and installation of shields or baffles.⁷⁰³

The Proponent accepted that offsite truck movements would be a source of direct light on public roads for non-preferred transport routes. No truck movements are proposed along the private haul road to the Fernbank siding at night and the Proponent submitted, therefore, there would be no unreasonable truck light impacts would arise from this transport option.⁷⁰⁴

The Proponent submitted the ‘soft glow’ created by lighting from the Project will not exceed 0.1 lux at any surrounding dwelling, including under cloudy conditions.⁷⁰⁵ The Proponent indicated that it is prepared to commit to an obligation to ensure that this standard is met.

The Proponent submitted:

Impacts from internal mobile operations will be dependent on adoption of management measures, for example, the use of baffled / shielded lights on plant and equipment, mobile lighting units being focused internally and operating behind stockpiles. If these actions are taken, obtrusive light effects on any receivers will be low. These best practice lighting measures, e.g., as contained in Appendix B of the LVIA, will be documented in the Visual Amenity Management Plan (a plan which is foreshadowed in TN02 – Expert Recommendations, p 88, and which would form part of Risk Management Plan under the Work Plan.)

For offsite truck movements, truck lights will provide a

MFG submitted that lights from vehicles using roads in the area or agricultural equipment working into the night is transient in nature and that standard street lighting is infrequent in the Project Area and surrounds, outside townships.⁷⁰⁶ In contrast, it submitted:

The Project site will have moving vehicles with constant headlights and flashing hazard lights for OH&S purposes. Despite the movement of light sources, Urbis are surprisingly confident the Project will be identified by a “soft glow” or “slight luminescence” overnight. Given the number of vehicles, fixed lighting and reflecting light from Mine void walls, ‘soft glow’ is very subjective. There is no clear reference range of the amount of light expected from the Project area.⁷⁰⁷

Ms Johnston, whose property is in the Project Area, submitted that rural nightscapes are significantly different to urban ones and at Glenaladale, there are no streetlights with only occasional passing vehicles and agricultural equipment working into the evening.⁷⁰⁸

⁷⁰¹ TN10, page 6.

⁷⁰² TN10, page 7. The Visual Amenity Management Plan is foreshadowed in TN02 – Expert Recommendations, page 88, and would form part of Risk Management Plan under the Work Plan.

⁷⁰³ TN10, page 6.

⁷⁰⁴ TN10, page 7.

⁷⁰⁵ TN10, page 7.

⁷⁰⁶ Submission 813, page 588.

⁷⁰⁷ Submission 813, page 588.

⁷⁰⁸ Submission 268, page 55.

Several submitters expressed concern over the impacts of night time lighting.⁷⁰⁹ For example, Mr Geoff Banks, who lives within 2 kilometres of the Project Area, submitted the lights that would shine all night would be part of the “huge mental impact” of the Project.⁷¹⁰

Ms Hildebrandt submitted that natural darkness has an intrinsic value in the same way as clean water, air and soil.⁷¹¹

13.6.3 Discussion

All parties accepted the mine would have at least low levels of light spill at night, with the Proponent describing the residual impact as a “*soft glow*”. The IAC notes the mine is proposed to operate 24/7 but that night operations will be more limited than during the day. For example, no truck movements are proposed along the private haul road to the Fernbank siding at night. However, the IAC considers that there will be some increased traffic associated with the Project using roads at night including mine staff coming on and off shift.

Further, the IAC also notes the mine’s night period appears to start at 10pm. In terms of night lighting, this means there would be lighting impacts from daytime operations from dusk until 10pm. In winter this would mean approximately four hours with full day operations and associated lighting before the night lighting measures apply, but only a couple of hours during summer months.

Overall, the IAC considers the night lighting would disturb the dark rural environment, with impacts on nearby residences being more pronounced when mining is nearby. The IAC also considers that given the Project would be situated on a plateau, the glow of the Project will be visible across the landscape at night, including across the Lindenow Valley and the foothills, as well as from the Mitchell River National Park.

The IAC notes the Proponent is willing to commit to an obligation the light spill will not exceed 0.1 lux at any surrounding dwelling, including under cloudy conditions.

13.6.4 Findings

The IAC finds that:

- The Project would disturb the night time dark rural environment of adjacent properties and the glow of the Project would be visible across the landscape at night.

13.7 Overall conclusions on landscape and value

The Panel concludes:

- The LVIA and graphics package were of limited usefulness and downplayed the landscape and visual impacts of the Project.
- Visual impacts on nearby residents can be adequately managed.
- If the Project proceeds, the Work Plan should contain:
 - a requirement that sufficiently mature screening native vegetation is established at sensitive receptors (with the owner’s consent)

⁷⁰⁹ Document 25, page 15 refers to concern about “Light pollution due to night time operations” in Submissions 12, 266, 268, 305, 481, 488, 652, 659, 672, 813, 837, 875 & 887.

⁷¹⁰ Submission 94.

⁷¹¹ Document 378, page 6.

- detailed plans including locations for early implementation of visual screen planting prior to mining commencing to mitigate visual impact
- management measures (including consultation with adjoining residents) to ensure the proposed visual bunds are appropriately designed and located to minimise negative visual impacts of the Project.
- The landscape of the Project Area and its surrounds has a scenic quality that would be fundamentally and irreparably changed by the Project.
- Even considering the proposed rehabilitation and other mitigation measures, the residual impact would be a loss of that scenic quality, particularly the extent of loss of vegetation and large trees and changes to the topography that would result from the Project.
- The loss of landscape values would create an unwelcome in the local community's cognitive map of the area.
- The Project would have a significant impact on the landscape values of the journey to the Mitchell River National Park and thereby detract from the landscape and recreational values of the Park itself, but would not have a significant impact on the views *from* the Mitchell River National Park.
- The Project would disturb the night time dark rural environment of adjacent properties and the glow of the Project would be visible across the landscape at night.

14 Agriculture and horticulture

14.1 Introduction

Agriculture and horticulture issues are discussed in the EES Chapter 12 and Technical Reports in Appendices A015, A016 and A018 and Attachment G Stakeholder Engagement.

The relevant draft evaluation objectives are:

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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

Rehabilitation – To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.

The EES proposes mitigation measures included in EES Attachment H to manage the impacts of the Project on agriculture and horticulture. These, were, in summary:

- AG01: Potential solutions to labour competition.
- AG02: Local agriculture and horticulture industry body engagement.
- AG03: Environment review committee – local representation.
- AG04: Adherence to the work plan.
- AG08: A community engagement plan.
- AG10: Local workforce retention initiatives.
- AG11: A working group with growers will be established.
- AG12: Environmental certification schemes.
- AG13: An annual local community event.
- AG14: Minimising the amount of land clearance wherever possible.
- AG15: Progressive rehabilitation where feasible.

The Proponent provided the following TN relating to agriculture and horticulture:

- TN4: Sensitive Receptors – Response to IAC Request for information – Part 2.8, questions 23 and 24
- TN7: Dust Deposition Tables - Response to IAC Request for information questions 57 and 61
- TN11: Consultation for agricultural and horticultural assessments
- TN25: Compliance enforcement and complaint handling process
- TN34: Contribution to dust modelling - Response to IAC Request for information Tabled Document 401.

The IAC benefited from submissions and evidence in its consideration of agriculture and horticulture related impacts, as well as visits to agricultural and horticultural businesses near the Project. Table 16 lists agriculture and horticulture evidence that was called.

Table 16 Agriculture and horticulture evidence

Party	Expert	Firm	Evidence
Proponent	Dr Doris Blaesing	RMCG	- Horticulture Expert Witness Statement, 2 February 2021 ⁷¹² - Supplementary Expert Witness Statement, 8 February 2021 ⁷¹³

14.2 Key issues

The fundamental issue is whether agricultural and horticultural activities can co-exist with a large-scale open cut mine nearby.

The key issues are:

- strategic setting and baseline
- dust impacts
- water quality, quantity and access
- market issues and economic impact.

14.3 Strategic setting and baseline

14.3.1 Background

The EES describes the general settings and baseline conditions for agriculture and horticulture:

Nine settlements and towns are located within 10 kilometres of the project area, with the closest being Glenaladale at 1.5 kilometres from the boundary. These settlements are characterised by small but stable populations with a median age higher than that of Victoria's. Some residents in the local region have a strong family history of farming while others moved to the area more recently for lifestyle reasons.

The agri-food sector provides the primary source of income and employment in the area surrounding the project area. The total gross value of agriculture in the local agricultural region (combined Australian Bureau of Statistics areas of Bairnsdale and Bruthen-Omeo) in 2015/16 was \$169.2 million. This value represents approximately 71% of the agriculture output across East Gippsland Shire, 8.3% for the Gippsland region, and 1.3% for Victoria.

The land within the project area is predominately used for dryland agriculture and to a lesser extent forestry. Residential dwellings and public roads also occur in the project area. Many of the roads within the project area and surrounding region have low traffic volumes. Heavy vehicles account for 7 to 18% of all vehicle movements. High quality horticultural production occurs within the Lindenow Valley immediately northeast of the project area (Figure ES-8).⁷¹⁴

Horticulture is a significant industry in the Lindenow Valley. The Horticultural Impact Assessment (HIA) provides the following description:

The Mitchell River flats landscape in the Lindenow Valley is characterised by high value irrigated vegetable production. Many areas have been farmed by the same families for multiple generations. Horticultural production activities are concentrated in the area due to a combination of:

- Quality rich alluvial free draining soils
- Suitable topography for intensive production

⁷¹² Document 73.

⁷¹³ Document 126.

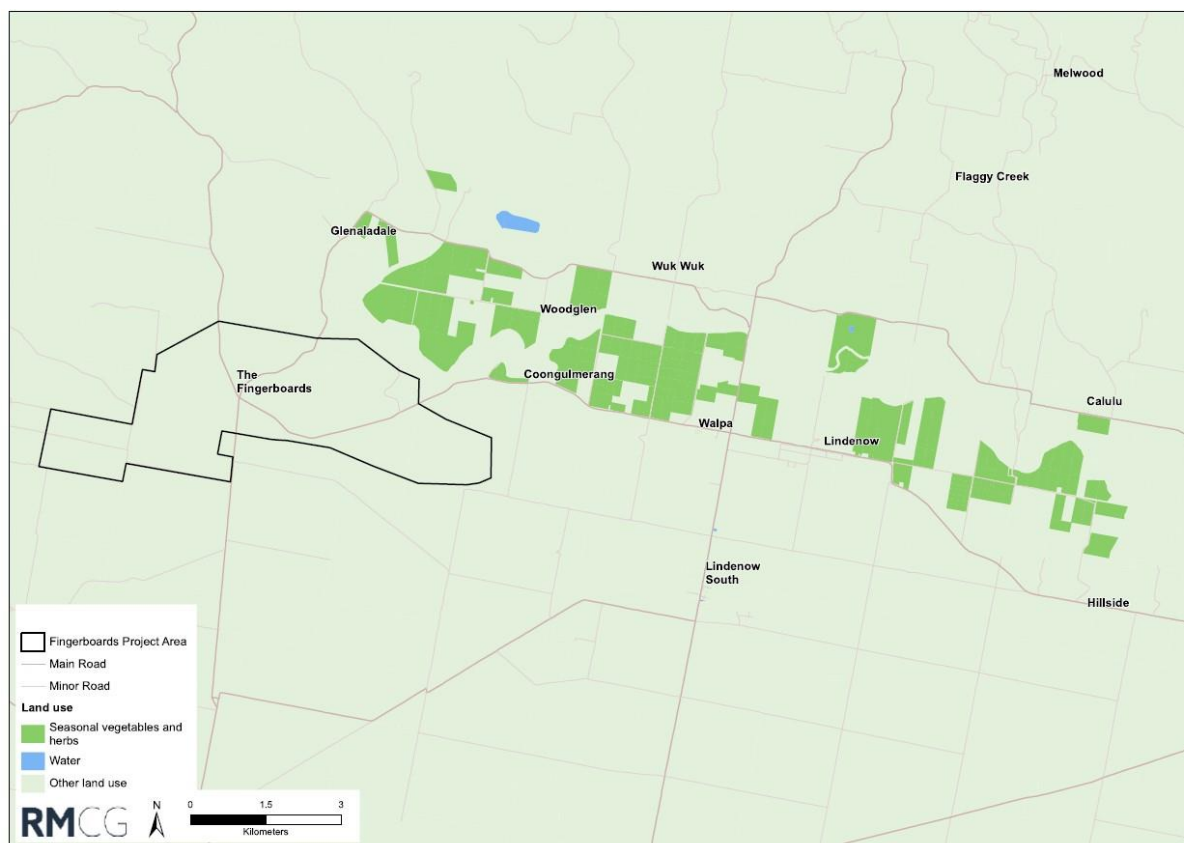
⁷¹⁴ EES Executive Summary page xiv.

- Reliable rainfall
- Accessible irrigation
- Suitable climatic growing conditions
- Windows of market access for higher product return in shoulder periods to peak production.

Key horticultural and agriculture values and issues around the Lindenow Valley and Project Area, summarised from the HIA and Agricultural Impact Assessment (AIA) include:⁷¹⁵

- Approximately 4,700 hectares under production including beans, broccoli, capsicum, carrots, cauliflowers, sweet corn, lettuce, spinach (including baby leaf), peas, pumpkin, and onion (see Figure 27).
- Approximately 80 per cent of produce goes interstate, approximately 20 per cent in Victoria and 1 per cent exported.
- Six of the top ten salad producing companies in Australia have a footprint in Eastern Gippsland.
- Australia's largest producer of bagged, ready-to-eat, washed salads is in Bairnsdale.
- Pre-cutting and or prepacking to create ready to eat or ready to cook vegetable products.
- The Lindenow flats are a high-value vegetable production area of national importance (a 'food bowl' or 'salad bowl').
- The combination of excellent soil and land capability, access to water, typically dry winters and cool easterly winds during summer make for ideal growing conditions. The industry can supply vegetables when other Australian production areas are limited by weather and other factors.
- Vegetable growing and profitability per hectare is much higher than for broadacre enterprises (see indicative margins in Table 17 – local industry estimates for production are much higher).
- The local vegetable industry is a major employer:
 - peak seasonal employment of 1,526 and a low of 656 in 2014/2015 compared to 14,276 part-time and full-time employees in East Gippsland Shire in 2011.
 - approximately 800 people employed in the two main processing companies
 - significant downstream employment.
- Approximately 443 hectares of agricultural production will be affected by the Project at any time.
- The lost value of agricultural production will be in the order of \$87,250 to \$125,250 per annum because of the Project (see Table 18 for margins in EES).
- Agricultural land use in the local region includes agricultural enterprises (wool and meat sheep, beef, dairy, vegetable production and broadacre cropping) and plantation and native forest forestry.

⁷¹⁵ Appendix A015 and A016.

Figure 27 Land use for vegetable production in the Lindenow Valley⁷¹⁶**Table 17** Indicative Profitability of Key Irrigated Vegetable Enterprises⁷¹⁷

Irrigated Vegetable Enterprise	Income (\$/ha)	Variable Costs (\$/ha)	Enterprise Gross Margin (\$/ha)
Asparagus - fresh	26,400	23,452	2,948
Carrots	19,250	12,688	6,562
Beans - fresh	6,000	2,860	3,140
Carrots - fresh	8,200	4,140	4,060
Potatoes - fresh	15,600	8,900	6,700
Lettuce	24,200	21,345	2,855
Onions	6,720	3,220	3,500
Cauliflower - processed	12,510	9,120	3,390
Processed Peas	3,150	1,970	1,180
Sweet corn	23,650	12,845	10,805

Source: Compiled from existing industry gross margin data from the last five years as prepared from consultant's previous projects, and also NSW DPI, and Macquarie Franklin Tasmania assessments. Where figures have deviated between studies an indicative figure has been used based on available ranges.

⁷¹⁶ EES Appendix A016, page 21.

⁷¹⁷ EES Appendix A015, page 23.

Table 18 Weighted Average Project Area Gross Margin/ha⁷¹⁸

Land Use	Proportion of Project Area	Gross Margin (\$/ha)	
		Low	High
Beef cattle	40%	\$128	\$230
Wool Sheep	9%	\$84	\$151
Meat Sheep	9%	\$117	\$229
Blue Gum	15%	\$99	\$99
Radiata Pine	12%	\$369	\$369
Remnant vegetation	7%	\$0	\$0
Road reserve	4%	\$0	\$0
Other	3%	\$0	\$0
Weighted average		\$130	\$187

In July 2019, the Victorian Government declared the Mitchell River horticultural area (the Lindenow Valley) to be exempt from mining. The Government's media release states:

The future security of prime agricultural land in Gippsland is being safeguarded with new protections from mining and minerals exploration being introduced for the Mitchell River floodplain near Bairnsdale.

The exempted area, stretching from Glenaladale to Hillside, is highly valued for its horticultural produce, with farm gate production estimated to be worth over \$100 million per year and providing up to 2000 ongoing and seasonal jobs.

The Mitchell River floodplain is a prime irrigated horticultural area producing a wide variety of fresh vegetables including lettuce, cabbage, peas, capsicum and sweet corn, all of which are enjoyed across Australia.

Geological studies show low potential for minerals development in the floodplain area, which makes mining in the area less likely to be commercially viable compared to the highly-productive farming businesses in the area.

The decision to exempt this area from minerals exploration and mining licencing provides certainty to the highly productive Mitchell River floodplain horticultural business and the many people working in the industry across Gippsland.⁷¹⁹

⁷¹⁸ EES Appendix A015, page 28.

⁷¹⁹ Document 383 Victorian Government media Statement 18 July 2019.

Figure 28 Diagram of exclusion area⁷²⁰

On 10 April 2019 the Federal Government announced a \$10 million fund to support water storage for the Lindenow Valley. The associated media release included, in summary:⁷²¹

- a \$10 million fund will help farmers finance large-scale water storage projects on their farms to capture high spring flows in the Mitchell River
- farmers will need to provide matching funds for projects on their properties
- the Mitchell River catchment is home to seven of Australia's top 10 salad producers and supplies major supermarkets across eastern Australia and is a key employer and contributor to the region's prosperity.

The EES identifies potential impacts for agriculture and horticulture as including:

- increased dust deposition on plants and soils
- loss of market due to reputational damage
- labour shortages
- diminished surface water and groundwater quality and availability.

The EES states:

The project will be managed to avoid or reduce potential impacts to surrounding agriculture and horticulture production. Mitigation measures include progressively rehabilitating the mine void to reduce potential for wind erosion (dust), managing surface water and groundwater in accordance with the relevant approvals, and implementing a seasonal agricultural worker support programs to maintain the availability of local labour to the industry.⁷²²

⁷²⁰ Document 383 Victorian Government media Statement 18 July 2019.

⁷²¹ Federal member for Gippsland Darren Chester – Media Release 10 April 2019.

⁷²² EES Executive Summary page xxxi.

14.3.2 Evidence and submissions

(i) Horticulture

Dr Blaesing was called to give evidence in relation to the impact on the existing horticulture industry. She gave evidence the 2018 estimated value of production of the existing Lindenow Valley horticultural industry was \$62 million (based on 2016 data).⁷²³

Dr Blaesing advised that in 2016, there was 4,700 hectares of horticultural production in the Lindenow Valley and the area under production was now likely to be larger. Dr Blaesing acknowledged under cross examination that she had not interviewed horticultural landholders during preparation of her assessment or evidence to verify local conditions or operational practices, noting that other consultants at her firm (RCMG) had undertaken stakeholder engagement. She agreed the diagram in the HIA showing the extent of horticultural land was incomplete.⁷²⁴

Dr Blaesing said she had relied on other technical studies prepared for the EES and had concluded that risks to horticulture were low, but had not independently validated whether the assumptions made in other technical studies were correct.

In its submission, Bulmer Farms said that it is a fourth-generation family run horticulture enterprise, located in the heart of the Lindenow / Mitchell River Valley. It specialises in lettuce, baby spinach and baby broccoli, and is credited by industry as one of Australia's leading and largest producers of fresh salads in Australia.

Employing up to 170 people in peak summer production periods, Bulmer Farms operates year-round sowing and harvesting. It said they:⁷²⁵

...deliver primary produce to companies such as Vegco/One Harvest "The Largest Bagged Salad Manufactures in the Southern Hemisphere" located in Bairnsdale, Sydney and Brisbane, McDonalds, Australia's largest QSR and Hungry Jacks.

Washed salads and other fresh produce lines are supplied daily to Australia's wholesale domestic Fruit and Vegetable markets, located in Melbourne, Brisbane, Adelaide and Perth.

Bulmer Farms submitted Gippsland hosts seven of the top ten largest (by volume) salad producers in Australia.

Busch Organics operates a 121 hectare certified organic business employing 50 people in the Lindenow Valley.⁷²⁶ It advised the topsoil is 9 metres deep and the orientation of the valley creates cooling breezes. The area has a temperate climate creates a significant growing advantage. Busch Organics submitted that water quality and quantity was a crucial issue for it, and noted its bore levels had dropped over time.

Its submission noted many Busch Organics products are certified to be eaten raw and the organic certification systems it operates under require product origin to be clearly labelled.

⁷²³ Submissions from growers, Council and the VFF and the Government's own media release announcing protection of the Lindenow Valley put the likely value in current terms at \$100-120 million.

⁷²⁴ EES Appendix A016 – diagram 5-1.

⁷²⁵ Submission 711, page 2.

⁷²⁶ Submission 218.

Busch Organics submitted that most horticulturalists are opposed to the Project and questioned why growers were not given the opportunity to validate the material to be presented in the technical studies.

Frais Farms⁷²⁷ is a horticultural producer in the Lindenow area. Frais Farms submitted local packaged fresh vegetable produce is a critical success for the region and the Lindenow Valley is the value-add, fresh food hub in Australia. It said the VegCo processing factory in Bairnsdale is a significant employer that emerged from grower-lead initiatives around fresh salad and other fresh packaged vegetable products. Frais Farms employs 30 permanent staff.

Other submitters, such as Ms Coleman, raised the importance of Victoria's food security.⁷²⁸ Ms Coleman pointed to the importance of areas such as the Lindenow Valley considering the diminishing availability of uncontaminated land and water, the impacts of climate change, and loss of fertile land to urbanisation.⁷²⁹

Many of the horticultural submitters questioned the usefulness of the HIA undertaken, including the validity of the data presented, and the engagement process. Those that had been consulted described casual coffee style chats, rather than a formal and comprehensive evaluation of activity in the horticultural area. Others expressed concern they had not been consulted at all. The raw data obtained from the stakeholder engagement is not included in the EES.

(ii) Agriculture

The Project Area comprises dryland agricultural grazing land (sheep and beef) and forestry plantations (blue gum and radiata pine) on freehold land, although traditionally it was a wool producing area. There are areas of remnant native vegetation along gullies, creeks and roadside reserves.⁷³⁰

No expert evidence was called on agricultural impacts but there were several submissions from agricultural landowners on and around the Project Area. Some farmers who submitted they would be impacted by the Project expressed concern they had not been consulted by the Proponent and submitted the EES had not accurately assessed or understood the impacts on farming enterprises.

Many submitters identified that agriculture in the area is moving towards high value, high certification production including ultrafine wool, European Union certified meat and 'paddock to table' systems certifying high quality produce with consequent increased investment in quality, sustainable, production.

The AIA identifies 19 landholders will be directly affected by the Project.

Submitters Lyn and Geoff Johnston⁷³¹ are fourth generation farmers with their Fingerboards 183 hectare property directly impacted by mining, haul road and other road diversions, plant and equipment, and water storage dams. Their farm produces grass fed beef that is subject to certification processes in respect to quality and contaminants.

In submissions, the IAC was informed about how livestock are moved around their farm depending on seasonal and weather conditions. The Johnstons indicated they drove stock on foot to

⁷²⁷ Submission 530.

⁷²⁸ Submission 679, page 5.

⁷²⁹ Day 27, 30 June 2021.

⁷³⁰ EES Appendix A015 at 2.6.3.

⁷³¹ Submission 268 and Document 629.

minimise stress on the animals, which contributes to better product quality and improved animal welfare. They described the significant rainfall events (east coast lows) that impact the area and the consequent significant runoff from the Project Area to lower areas including the Mitchell River. They explained they move their cattle from areas that flood in major rain events to higher areas, much of which would be mined and therefore unavailable to them for significant periods during the Project.

The Johnstons pointed out how the EES assessments of the area had occurred at the tail end of an extended drought and submitted the EES did not accurately reflect the capability of the land for farming in more normal conditions.

14.3.3 Discussion

Submissions, evidence and observations by the IAC during the Hearing and site inspections confirm the general characterisation of the area as presented in the EES and related technical studies. The area contains a range of small to large scale producers with sophisticated food growing businesses, supplying Victorian, interstate and international markets.

(i) Horticulture

In the context of increasing pressure from urbanisation on horticultural areas closer to Melbourne and the impacts of drier climates on some traditional growing areas, the IAC accepts the natural growing advantages of the Lindenow Valley make it a scarce and important resource in Victoria.

As identified in the EES and submissions, it has high quality deep alluvial soils and generally good water supply. It has a temperate climate that is ideally suited for fresh food production. The Lindenow Valley plays an important role in the national seasonal production of fresh food. Local processing facilities are integral to the supply chain, value adding and local employment generation.

The IAC accepts data and diagrams used in the HIA were based on available data from published sources at the time, but was not validated with existing businesses, Council or the VFF to confirm it was comprehensive and accurate in terms of the extent of horticulture and the flow on businesses that depend on it.

The IAC accepts the horticultural area employs approximately 2,000 ongoing and seasonal workers and based on submissions, the approximate value of horticultural production is in the range of \$100 - \$120 million per annum, and likely higher.

Agricultural evidence was not called by the Proponent, but the IAC considers the general description and characterisation of horticulture and agriculture in the AIA appeared more comprehensive than the HIA and better described the potential impacts and consequences for the sector.⁷³²

By its exclusion from mining, the Victorian Government has identified the Lindenow Valley as an important, strategic food production area. However, the IAC notes the extent of the declared area is geographically constrained and does not protect the horticultural area from external impacts, including from air contamination or changes to water availability or quality. The declared area is 500 metres away from the Project Area, downwind from the prevailing wind.

⁷³² EES Appendix A015 Agriculture Impact Assessment.

The IAC also notes the importance of the Lindenow Valley for horticulture is illustrated by the Commonwealth Government's \$10 million fund for water storage projects in the Lindenow Valley.

The IAC notes the many submissions criticising the Proponent's lack of comprehensive engagement with growers and farmers through the development of the EES and HIA. While there was some contact with horticultural businesses in the Lindenow Valley and its surrounds, it does not seem to have been undertaken to a level that might be expected given the scale and economic value of the horticultural resource and the potential risk to the industry.

Given the limited number of growers involved, it would seem to the IAC that it would have been desirable to capture a comprehensive picture of each grower's activity and production practices, and the quality assurance schemes they operate under, and to have validated that with the growers. This approach would have enabled a more thorough understanding of the existing industry and better informed the Proponent and its technical advisors in preparation of the EES.

The IAC considers that while the EES acknowledged the significance of the Lindenow Valley for horticulture, it did not provide a comprehensive and coherent understanding of the extent of the production areas, the work practices involved, and the extent of the employment and economic activity that it generates.

Given the Government's decision to specifically exclude the Lindenow Valley area from mining, there would be merit in establishing an agreed contemporary baseline that captures the significance of the area and the value adding it generates.

(ii) Agriculture

The studies undertaken for the EES describe the Project Area and surrounding areas as supporting a range of existing agricultural land uses, including sheep and cattle breeding as well as cropping in a mix of dryland or irrigated settings.

What the IAC observed during site inspections, and supported by submissions in relation to dryland agriculture, was a mix of farming families, many of whom were multi-generational, who appeared to be conducting profitable and sustainable businesses. These included prime merino sheep, European Union certified grass-fed beef production and niche agricultural products targeting the restaurant and other sectors.

There was no evidence presented to confirm the assumed stocking rates or validate them against actual rates in the area. Submitters confirmed that stocking rates vary depending on seasonal and climatic conditions and fall during extended dry periods.

For farming businesses and families directly impacted by the Project Area, the AIA describes the impacts, including loss of land, lost productivity, potential need to sell bloodline stock or pay to relocate stock to alternate properties, impacts on the ability to sell land and a level of uncertainty about rehabilitation success to allow operations to recommence in the future.

The IAC accepts the estimates the Project will result in an average loss of productive agricultural land of 443 hectares per annum over the 20-year Project life, the predicted lost value of production of around \$87,250 to \$125,250 per annum and a small associated loss of employment. The IAC also notes the EES did not provide predicted loss of production on surrounding agricultural areas and is unclear if this is reasonable given the potential for offsite impacts as discussed in this report. In broad economic terms the loss is not as significant as for the existing horticultural industry, but not insignificant.

The IAC considers that the AIA did not capture the range of local practices and accreditation or certification schemes.

14.3.4 Findings

The IAC finds:

- The Lindenow Valley is a high value, regional, state and arguably nationally significant horticultural industry, with strong local employment and significant downstream value-adding. It has natural advantages for food production that make it a scarce resource.
- The EES has significantly underestimated the value and the physical extent of the horticultural land use that currently exists and will likely be impacted by the Project. It has not fully understood the business and production practices in the Lindenow Valley and therefore has not properly assessed potential impacts and the effectiveness of proposed mitigation measures.
- Agricultural losses in economic terms are not as significant as for horticulture but will be locally significant for directly affected and potentially for nearby landowners.
- Agriculture in the area is increasingly focusing on high value products with significant investment in production and certification.

14.4 Dust impacts

14.4.1 Background

The IAC visited several horticultural and agricultural properties in the vicinity of the Project Area and in the Lindenow Valley and had the benefit of submissions from existing horticultural and agricultural business operators. The IAC observed a range of small to large scale producers with sophisticated food growing businesses, supplying into Victorian, interstate, and international markets.

The HIA included, in summary, the following issues relating to dust:⁷³³

- dust on leaves can reduce the capacity of the plant to photosynthesise and reduce yields
- dust on some vegetables may cause market defects, particularly for brassica/white vegetables (cauliflowers, broccoli) and other head vegetables (lettuce), bunched leaf lines such as kale or silver beet and loose-leaf salad lines (e.g. baby leaf crops such as spinach, kale, lettuce types, rocket) and herbs
- prepacked salad leaves can be washed, and overhead irrigation and rain is expected to wash dust off plants
- dust is currently a challenge in the Lindenow Valley depending on soil moisture, wind speed, ground cover and soil type, and is managed through land management practices
- dust is generated more from the lighter hillside soils than the heavy alluvial soils of the Mitchell River flats
- baseline dust deposition data for fresh produce grown in the Lindenow Valley was not available
- dust on produce is classed as foreign matter under food safety guidelines and can result in a downgrading of quality or rejection of produce in the supply chain.

⁷³³ EES Appendix A016 Horticultural Impact Assessment at 6.1.2.

The EES stated:⁷³⁴

Air dispersion modelling carried out for operations in years 5, 8 and 12 indicated that dust deposition rates and PM_{2.5} concentrations would be below relevant air quality criteria at sensitive receptors (see Section 9.4.3.1). The predicted concentrations of larger particulates (PM₁₀) were estimated to exceed the air quality criteria on several occasions during years 5, 8 and 12 (see Section 9.4.3.1). No regulatory standard currently exists for dust deposition on vegetables. Standard mitigation measures to control dust releases offsite and the continued implementation of horticultural producers' management practices and quality assurance systems will reduce the potential for project-related dust to affect horticultural and agricultural producers.

14.4.2 Evidence and submissions

(i) Horticulture

The Proponent contended the Project and existing horticultural operations can coexist⁷³⁵ and proposed mitigation measures will result in no adverse impacts for horticultural businesses.

Dr Blaesing noted in evidence that she relied on the air quality assessment by Katestone and concluded that:⁷³⁶

...My response mentions the value of windbreaks around the Project site and in the productive landscape as an important mitigation measure that also has environmental and production benefits.

The HIA report and my response describes typical dust issues and mitigation practices by vegetable producers, as well as relevant (to dust and dirt) food safety (QA) standards and certification. The reference to food safety certification is included to explain that produce, if affected by dust or dirt from any source (including from agricultural activities or traffic) would not be sent to market based on QA standards.

My response includes reference to literature on the potential effect of dust on plant growth and concludes that insufficient data is available for vegetables. Based on data on the effect of dust on photosynthesis of roadside vegetation I estimated that a dust at the level of the daily guideline limit of 120 mg/m² would be unlikely to reduce vegetable crop growth, considering that overhead irrigation used at least once per week unless there is sufficient rain. The irrigation or rain would wash dust off.

I acknowledge that a standard for dust deposition levels in vegetables does not exist.

In relation to food safety Dr Blaesing's evidence concluded:⁷³⁷

...In summary, the air quality modelling and mitigation recommendations by Katestone (EES technical report on air quality), recommended by the HIA report and the already existing dust management measures by vegetable producers (to deal with dust from current sources under food safety QA) show that acceptance of fresh produce by buyers and consumers would not be affected.

Busch Organics submitted that dust is already an issue as the area experiences strong winds from the west that sweep across the plateau (Project Area) and down onto the flats. The company explained that many products are not washed at farm as it impacts transport and shelf life. Hydrocooling is used but is designed to cool product for processing and or transport. Busch Organics said the organic certification systems operated under, require product origin to be clearly

⁷³⁴ EES Chapter 12.

⁷³⁵ The example of an avocado orchard next to a mineral sands mine in Western Australia was discussed in Chapter 12.

⁷³⁶ Document 73, page 2.

⁷³⁷ Document 73, page 2.

labelled and dust cannot be controlled by windbreaks as suggested in the evidence of Dr Blaesing.⁷³⁸

Frais Farms expressed concern about the risks for dust to be blown across the horticultural areas and submitted major retailers would abandon the area if there is dust contamination in their products.⁷³⁹

The Hines⁷⁴⁰ employ 15 permanent staff and farm about 500 metres from the Project Area. Mr Hine said that dust is already an issue, with dust and pollen blowing off the plateau and visible on the river. He said north winds are an issue and can blow for extended periods of time. He raised concerns about the impact of East Coast low major rainfall events, and the ability to intercept and or manage water runoff from the Project.

Mr Hine submitted mitigation measures proposed to remove dust were inappropriate as watering of crops prior to harvest can cause white mould and other issues.

He noted the Katestone and HIA reports⁷⁴¹ assessed dust on *vegetation* and noted there is a huge difference between dust on vegetation and dust on *vegetables*. He indicated his products are all traceable back to the farm where they are produced.

Many submitters involved in agriculture and horticulture described the rigorous quality assurance regimes they currently operate under to ensure they can effectively deliver their product to market and expressed concern about whether they would be able to meet those requirements if their produce is impacted by dust from the Project.

Dr Premier for MFG submitted the Harmonised Australian Retailer Produce Scheme (HARPS) that all growers need to operate within, places the onus on growers to manage risks to fresh food at the source. In summary he submitted:⁷⁴²

- HARPS requires a documented risk assessment for fresh produce growing
- growers must manage identified hazards or not grow the crop
- there is a higher risk where the edible part of plants has contact with soil and most of the Lindenow Valley crops have soil contact
- produce is audited for dust and sand; if these are not controlled growers may lose certification and not be able to supply processors, and processors and supermarkets will look elsewhere for product
- some produce cannot be washed as it affects quality.

The VFF submitted that dust is a major issue for growers but depends on the crop. In reference to the example provided by the Proponent of avocados growing near a mineral sands mine, it submitted that is not such a big issue compared to vegetables due to the different nature and growing characteristics of avocados.⁷⁴³

A number of submitters in the horticultural industry described the nature of their workplaces including, in many cases, high numbers of staff working outdoors. Many raised concerns about

⁷³⁸ Submission 218. Mr Welchman in his evidence for the Proponent in relation to Air Quality, said that windbreaks were far more effective at the point of origin and that he had not recommended them as an effective dust mitigation measure.

⁷³⁹ Submission 530.

⁷⁴⁰ Submission 896.

⁷⁴¹ EES Appendices A009 and A016.

⁷⁴² Document 482.

⁷⁴³ Submission 738.

their obligations to deliver safe workplaces, particularly in the context of potential dust from the Project having an impact on workers' health.

(ii) Agriculture

Submissions from existing agricultural businesses questioned the ability to continue to operate their farms in close proximity to a mine. Issues of dust, noise, and water were common across submissions.

Judith and Keith Alexander⁷⁴⁴ farm cattle and sheep on a mix of dryland and irrigated pasture and submitted their son is the fifth generation on the farm that was established in 1878. They identified the houses on their farm are about 1 kilometre from the mine edge. They submitted beef they grow is prime grade grass fed that is European Union certified for export.

The Alexanders submitted key impacts are likely to include increased dust, potential for contamination of dust or water with consequent risk for bioaccumulation in stock, and noise. The Alexanders submitted the European Union certification scheme they operate under is rigorous and detection of contamination in their product would remove their ability to sell product in the European Union market. They said they achieve a higher rate of return due to certification and the premium nature of their product (discussed further in Chapter 14.6).

Lyn and Geoff Johnston,⁷⁴⁵ raised serious concern about the potential for contaminated dust to be blown across their adjacent land holdings, with the consequent risk for 'toxic' materials to bioaccumulate in livestock products for human consumption. They questioned whether the wind monitoring undertaken by the Proponent, given the location of the weather station, accurately reflected the true wind conditions of the Project Area.⁷⁴⁶

Chapter 10 of this report notes the views of DOH, and advice to the IAC by Dr Joyner in relation to radiation risk and dust where the DOH⁷⁴⁷, and as recommended by Mr Joyner⁷⁴⁸, advised:

There is one additional radiation exposure pathway the department will insist be modelled pre-mining and quantified as far as practicable following the commencement of mining operations. This potential exposure of members of the public is associated with the consumption of meat products in areas that are shown to be impacted by relocation of naturally occurring radionuclides from the mine site to meat producing areas. Based on the department's experience with other mineral sand mining activities and understanding the assessment method and the scale of the potential doses involved, the department anticipates that this radiation exposure pathway will not contribute significantly to the radiation exposure of a member of the public. Nevertheless, the derivation of estimated public radiation doses from this radiation exposure pathway using internationally accepted best practice methods developed by the International Atomic Energy Agency will be required to be submitted to the department as part of a licence application.

Ms Alison Waller⁷⁴⁹ is a practising vet in the area. In response to a question from the IAC, Ms Waller submitted that while livestock generally acclimatise to noise, dust is the more important issue, causing pinkeye, lung disease and can result in contaminants in meat.

All farmers stressed the importance of surface cover to minimise dust creation and movement.

⁷⁴⁴ Submission 157.

⁷⁴⁵ Submission 268 and Document 629.

⁷⁴⁶ Submission 268 and Document 629, this issue is discussed in Chapter 8.

⁷⁴⁷ Document 41.

⁷⁴⁸ Document 9 at 17.

⁷⁴⁹ Submission 743.

14.4.3 Discussion

Many submitters spoke of the strong winds and potential for dust movement from disturbed areas, particularly in periods of dry weather. During the site visit, the IAC observed the dusty nature of the topsoil, particularly near high traffic areas such as around farm gates. Farmers consistently described the loss of ground cover during drought events which resulted in increased dust transfer during windy periods and the fragile, dispersive nature of the topsoil (see Chapter 19).

The IAC notes the Lindenow Valley is generally downwind from the Project Area. There is no substantive buffer between the Project Area and the horticultural production area. The IAC does not consider the avocado orchard example provided by the Proponent is a relevant example given the different crop characteristics.

The IAC accepts the risk of dust generation from disturbed areas in the Project Area, which is located on a plateau above the Lindenow Valley, is high. The IAC concluded in Chapter 8 there will be significant dust deposition on nearby properties for the life of the Project even if air quality objectives or standards are met (and noting there is no relevant standard for horticulture).⁷⁵⁰ The dust would fall on vegetables and crops grown to feed animals and accumulate on and in the soil over time with the potential for increased soil contamination.

The IAC notes the growers in the Lindenow Valley are used to dealing with existing dust levels and managing their operations accordingly. The Projects risks a significant additional dust load which the growers cannot control. In the IACs view this is a significant risk to grower operations and the reputation for high quality produce the area currently enjoys. A similar conclusion can be drawn for other agricultural producers.

The IAC accepts that washing vegetables and a range of the mitigation measures for dust proposed by the Proponent are not practical for all operations and /or will not adequately address the impacts. The IAC is concerned the knowledge of existing growing operations by the Proponent seemed to be limited, leading to recommendations for mitigation that are not reasonable or practical or in some cases possible. This apparent lack of knowledge is not a good foundation for developing appropriate mitigation measures.

The IAC considers it likely there will be an increase in food safety regulatory compliance for producers if the Project proceeds, for example more testing given the changed growing conditions due to the Project.

The IAC considers there is a risk that if produce from the Lindenow Valley and other areas impacted by dust is found to have elevated levels of contaminants, producers may lose accreditations and be unable to supply into existing markets (See Chapter 14.6).

The IAC concludes in Chapter 10 the risk of radiation from the movement of dust from the Project Area represents an unresolved risk. Given the rates of deposition of Project-derived dust on crops and soils in the Lindenow Valley and other areas nearby to the Project Area discussed in Chapter 8, the IAC considers there remains an uncertain potential for radiation impacts on existing Lindenow Valley industries and other nearby agricultural producers.

⁷⁵⁰ All sensitive receptors are expected to be impacted by dust deposition rates over 100kg/ha/year with some receiving up to 162.7kg/ha/year of dust: Document 146 Technical Note 007 Table A2 Receptor 15 at 2024 Inc+Bg.

14.4.4 Findings

The IAC finds:

- There is no effective buffer between the Project Area and the Lindenow Valley.
- There are significant risks to the horticultural businesses and industry in the Lindenow Valley from likely increased dust and the potential for contamination of dust.
- Dust impacts on high value agriculture surrounding the Project Area are likely to be a significant risk to production and the ability to maintain access to high-value markets.
- There is a likely significant new regulatory compliance burden that will be borne by producers (both horticultural and agricultural) to ensure their product is safe for market and to maintain standards for access to markets; there is significant risk of product rejection and reputational risk from increased dust.
- Dust may represent a workplace safety issue, particularly for the horticulture sector given the large workforce in areas likely to be exposed to elevated dust levels and the potential for dust contamination.

14.5 Water quality, quantity and access

14.5.1 Background

The broader Project water issues are discussed in Chapters 5 to 7.

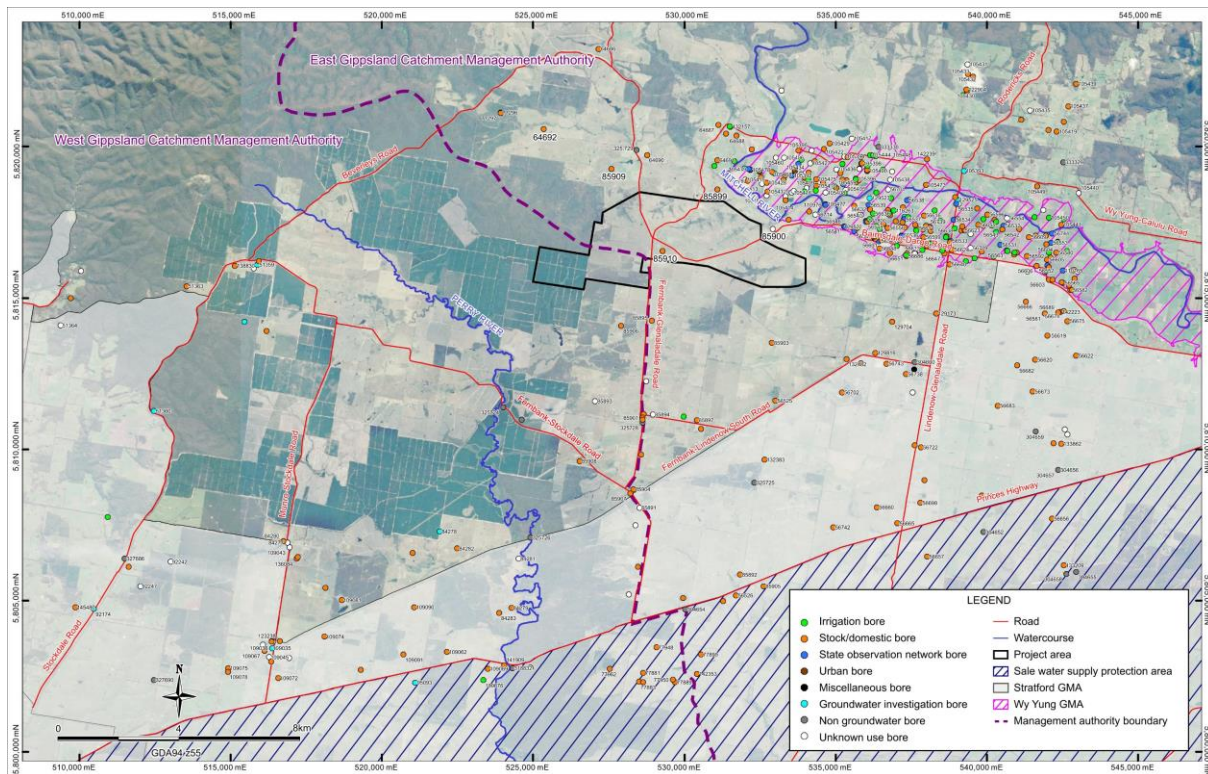
The EES notes:⁷⁵¹

Concerns were raised about the proposed water requirement for project operations (3 GL/year) and potential impacts on the availability of water for other uses and industries. The extraction of surface water from the Mitchell River under a winterfill licence would represent a 1.7% reduction in the river flows at the winterfill threshold of 1,400 ML/day (the minimum flow rate at which licenced users can extract water from the river). Project-related extraction could result in the winterfill threshold being reached marginally faster, potentially reducing water availability for other winterfill licenced users

Existing bores in the immediate area relied upon by existing agricultural businesses is shown in the Draft Work Plan and reproduced below in Figure 29.

⁷⁵¹ EES Chapter 9.

Figure 29 Registered groundwater bores⁷⁵²



14.5.2 Submissions

(i) Horticulture

The Proponent argued that a fundamental premise was that regulators must be relied upon to do their jobs, and that water allocation applications would be assessed by SRW in accordance with all the considerations that SRW need to apply, including consideration of potential impacts for other existing water users. They said that water is a tradable commodity, and that in the main the Project will rely on winterfill licensed extraction from the Mitchell River.

Busch Organics⁷⁵³ advised that water quality and quantity was a crucial issue for business, and noted that bore levels had dropped over time.

Many horticultural submitters confirmed they use water from the Mitchell River untreated in their daily work practices and for drinking water and the river water is very clean .

Some growers have water storages that rely on filling from winterfill licence extraction from the Mitchell River or from groundwater sources.

Bulmer Farms submitted: ⁷⁵⁴

Water security is vital to the ongoing success of any Horticulture enterprise. Surprisingly, little is mentioned within the Horticultural Impact Assessment conducted by RMCG for the Environmental Effects Statement. It is stated in the Agriculture Impact Assessment final report by Hamilton Sierra Con on page 29, 5.1.2 (Impact on the neighbouring Vegetable Industry), a key consideration for vegetable production is the availability of irrigation water, Kalbar has stated the project will not create additional competition with local farmers water

⁷⁵² EES attachment 20 – Attachment B – Draft work plan, page 18.

⁷⁵³ Submission 218.

⁷⁵⁴ Submission 711 Bulmer Farms.

needs, and in this regard it will be incumbent on the water authority to ensure that a new water allocation does not impact on the existing water right holders.

Many irrigators from the Lindenow Valley/ Mitchell River have accessed funding through the Lindenow Valley Water Security Scheme to build water security infrastructure projects to support their own business water security. The water required for these infrastructure projects will come from current allocations and will help mitigate risks associated with drought conditions in the region and add significant economic value to the industry over peak production periods.

Kalbar are requesting access to a very significant volume of water from the governing authority. Irrigators in the region have made applications to access this water allocation to the authority in the past without success. The Authority has set aside six thousand mega litres of winter flow water license that has never been allocated, when this volume was set aside it was envisaged the water would go to irrigators for Agricultural production not mining. The Mitchell Valley could realise a significant increase in the value of its produce production if more water were released for Agricultural purposes. Therefore, it is a very real prospect the proposed mining operations will have an impact on the water rights of existing licence holders.

Dr Premier⁷⁵⁵ submitted that growers depend on clean water for their production and dust and deterioration in water quality have huge potential to impact grower futures and market access. He noted growers have limited access to water and that if they have to deal with increased dust, they would need to change water in their processes more often, resulting in impacts for the feasibility of their businesses.

(ii) Agriculture

Judith and Keith Alexander⁷⁵⁶ submitted their farm is dependent on a shallow bore, and the water level in that bore dropped during the Proponent's bore pump test. They indicated there had not been any direct consultation with them during the development of the agricultural and horticultural background studies. They indicated they were building an on-site storage to boost their resilience to drought.

A number of submitters referred to perennial dams within the immediate Project Area and how they are crucial to their operations and animal welfare during period of drought because they always held water.

14.5.3 Discussion

Water

Water quality and quantity was a fundamental concern for all agricultural and horticultural submitters. These businesses either have existing allocations or must compete in the market for additional allocations within the framework of the *Water Act 1989* (Vic).

The IAC notes the concern of existing groundwater licence holders about a general decline in groundwater levels. The IAC notes and accepts the concerns around confidence as to whether it is possible to deploy up to 3 gigalitres of groundwater to the Project without having an offsite impact.

⁷⁵⁵ Document 482 MFG Dr Robert Premier – Presentation.

⁷⁵⁶ Submission 157.

A number of submitters referred to perennial or spring fed dams that may be removed by the Project. The IAC considers proper identification of, and compensation for the loss of, these permanent water sources is critical and has addressed the issue in Chapter 6.

The competitive market process for water allocation ensures, in theory, that water is allocated to the highest and best use. What has not been tested in the EES, or the supporting technical studies, is the sensitivity of existing businesses to distortions in the water market due to the potential for a new licence applicant to outprice existing users.

Currently, as described in Chapter 7, horticultural and agricultural use water licence holders generally bid for water amongst like businesses, with generally comparable abilities to pay for water relative to their other business costs and profitability. In contrast, water required for the Project would be just one, input cost among the many associated with establishing and undertaking a mining project.

The *Water Act 1989* has checks and balances that seek to deal with these sorts of market distortions,⁷⁵⁷ but there is no information before the IAC to demonstrate the water needs of the Project will not lead to adverse impacts for existing businesses in terms of their ability to obtain new water allocations in an open market.

The IAC notes that the EES is silent on the potential consequences of trading groundwater allocations. The Proponent argued there is no change because groundwater is fully allocated and therefore, they will need to buy existing allocation to deploy on the Project. The consequence of this has not been explored in respect to impacts for land holders or locations where the current groundwater allocation is traded away from. This is a matter that should be considered by SRW in assessing any water allocation application.

14.5.4 Findings

The IAC finds:

- Clean and reliable water supply is critical to horticultural and agricultural operations.
- There is high potential for the Project to lead to significant changes in water availability and risk of reduced water quality with consequent risk for existing horticultural and agricultural businesses.
- The loss of perennial dams, if proven, will adversely affect agricultural businesses that rely on them and would need to be compensated.
- The offsite impacts of trading groundwater are not addressed in the EES.

14.6 Market issues and economic impacts

14.6.1 Background

The ability of fresh food to be sold into Victorian and national supply chains is dependent on delivery of high- quality product. The key issues are:

- market influences – ‘clean green’ image
- impacts on accreditations

⁷⁵⁷ For example, the matters required to be considered for a s51 take and use licence (one of the eligibility requirements for bidding at auction) include the adverse impacts that the allocation of water would have on other existing users, any water to which the applicant is already entitled, the purposes for which the water is to be used; and the needs of other potential applicants (ss 51 & 40(1) of the Water Act).

- loss of productivity and access

14.6.2 Evidence and Submissions

(i) Market influences – ‘clean green’ image

Dr Blaesing gave evidence the onus was on the producer to manage their activities to meet relevant quality assurance and accreditation standards.⁷⁵⁸

The Proponent argued that consumers would not know the origin of products they buy at supermarkets.

Dr Blaesing’s evidence was that:

Research into the importance of provenance for vegetables or ‘local food systems’ in general is still inconclusive. Information collected by different survey methods and standard agricultural and business data is limited in its capacity to adequately document local food production, the operation of local food systems and their importance to the local economy. The vast majority of vegetables from the Lindenow area are ‘exported’ from the East Gippsland region and are currently not identifiable for consumers outside of the region e.g., via branding. The local food processing company Vegco (One Harvest) sources much of its produce from the Lindenow area but also ‘imports’ from other regions around Australia to be able to provide to the required volumes of vegetable and fruit based products to retailers.⁷⁵⁹

Council⁷⁶⁰, MFG⁷⁶¹ and many submitters referred to the ‘clean green’ image of food produced from the area, including both agricultural products and horticultural products. Many businesses from both sectors described the rigorous quality assurance regimes they operate under to maintain market access to sell their product.

Dr Premier⁷⁶² presented on the primary quality assurance processes that underpin fresh food sales through the major supermarket supply chains in Australia. He said there had been no consultation with the clients that dictate the markets for these products, such as the supermarkets or the processors that take the bulk of the product grown in the Lindenow Valley.

He submitted:⁷⁶³

- All growers that supply supermarkets and processors must have an “on farm” QA system in place, this can be FreshCare, Global GAP, BR, SQF, in addition growers that supply supermarkets and processors that supply supermarkets in their house brands are also required to have an additional QA system in place (HARPS)
- Aldi, Coles, Costco, Metcash (IGA) and Woolworths have all signed on to the Harmonised Australian Retailer Produce Scheme (HARPS).
- So everyone supplying a supermarket needs a QA system in place plus HARPS
- These QA systems are audited by a third-party auditor, HARPS is audited by a third party auditor and the processing industry also audits the grower. So growers must pass three audits to obtain market access to supermarkets and processors.
- These audits can take all day and are very strict, multiple failures can lead to the loss of accreditation and loss of market access.

⁷⁵⁸ Document 73 – Kalbar Expert Witness Statement – Dr Doris Blaesing – Horticulture.

⁷⁵⁹ Document 73 - Kalbar Expert Witness Statement – Dr Doris Blaesing – Horticulture.

⁷⁶⁰ Submission 716 A&B.

⁷⁶¹ Document 749.

⁷⁶² Document 482.

⁷⁶³ Document 482 slide 7.

He submitted that consumer concern about food safety and quality was the key driver in the development of the various quality assurance systems that growers operate under and that allows the origin of produce to be traced back to the farm where it was grown.

Mr Ewan Waller⁷⁶⁴ submitted farmers in the area had worked hard to achieve a ‘clean green’ reputation and have worked to achieve good practice. He submitted the Project puts that all at risk.

Food & Fibre Gippsland, an advocacy body representing Gippsland’s food and fibre sector, submitted:

Produce from East Gippsland region has a well-established reputation as clean, green, and trusted....

Fresh produce is normally consumed directly by the consumer – perception of a product is key to its successful adoption by the consumer. If the [EES] studies did not consider the consumers opinion, how can the risk matrices provide advice on mitigation strategies if an event did occur? Furthermore, sustainable production practices are becoming more important to consumers, especially amongst urban population, even if they do not understand farming practices..⁷⁶⁵

(ii) Impacts on accreditations

Dr Premier submitted that fresh food producers must operate under quality assurance schemes. Other submitters said they had chosen to seek accreditation under European Certification schemes for products such as their grass-fed beef, and the fact their product was accredited enabled a market advantage. These accreditations are over and above any mandated Victorian or Australian quality assurance requirements.

Mr John Alexander submitted he operated a grass-fed beef and lamb farm of about 800 hectares close to the Project Area. His water supply is from rainwater and river water. He submitted his farm is European Union accredited and meets Australian requirements with strict requirements on residual contamination risk for heavy metals. He said livestock ingest dust and any contaminants in it and cadmium is regularly tested for as it accumulates in livers and kidneys in sheep. Any detection of contamination in products would put his accreditations at risk with significant consequence for his business.⁷⁶⁶

Other submitters made similar comments in respect to their businesses.

(iii) Loss of productivity and access

The EES indicates an area of about 443 hectares will be removed from agricultural production each year during the Project life and progressively rehabilitated. The EES predicts the disturbed area will be in active mining or rehabilitation for about three years as the mining footprint moves around within the overall Project Area⁷⁶⁷.

Many submitters near the Project Area spoke about impacts on their properties, including management and movement of stock, noise (particularly in the context of being able to hear animals in distress), and the consequences of water changes on their ability to operate.

⁷⁶⁴ Submission 652.

⁷⁶⁵ Submission 277, page 1.

⁷⁶⁶ Submission 375 – John Alexander – Sensitive Receptor 29.

⁷⁶⁷ EES Appendix A015 Agricultural Impact Assessment at 1.4.

Submitters Lyn and Geoff Johnston⁷⁶⁸ explained how the management of their stock between different parcels of land would be impacted by the Project.

In addition, Mr Ewan Waller submitted he would be unable to move his stock between properties if the Project were to proceed. When questioned by the IAC during the Hearing, Mr Waller explained that he preferred to drive his stock the seven or eight kilometres between the different parts of his farm rather than trucking the animals as trucking stresses the animals.⁷⁶⁹ His driving route would be dissected by the Project Area.

The VFF drew on, and supported, the evidence of Mr Campbell in relation to the potential loss of horticultural production.⁷⁷⁰ The VFF made several recommendations for further work and consideration of horticultural and agricultural issues including:⁷⁷¹

The VFF recommends that on this consideration alone the project requires further investigations to establish the economic cost to production if control mechanisms do not deliver the promised environmental outcomes. Further investigations are required to understand the consequences and allow for the preparation binding agreements with all farmers who may be impacted by the mine. These agreements should respond to each control mechanism, the level of breach, the consequence of breach, how compensation will be calculated and administered and how integrated management systems will respond to key threats to each crop or production system.

14.6.3 Discussion

The IAC considers there is a significant risk, whether real or perceived, to the quality of Lindenow Valley produce if the Project proceeds and to the area's 'clean green' image. Reality and perception are both important in how consumers approach product at market. The IAC considers market confidence in the quality of Lindenow Valley and local agricultural produce is paramount to the long-term sustainable viability of these existing industries.

The IAC understands the production and marketing of food is subject to rigorous quality assurance requirements that include tracking to place of origin that is visible to growers and the retail supply chain, but may be less visible to final retail consumers. Those systems will identify any potential contaminants in food which may have a significant impact on products and product marketing.

Given his background and employment, the IAC was of the view that Dr Premier was very well credentialed to speak on the subject and accepts the general points made in his submission.

The IAC does not consider the EES has effectively tested the sensitivity of the food processing sector to reductions in supply of product from the Lindenow Valley, and whether processors in Bairnsdale would be able to source alternative fresh vegetable inputs if there were significant impacts on the horticultural area.

The IAC considers that based on the submissions and evidence, there is a very high risk of significant loss of horticultural and agricultural productivity in the area based on dust and risk to water supplies, with potentially significant negative economic consequences.

⁷⁶⁸ Submission 268 and Document 629.

⁷⁶⁹ Day 28, 1 July 2021.

⁷⁷⁰ Document 383, page 6. Mr Campbell in his evidence addressed the issue of impacts on the value of the horticultural industry in depth; this issue is considered further in Chapter 17.

⁷⁷¹ Document 383, page 11.

The IAC does not suggest the entire growing area would cease operation due to potential adverse impacts but considers that even small reductions in overall output from the area would have a significant consequence, and the loss of reputation may be as significant as the physical impact.

The IAC considers detailed economic issues in Chapter 17, but concludes the economic case for the Project when measured against potential impacts to existing horticultural and agricultural industries that may be threatened, is marginal.

14.6.4 Findings

The IAC finds that:

- The area is a major economic contributor and source of employment in the East Gippsland economy, with significant economic flow on benefits resulting from the growing of horticultural products.
- A modest impact on the horticultural area could result in significant losses to the region in terms of income and employment.
- Given the intense growing nature of the horticulture area, impacts from excessive dust or contamination would likely have a significant negative economic impact.
- There are likely to be significant direct impacts on existing agricultural businesses, and a high likelihood for indirect impacts on farming operations and quality assurance certifications.
- The 'clean green' image of the area will be at risk.

14.7 Overall conclusions on agriculture and horticulture

The IAC concludes:

- The Project is a very significant risk to a State strategic horticultural production area and highly integrated businesses that generate very significant regional employment due to potential offsite impacts from dust and contaminants and impacts from water allocation to the Project.
- The Project has the potential to cause a significant negative economic impact to the horticultural industry in East Gippsland and Victoria.

15 Cultural heritage

15.1 Introduction

Cultural heritage effects are discussed in EES Chapter 9.12 and Appendix A017.

The relevant draft evaluation objective is:

Cultural heritage – To avoid or minimise adverse effects on Aboriginal and non-Aboriginal cultural heritage.

The Cultural Heritage Impact Assessment (Appendix A017) (CHIA), which covered both Aboriginal and non-Aboriginal heritage values, was prepared by Andrew Long and Associates Pty Ltd.

The EES proposed eight mitigation measures included in Attachment H to manage the impacts of the Project on cultural heritage. These include:

- CH01: A cultural heritage management plan which will include site-specific management and salvage procedures
- CH02: Cultural heritage training for all personnel involved in vegetation clearance and ground disturbance works
- CH03: Storage of collected cultural heritage materials by a qualified heritage advisor
- CH04: Recovered Aboriginal cultural heritage materials repatriated to a Registered Aboriginal Party, e.g., the GLaWAC
- CH05: Protocol for a cultural heritage chance finds
- CH06: Process for managing discovery of cultural heritage sites
- CH07: Salvage procedures prior to commencing construction for registered Aboriginal cultural heritage places VAHR 8422-0369 and VAHR 8322-0226,
- CH08: Investigation of properties within the Project Area or Infrastructure Options Area not accessed during the cultural heritage study

In response to the IAC's RFIs, the Proponent provided further and updated information regarding cultural heritage in TN8.

The IAC benefited from various submissions, including from GLaWAC, in its consideration of potential impacts on cultural heritage. No evidence was called.

15.2 Key issues

The issues are:

- the adequacy of the cultural heritage investigations (and the failure to provide a heritage report)
- the level of impact on Aboriginal cultural heritage and the potential loss of significant Aboriginal cultural heritage values
- the level of impact on non-Aboriginal cultural heritage and the potential loss of significant non-Aboriginal cultural heritage values.

15.3 The adequacy of the cultural heritage investigations

15.3.1 Background

(i) Aboriginal cultural heritage

The CHIA adopted a staged risk-based assessment which included a desktop assessment (review of relevant registers, literature, and development of a predictive model for identification of likely occurrence of Aboriginal cultural heritage sites), a standard assessment (archaeological survey, field survey and collection of sediment samples) and a preliminary complex assessment which included a subsurface testing program.

The study area adopted by the CHIA was broadly consistent with the Project Area and Infrastructure Area (as exhibited in the EES). The CHIA noted that some private properties within the study area could not be accessed during the site survey.⁷⁷²

A cultural heritage management plan (CHMP) will be required under the *Aboriginal Heritage Act 2006* (Vic) prior to any statutory authorisation for the Project being granted. The CHIA identifies that a CHMP (ID 14969) is currently being prepared for the Project. At the time of the Hearing, the draft CHMP was still in preparation and not available to the IAC.

GLaWAC is currently the prescribed body corporate on behalf of the Gunaikurnai people, for the purposes of the *Native Title Act 1993* (Cth) and is a Registered Aboriginal Party (RAP) for the purposes of the *Aboriginal Heritage Act 2006* (Vic). However due to administrative issues, when the Notice of Intent to Prepare a CHMP was submitted Aboriginal Victoria took on the evaluation and approval role for the CHMP (in consultation with GLaWAC once it regained its RAP status). Aboriginal Victoria retains this role despite GLaWAC having regained its RAP status.⁷⁷³

(ii) Non-Aboriginal cultural heritage

The CHIA assessed non-Aboriginal heritage values but did not include a historian's report.

15.3.2 Submissions

(i) Aboriginal cultural heritage

GLaWAC submitted the CHIA was not sufficiently robust and did not include consideration of intangible values, oral history, the importance of the water, land or cultural landscape of the area, or the travel routes of their people. It submitted, therefore, there are significant cultural values remaining to be investigated. GLaWAC noted that this deficiency was, in part, due to its voluntary administration during preparation of the CHIA.⁷⁷⁴

The Proponent submitted the methodology of the CHIA was generally appropriate and adequate but acknowledged the failure to address intangible cultural values was a gap and advised that since the exhibition of the EES, the Proponent had engaged a Dr Seumas Spark to progress the cultural

⁷⁷² Appendix A017, page 74. These included (but were not limited to) "the property immediately southeast of the Fernbank-Glenaladale Road/Bairnsdale - Dargo Road intersection, and the property east of the Careys Road/Bairnsdale - Dargo Road intersection".

⁷⁷³ Appendix A017, page 31 and confirmed in submission 662, page 7.

⁷⁷⁴ Submission 662, page 7.

values assessment in consultation with the traditional owners.⁷⁷⁵ The Proponent also pointed to the “*significant survey and review effort*” which included:

- Site surveys conducted over thirteen days involving a multimember team of archaeologists and members of GLaWAC resulting in the identification of 68 stone artefacts.
- Subsurface testing including excavation of 45 test pits recovering 281 artefacts.⁷⁷⁶

Council submitted the CHIA was deficient in a number of respects including flaws in the preliminary site predictive model and the methodology and extent of the sub-surface testing, lack of consultation with GLaWAC, and failure to identify intangible cultural heritage.⁷⁷⁷ Council submitted the EES Scoping Requirements demonstrated that a clear priority for characterising the existing environment was to identify and document previously unidentified places and sites of historic and cultural heritage significance within and adjoining the Project area.⁷⁷⁸ It submitted the deficiencies in the CHIA meant the IAC would not have sufficient information to properly assess the extent of the impacts on cultural heritage and it was unacceptable to leave these impact assessments to the CHMP stage.⁷⁷⁹

MFG’s submissions during the Hearing echoed the above concerns regarding the deficiencies in the CHIA. In closing oral submissions, Counsel for MFG invited the IAC to rely on the submission by GLaWAC as direct factual and opinion evidence, particularly as no formal evidence had been provided on Aboriginal cultural heritage.⁷⁸⁰

Ms Barnes submitted the CHIA had not considered the impact of the Project on Skull Creek as the site of a massacre of Gunaikurnai people. She submitted that although the details of the Skull Creek massacre are not fully known, the area of Skull Creek that transects the Infrastructure Area should be treated as an unregistered Aboriginal cultural heritage site with the potential to contain unregistered relics. Her submission provided sources referencing the massacre of Gunaikurnai by European settlers at this location.⁷⁸¹

(ii) Non-Aboriginal cultural heritage

Council submitted the inadequacies of the CHIA included the absence of apparent consultation with the local historical society or a historian’s report.⁷⁸²

15.3.3 Discussion

(i) Aboriginal cultural heritage

The IAC agrees the key complaints from submitters about the gaps in the CHIA such as the lack of oral history, failure to include intangible Aboriginal cultural values, the extent of cultural heritage investigations and inaccuracies in the report are of concern. Although the majority of these are likely to be addressed in the CHMP process which will be required if the Project proceeds, these deficiencies make it difficult for the IAC to properly assess the extent of impact on Aboriginal cultural heritage values. The IAC notes that some of the deficiencies in the report were due to the

⁷⁷⁵ Document 698 pages 185 - 186; TN8.

⁷⁷⁶ Document 698 page 185 referring to Appendix A017, pages 122 & 156.

⁷⁷⁷ Document 407 pages 91-92.

⁷⁷⁸ Document 407 page 91.

⁷⁷⁹ Document 407 page 92.

⁷⁸⁰ Day 26, 22 July 2021.

⁷⁸¹ Submission 488, page 30.

⁷⁸² Document 407, page 92.

inability of the Proponent to contact GLaWAC due to administrative issues. However, the IAC has been greatly assisted by the submission from GLaWAC and considers that it has sufficient information to assess the impacts of the Project on Aboriginal cultural heritage.

In particular, the IAC considers the investigations undertaken to date demonstrate that it is highly likely that more artefacts will be discovered in future surveys, including in areas not able to be accessed. Indeed, each level of investigation so far has turned up more artefacts and places of interest. This conclusion is supported by the submissions from GLaWAC the area was well used by Aboriginal people and was part of a travelling route. The IAC considers the intangible cultural values and oral history, including songlines, transit and trade routes, and connections to Country of the Gunaikurnai can be adequately recorded through the CHMP process and notes the Proponent is in the process of doing this. The IAC considers that further investigation of the Skull Creek massacre is warranted.

(ii) Non-Aboriginal cultural heritage

The IAC notes with concern the absence of a heritage report and the apparent lack of consultation with any local historical society; particularly given the significant number of submitters with a 4-6 generation connection to, and habitation in, the area. However, the IAC considers the CHIA did examine relevant sources of European history and cultural values. The IAC has also been assisted by the many submissions from the community which included information about generations past and more recent history and cultural values. As a result, the IAC considers that it has sufficient information to assess the non-Aboriginal cultural heritage impacts of the Project.

15.3.4 Findings

The IAC finds:

- The CHIA, when considered together with submissions, provides sufficient information for the IAC to make an initial assessment of the cultural heritage impacts of the Project.
- If the Project is to proceed, the Proponent should undertake further work to identify and record relevant Aboriginal intangible cultural values, oral history and other matters required to develop an acceptable CHMP, including in areas unable to be accessed during the CHIA site surveys.
- Sufficient information is available to assess the non-Aboriginal cultural heritage impacts of the Project

15.4 Aboriginal heritage impacts

15.4.1 Background

Tangible cultural heritage identified within the site comprised two existing registered places, being a scarred tree and silcrete stone artefact, and the additional artefacts discovered during the site surveys and subsurface investigations. The CHIA concluded:

Based on the information collected in this report, the residual risk to Aboriginal cultural heritage values is considered to be in the range of moderate-high after following implementation of the standard and additional mitigation measures.⁷⁸³

⁷⁸³ Appendix A017, page iv.

The CHIA identified that risks to known and unknown Aboriginal heritage values had an occurrence likelihood of “almost certain”.⁷⁸⁴

The CHIA acknowledged that further work would need to be undertaken to finalise the CHMP. The CHIA described the CHMP and cultural heritage permit processes as being “*processes to manage activities that may harm Aboriginal cultural heritage*”.⁷⁸⁵

15.4.2 Submissions

The Proponent acknowledged the generally high impact on both known and unknown Aboriginal cultural heritage, given the nature of the Project as a mine. However, it noted the known Aboriginal cultural heritage places that would be impacted by the Project were not ranked as having either medium or high cultural heritage significance in the CHIA.⁷⁸⁶ It also submitted that because the Project site is not one warranting preservation on cultural grounds⁷⁸⁷ and a CHMP will be required before the Project could proceed, these impacts would be acceptable.⁷⁸⁸ In submissions the Proponent pointed out the land affected by the mine is not in the same condition as it was before European settlement and those modifications have impacted the natural landscape, and by implication the associated Aboriginal cultural heritage values of the area.⁷⁸⁹

GLaWAC submitted the Gunaikurnai people value the ‘cultural landscape’⁷⁹⁰ in which the Project would be located through their longstanding relationship with Country⁷⁹¹ which “*embodies traditional knowledge of spirits, places, land uses and traditional ecological knowledge*”.⁷⁹² It submitted the impact assessment must not be site specific but must consider impacts of the Project within the context of the broader surrounding cultural landscape. The GLaWAC submission describes this wider cultural landscape:

The site is adjacent to Wangangarra (Gunaikurnai name for the Mitchell River upstream from Bairnsdale), the lifeblood of the Brabralung. It is overlooked by the Mitchell River National Park, a park jointly managed by GLaWAC and Parks Victoria. Note that Kalbar Operations in its EES has conceded the mine and the lights from the 24/7 operation will be visible from the Mitchell River National Park.

The site is on a major travel route used by the Gunaikurnai for many thousands of years.

“Mitchell River was a major stop-off point for our old people.” - Gunaikurnai Whole of Country Plan, 2015

Members of the Gunaikurnai community have deep ancestral, spiritual and broader cultural connections with the cultural landscape.⁷⁹³

This cultural landscape is part of the “30,000 year-old Bataluk Trail”:

The connectivity of the cultural landscape includes Wangangarra and its tributaries, including the seasonal streams, and the freshwater ponds that are dotted in the area fed from groundwater. [Footnote: It is believed ponds exist on the Kalbar site.] The connectivity of

⁷⁸⁴ Appendix A017, pages 184-185, table 54.

⁷⁸⁵ Appendix A017, page 35.

⁷⁸⁶ Document 698, page 186.

⁷⁸⁷ Based on the findings of Appendix A017.

⁷⁸⁸ Document 698, page 187.

⁷⁸⁹ Day 35, 20 July 2021.

⁷⁹⁰ The submission explains that the term ‘cultural landscape’ is used to describe not only the privately held site of the proposed Kalbar mine, but also how it is an integral part of a broader surrounding area. Submission 662, page 3.

⁷⁹¹ The submission states that the site is on the Country of the Brabralung clan, one of the five clan groups of the Gunaikurnai. Submission 662, page 4.

⁷⁹² Submission 662, page 3.

⁷⁹³ Submission 662, page 4.

the landscape extends further, both to the Gippsland Lakes through the Mitchell River connection, the Latrobe Valley through the groundwater aquifer, and from the Perry River and beyond.⁷⁹⁴

... “It’s in a trade area – there are boundary trees right there, metres from the site. That Fingerboards is a very significant place that has been used by Gunaikurnai People for thousands of years.” – Gunaikurnai Traditional Owner, 2020.⁷⁹⁵

The GLaWAC submission noted the Gunaikurnai’s concern about the surface water and groundwater impacts, including impacts to the seasonable streams in the area and the values they support (including freshwater crayfish), the Perry River system and its Chain of Ponds, a reliable water source even in drought.⁷⁹⁶

The submission concluded:

GLaWAC determines however the proposed Kalbar project is at a scale and impact that cannot co-exist with the cultural heritage values of the site, its waterways, and the landscape it sits within.⁷⁹⁷

GLaWAC stated:

The proposed mine conflicts with the principles of the Gunaikurnai Whole of Country Plan, and of most of the Gunaikurnai Traditional Owners who have shared their views with GLaWAC.⁷⁹⁸

At the Hearing, Mr Fenwick, CEO of GLaWAC, indicated that GLaWAC had been working with the Proponent to expand on the EES assessments, including work on intangible heritage values, and that this work was ongoing. He raised the issue of there being potential native title claims over road reserves proposed to be impacted by the Project, an issue which was not covered by GLaWAC’s original submission. He also confirmed the Project site was in the middle of traditional trade and transit routes that would need to be considered as part of the assessment of intangible heritage values.⁷⁹⁹

When questioned about the extent to which the CHMP process would mitigate the potential impacts on Aboriginal cultural heritage, Mr Fenwick confirmed GLaWAC’s view the Project would harm Aboriginal cultural heritage (even with a CHMP) and the Project should not proceed. Mr Fenwick acknowledged the statutory process within which the CHMP sits but submitted that a CHMP is essentially an approval to harm Aboriginal cultural heritage under a legal framework.⁸⁰⁰

Council generally supported GLaWAC’s submissions and noted:

As was made plain on behalf of GLaWAC, any CHMP does not ameliorate the loss of cultural heritage which is opposed by the aboriginal community but, rather, answers the statutory framework in which GLaWAC operates. ... GLaWAC’s submission makes it clear that a large proportion of the Gunaikurnai population have opposed the proposal. As was observed on behalf of GLaWAC, a CHMP is a licence to do harm to cultural heritage.

The strong views that have been shared with the corporation are the Project is opposed.⁸⁰¹

⁷⁹⁴ Submission 662, page 5.

⁷⁹⁵ Submission 662, page 7.

⁷⁹⁶ Submission 662, page 5.

⁷⁹⁷ Submission 662, page 11.

⁷⁹⁸ Submission 662, page 3. The submission states that it tested the views of the Gunaikurnai Community through a series of on-line consultations in October 2020 by asking “Do you want the mine to go ahead?”. 86% of respondents answered “no”, 14% were “unsure”. Zero respondents answered “yes”. Submission 662, page 9.

⁷⁹⁹ Day 13, 19 May 2021.

⁸⁰⁰ Day 13, 19 May 2021 (Audio Hearing Recording at 1:34 and 1:37).

⁸⁰¹ Document 407, page 93.

Council submitted it was therefore inappropriate for the cultural heritage impact risk rating to be reduced from moderate (with standard mitigation, being implementation of a CHMP) to low (with additional mitigation).⁸⁰²

MFG supported the submission of GLaWAC the Project cannot co-exist with the cultural heritage values of the site, its waterways, and the landscape it sits within.⁸⁰³

Ms Barnes submitted in support of the retention of the Aboriginal cultural heritage values of the Project Area and expressed concern at the level of Aboriginal cultural heritage that would be destroyed by the Project.⁸⁰⁴

Ms Grant submitted the CHIA had failed to identify marker trees (as distinct from scar trees) in the area. These are trees where two branches are tied together and fuse together to form a circular shape as the tree grows. She submitted that one would be destroyed by the Project.⁸⁰⁵ MFG also drew attention to the potential for marker trees in the Project Area and submitted there are examples within the nearby landscape less than 3 kilometres from the Fingerboards intersection.⁸⁰⁶

15.4.3 Discussion

The IAC considers the Project would have significant impacts on both known and unknown, tangible and intangible Aboriginal cultural heritage values and places. The Proponent accepted as much. It is also clear that if the Project proceeds, a CHMP will need to be agreed with Aboriginal Victoria (which the IAC assumes will be in consultation with GLaWAC).

The IAC has given weight to the submission by Mr Fenwick that the Gunaikurnai people consider that rather than ameliorating impacts, a CHMP is an approval to harm Aboriginal cultural heritage. It has done so in the context of the Project being an open-cut mine which would cause very significant ground disturbance. The affected areas will be rehabilitated, but in the IAC's view, this process will fundamentally change the site and its landforms. Although mitigation measures include measures such as salvage and a chance finds protocol, the IAC is very doubtful the methods proposed for clearing and mining the shallower layers (where artefacts are likely to be present) would be sensitive enough to identify and save all unknown tangible heritage present, even if significant survey efforts had taken place as part of the CHMP.

GLaWAC's submissions have clearly articulated they take a whole of country perspective. In this respect, the EES's lack of detailed analysis of the intangible values, such as the song lines, travel routes and so on, is concerning to the IAC. However, even on the limited information available, the IAC considers it clear the Project and Infrastructure Areas are part of what was once a well-used landscape, rich with cultural content and value. Further, the GLaWAC submission talks of the cultural values of the native fauna and flora and of the Mitchell River. Given the extent of removal of native vegetation, this disturbance of the landscape by the Project is highly likely to have a significant impact on the cultural values associated with them.

The approval of a CHMP will add some value in terms of recording physical and intangible cultural heritage but will not mitigate the impacts. The IAC does not accept the Proponent's submission

⁸⁰² Document 407, page 94

⁸⁰³ Document 451 page 2.

⁸⁰⁴ Submission 488, page 27ff.

⁸⁰⁵ Document 564, page 5. The potential loss of marker trees were also identified in Submission 268, page 20 & 21.

⁸⁰⁶ Submission 813, pages 490-491.

that because the landscape in the Project Area has been modified by post European settlement clearing and agriculture that its Aboriginal cultural heritage values are significantly diminished. This is a narrow view of Aboriginal cultural heritage that is not supported by Traditional Owners or indeed Government legislation and policy.

The IAC notes the submission regarding the Skull Creek massacre, and recommends that if the Project were to proceed, the history and location of the site be investigated further. The IAC also notes the example of Skull Creek is illustrative of the care that would need to be taken in relation to remnant physical objects and artefacts in the Infrastructure Area, as well as the Project Area, should the Project proceed. The IAC also considers the existence of marker trees in the Project and Infrastructure Areas should also be investigated if the Project proceeds.

15.4.4 Findings

The IAC finds that:

- The Project should be able to obtain its statutory approvals but is likely to harm Aboriginal cultural values, both known and unknown, and tangible and intangible.
- The extent of loss is not clear at this time and the IAC is not satisfied the Proponent has undertaken all steps possible to minimise adverse effects.

15.5 Non-Aboriginal heritage impacts

15.5.1 Background

There are no properties within the Project or Infrastructure Areas listed on the Victorian Heritage Register and no heritage overlay applies under the Planning Scheme.

The CHIA identified and investigated a grouping of partially ruined, nineteenth century wooden, corrugated iron and brick structures to the south-west of the Fingerboards intersection (Fingerboards Structures).⁸⁰⁷ Heritage Victoria and Council have determined the structures did not justify protection or management conditions at a local, or state level.⁸⁰⁸

The CHIA concluded the residual risk to historical cultural heritage values is low.⁸⁰⁹

15.5.2 Submissions

The Proponent submitted that on balance the impacts of the Project on local heritage values would be acceptable, noting the Project site does not contain any properties on the Victorian Heritage Register and no heritage overlay applies. In closing submissions, the Proponent accepted the Fingerboards intersection has local heritage value which should be appropriately recorded.⁸¹⁰

Various submitters referred to the Fingerboards intersection and its history. These submissions are detailed in Chapter 16. Photographs of the Fingerboards Structures were provided to the IAC by submitters.⁸¹¹

⁸⁰⁷ Appendix A017, section 6.3.3 (Historical cultural heritage), p 127 (pdf p 143). See Plate 70 and 71.

⁸⁰⁸ Appendix A017 page 168 (pdf p. 184).

⁸⁰⁹ Appendix A017 page iv.

⁸¹⁰ Document 698, page 188; Document 699, page 75.

⁸¹¹ For example, see Submission 268, page 80; Submission 813, page 567; Document 673, Part 1, slides 23 & 24.

15.5.3 Discussion

The IAC accepts the Project Area and its surrounds are rich in post settlement history. It also notes the value the local community place on the Fingerboards intersection and the Fingerboards Structures. However, the Project site does not contain any properties on the Victorian Heritage Register and no heritage overlay applies. The IAC accepts the findings of the CHIA the Fingerboards Structures do not warrant current protection at a local, council, or state level.

15.5.4 Findings

The IAC finds:

- From a post-settlement historic heritage perspective, the Project's impacts would be low.

15.6 Overall conclusions on cultural heritage

The IAC concludes:

- Both tangible and intangible Aboriginal cultural heritage will be lost if the Project proceeds and a CHMP will need to be approved by the Registered Aboriginal Party.
- There will be limited impacts on post-settlement historic heritage.

16 Social impact

16.1 Introduction

Social effects are discussed in EES Chapter 9.13 and EES Appendix A018. Stakeholder engagement is discussed in EES Chapter 6. Additional material is provided in TN25 and TN27.

The relevant draft evaluation objectives are:

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

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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

Appendix A018, the SEIA, was prepared by Coffey Services Australia Pty Ltd. It relied on the Economic Impact Assessment (EIA) prepared by BAEconomics (Appendix D to Appendix A018) (BAEconomics Assessment).

The EES proposes a range of mitigations measures included in Attachment H to manage the impact of the Project on social factors:

- SE01: Community access provided to Project and EES information.
- SE02: Dust, noise and water monitoring results and responses made available regularly on Project website.
- SE03: Regular meetings with adjacent residents.
- SE04: A community fund supporting community initiatives that encourage social interaction.
- SE05: The community engagement plan regularly reviewed and adapted.
- SE06: A range of avenues provided to contact The Proponent.
- SE08: Regular updates provided to local communities on the progress of the EES.
- SE09: Regular community updates provided on bushfire mitigation measures on site.
- SE11: Incentives to encourage employees to become emergency services volunteers, including paying Project employees to attend training and incidents.
- SE12: Engagement with residents adjacent to affected roads.
- SE13: Cycleway/foot path on Lindenow-Glenaladale Road to be investigated.
- SE14: If Bairnsdale Siding utilised, Bairnsdale Racing Club and East Gippsland Shire engaged regarding public events and pedestrian safety.
- SE15: Adjacent landholders engaged to discuss concerns and minimising dust emissions.
- SE16: Use of low beam lights on vehicles promoted.
- SE17: Site-specific visual impact management discussed with affected residents.
- SE18: Current levels of access to national parks and other natural assets maintained.
- SE19: An environmental review committee established to involve the community.
- SE20: A community reference group established to provide a point of liaison.
- SE21: Dialogue with Councils maintained to identify opportunities to encourage social interaction.

- SE22: Timely responses provided to any community complaints raised.
- SE23: Engage with Council to review and update the Lindenow and District Community Plan.
- SE24: Incentives for Project personnel to participate in local community activities and organisations.
- SE25: Employment code of conduct, pre-employment screening and fit for work procedures.
- SE26: A community complaints procedure developed and implemented.
- SE28: Police checks conducted on potential Project personnel.
- SE29: A local employment and procurement guideline developed and implemented.
- SE30: Incentives for new residents to buy locally.
- SE31: Capacity building of local community through training.
- SE33: Access to the Fingerboards information board maintained and a similar meeting point established.
- SE50: Local services and support networks engaged.
- SE56: Transport contractors engaged about adopting vehicle management systems to detect school buses.
- SE57: Regular one-on-one meetings with adjacent landholders.
- SE58: Road works avoided on Den of Nargun access roads.
- SE62: Review emergency services capability and future requirements.
- SE64: Health and wellbeing programs to be investigated.

The IAC benefited from extensive submissions in its consideration of potential impacts on social matters at the local, regional, state and national levels. No social impact evidence was called.

16.2 Key issues

The key issues are:

- efficacy of and engagement through the SEIA
- impacts on the community's connection and sense of place
- impacts on community cohesion and well-being
- whether the Project has a social licence to operate.

16.3 Efficacy and engagement

16.3.1 Background

The SEIA was undertaken in accordance with the impact assessment framework set out in EES Chapter 7, which included, relevantly:

- understanding community issues and concerns and scoping the assessment
- characterising the socioeconomic baseline
- identifying the socioeconomic values of relevance to the Project
- applying risk assessment to Project activities with the potential to impact socioeconomic values
- identifying mitigation measures to avoid significant impacts
- assessing residual impacts of the Project on socioeconomic values where the risk of significant impacts was identified as moderate or above.

Much of the SEIA was derivative, relying on the findings of other specialist studies conducted for the EES including the economic analysis and modelling of BAEconomics. The adequacy of the BAEconomics Assessment is examined separately in Chapter 17.

The SEIA was informed by engagement with “*residents adjacent to the project area and key agencies and service providers in the region such as tourism authorities, health service providers and training providers*”.⁸¹² The Proponent conducted an online survey (May-June 2017) to understand stakeholder attitudes to the Project and their key concerns.⁸¹³ A specific community values workshop to gather feedback on socioeconomic values was conducted by Gillian Hayman Facilitation and Project Services (with Coffey representatives in attendance) in March 2018 at Lindenow Hall where 50 people from the local community attended.⁸¹⁴ This was supplemented by anecdotal information regarding the socioeconomic impacts experienced by communities adjacent to other Australian mineral sands mines.

16.3.2 Submissions

Council submitted it was unusual for no social impact evidence to be provided as part of an EES for a Project of this scope.⁸¹⁵ It submitted that rather than gathering primary data, the SEIA had used “*secondary material*” such as consultations focussed on raising awareness and gaining feedback together with input from consultation held by Hamilton SierraCon in the course of its preparation of the AIA.⁸¹⁶ Council submitted these efforts of the Proponent were part of its consultation requirements, and were not “*proper social research required for a social impact assessment*”.⁸¹⁷

Council also submitted the analysis of impacts on tourism was inadequate, particularly in terms of identifying impacts beyond 5-10 kilometres from the Project Area.⁸¹⁸ Further, Council questioned why the Proponent did not bring social impact evidence before the IAC at the Hearing, noting that social impact and community concern was raised squarely in a broad spectrum of submissions.⁸¹⁹ Council submitted the lack of independent social impact evidence was a “*gap in the ability to understand environmental effects*” of the Project.⁸²⁰

The Proponent submitted the EES provides considerable detail on social impacts and drew particular attention to consultation opportunities set out in section 2.1.1 of the SEIA including:

- a) A community values workshop in March 2018, facilitated by an independent facilitator and attended by around 50 people from the area, as well as representatives of various groups, including MFG;
- b) A community meeting in July 2018, which was advertised in local papers and attended by more than 80 people;
- c) One on one interviews with a number of landholders adjacent to the Project Area in December 2018; and
- d) Community surveys conducted by the Proponent in 2017 and 2018.⁸²¹

⁸¹² EES Chapter 9.13, pages 9-335.

⁸¹³ EES Chapter 6, pages 6-15. The survey received 263 responses.

⁸¹⁴ EES Chapter 6, pages 6-12.

⁸¹⁵ Document 407 page 67.

⁸¹⁶ Document 407 pages 68-69.

⁸¹⁷ Document 407 page 69.

⁸¹⁸ Submission 716B, PDF 16.

⁸¹⁹ Document 407 page 69.

⁸²⁰ Document 407 page 87.

⁸²¹ Document 698 page 197.

Council questioned the relevance and suitability of these consultation “*activities*” as the research basis for a meaningful social impact assessment.⁸²²

Council criticised the SEIA due to its lack of a cumulative impact assessment and any detail on the proposed Social Management Plan. The SLR Report:⁸²³

We also note there is no ‘cumulative effects assessment’ as part of the EES (also noted in the Economics Peer Review), this limits the proponents/projects ability to understand the impacts of the competing interests of other regional and sub-regional projects on the labour market, the vulnerable members of the community, businesses, Council’s, NGO’s, community groups and sporting groups etc. The combination of no cumulative effects assessment and no implementation strategy/framework makes it difficult for key stakeholders and the broader community, including traditional owners, to quantify the impacts and expected benefits of the Project.

MFG criticised the Proponent’s gathering of social impact information as being limited to concerns raised at community meetings or one-on-one discussions with landowners which it described as “*exclusive affairs*” with very few landowners within the Project Area having been directly consulted.⁸²⁴ It submitted the Proponent’s community consultation was “*limited and biased*”:

Proper and fulsome consultation (not preferential interaction with adjoining landowners and the provision of different information delivered to individuals depending on their perceived interests or lack of interest) should have been undertaken. Most food producers inside the proposed mine footprint have never seen the survey in the agriculture report upon which the proponent has produced many inaccurate assumptions and inaccuracies. Most directly impacted landowners are extremely unhappy and angry about the inadequate landholder consultation.⁸²⁵

MFG took issue with the number of changes to the Project and that the Proponent’s social impact assessment was not updated to reflect changes to the Project over time. Nor, it said, was the community given further opportunity to express their views on the changes.⁸²⁶

Individual submitters raised concerns about the way the Proponent undertook its community engagement and stakeholder consultations.⁸²⁷

16.3.3 Discussion

The SEIA is largely derivative, relying on outputs of various other assessments undertaken for the Project.⁸²⁸ Any deficiencies in those reports flow necessarily through into the SEIA (for example, the HIA discussed in Chapter 14).

⁸²² Document 748 page 31.

⁸²³ Attached to Document 14.

⁸²⁴ Document 813, page 442.

⁸²⁵ Document 813, page 442.

⁸²⁶ Document 813, page 442.

⁸²⁷ Document 25b, page 45 referring to Submissions 12, 19, 27, 70, 88, 130, 135, 168, 253, 268, 303, 319, 410, 433, 437, 473, 484, 488, 522, 534, 535, 548, 564, 568, 598, 616, 690, 698, 703, 715, 724, 745, 777, 781, 813, 814, 831, 833, 837, 838, 843, 847, 851, 865, 868, 875, 893, 899, 900 & 909. It notes that Submitter 232 was “*impressed with the inclusiveness and lengths Kalbar has gone to in keeping East Gippslanders informed of the Project over the last 3 years*”.

⁸²⁸ Including the Economic Impacts Assessment by BAEconomics (Appendix 4 to the SIA), the Traffic and Transport Impact Assessment, Stage Two Air Quality and Greenhouse Gas Assessment for the Fingerboards Mineral Sands Project, Noise and Vibration Assessment, Landscape and Visual Impact Assessment, Human Health Risk Assessment, Agriculture Impact Assessment, Horticultural Impact Assessment, Cultural Heritage Impact Assessment, Groundwater and Surface Water Impact Assessment, Bushfire Risk Summary and Rehabilitation Report.

The IAC considers the SEIA relied on a very limited amount of direct or meaningful research with impacted community members and business. Some of this was a result of the Proponent’s failure to identify all sensitive receptors (in particular, dwellings) within 2 / 5 kilometres of the mine footprint (discussed in Chapter 2.6.5).

For example, the EES reports the Proponent provided a formal written invitation in July 2018 to all landowners within 2 kilometres of the Project Area to meet with Proponent staff, resulting in over 20 meetings with directly and indirectly impacted landowners. However, only 11 landowners located within 1 kilometre of the Project Area were asked to participate in one-on-one interviews with Coffey as part of the SEIA which resulted in only eight landowners taking part in interviews that each lasted approximately half an hour.⁸²⁹

The IAC agrees with MFG’s submission these appear to be somewhat “*exclusive*”. Given the complexity of issues at play, and the potential number of different situations that community members might be in, the IAC questions what level of understanding of the Project’s impacts across the community would be gained in such limited direct research. Further, the EES reports that five horticultural producers and four grazing or dairy operators, along with representatives of the East Gippsland Food Cluster, were consulted as part of the AIA (Appendix A015) and nine horticultural businesses and one industry stakeholder were consulted for the HIA (Appendix A016). The inadequacy of this research is discussed further in Chapter 14.

The Proponent engaged with the community through:

- project briefings
- community information and drop-in sessions
- town-hall community meetings
- technical information sessions
- business breakfast information and feedback session
- provision of website information and project bulletins by email⁸³⁰

This could have been supplemented with comprehensive empirical research.

The IAC notes some telephone and online surveys were undertaken which added to the strength of the social research. However, the IAC considers that when viewed as a whole, the social research was not comprehensive or rigorous.

The IAC reiterates the comments of the Minister in his assessment of the recent Crib Point EES:

Engagement is essential for gathering data to inform an analytical and rigorous SIA [Social Impacts Assessment] but it is important not to confuse engagement and the SIA. Stakeholder engagement by proponents preparing an EES is intended to inform people about a project and to gather information and feedback which can be addressed through the EES. It fulfills a broader and at times different role to engagement conducted for the purposes of preparing an SIA.⁸³¹

The IAC has had the benefit of the many submissions received directly from community members and local businesses about existing conditions and how they would be impacted by the Project from a socioeconomic perspective. Further, as discussed in Chapter 18, the IAC has also relied on

⁸²⁹ EES, Chapter 6, section 6.4.2.1.

⁸³⁰ EES, Chapter 6.

⁸³¹ Crib Point Gas Import Jetty and Crib Point – Pakenham Gas Pipeline Project, Minister’s Assessment under Environment Effects Act 1978 (March 2021), page 49, quoted in Document 407, page 69.

the qualitative research of submitter Dr Campbell AM.⁸³² These submissions, while not given the weight of evidence, were of great assistance to the IAC.

Accordingly, the IAC considers that it has sufficient information about socioeconomic impacts to carry out its role.

16.3.4 Findings

The IAC finds:

- While the SEIA was adequate, it was limited by the paucity of thorough direct social research with community members and local businesses.

16.4 Connection and sense of place

16.4.1 Background

The SEIA identified the local community's strong connection to land and their concerns about the Project's impact on the associated change of land use, ground disturbance, ecological values and cultural heritage values (amongst others) on their connection to the land.⁸³³ Concerns also included whether future generations would be able to enjoy the area and family history and traditions could be continued in the area.⁸³⁴ The SEIA also identified that views of the Project also had the potential to impact on people's sense of place.⁸³⁵

The SEIA considered that progressive rehabilitation of exposed areas and return of the land to its former agricultural land use may assist some in re-establishing a connection with land, but accepted that for others, this connection may be permanently modified and could in some cases lead to people leaving the area.⁸³⁶

The SEIA described the mitigation measures proposed to reduce the likelihood of community members experiencing a change to their connection to the land. These included:

- continuing to engage with stakeholders after the EES is submitted to enable local knowledge, priorities and expertise to contribute to the approvals process
- conducting progressive rehabilitation to return the land to its former agricultural land use
- establishing a community reference group to provide a point of liaison and communication with the local community during project construction and operations
- holding individual meetings with landholders within, and adjacent to, the Project Area to understand what specific controls can be adopted to minimise potential impacts on their property.⁸³⁷

The proposed mitigation measures include that access will be maintained to the Fingerboards information board and a similar meeting point re-established.⁸³⁸

With these proposed mitigation measures, the EES assessed the various impacts on people's connection to land as being either moderate or low.⁸³⁹

⁸³² Document 669.

⁸³³ Appendix A018, pages v & 132-134.

⁸³⁴ Appendix A018, page 35.

⁸³⁵ Appendix A018, page 118.

⁸³⁶ Appendix A018, pages v & 132-133.

⁸³⁷ Appendix A018, pages v & 133.

⁸³⁸ SE33, Document 695, page 19.

⁸³⁹ Chapter 9.13, Table 9.80.

16.4.2 Submissions

Numerous submissions expressed concern the Project would severely negatively affect community connection to the land, sense of place and the Fingerboards as a meeting place. This they submitted, would result in ‘solastalgia’, being the profound sense of loss experienced by communities who watch a beloved landscape be irrevocably negatively altered.⁸⁴⁰

MFG submitted these types of statements from individual community members are direct testimony of their sense of place, the value of the landscape and part of the cognitive mapping of the area that will be radically impacted by the mine.⁸⁴¹ The concept of a cognitive map is discussed in Chapter 13.

MFG relied on the *Gloucester* case in which, the concept of a ‘sense of place’ was explained in these terms:

... sense of place has many dimensions, including, for example, cultural and historical connections, and feelings of belonging and attachment to place and the environment. Sense of place is the “everyday connection individuals have with their local spaces that gives their life meaning in the present. Having a sense of place contributes to a person’s wellbeing, general health and life satisfaction”. Sense of place may be experienced both cognitively (intellectually) or viscerally (through the body or emotions) and may involve the experience of all the different senses. Sense of place therefore cannot be reduced to a narrow question of visual changes in a place or the environment, but should engage with how these changes are experienced by people in a variety of different ways.⁸⁴²

Lakes Entrance Community Landcare submitted the East Gippsland community has experienced “*an unrelenting fear of loss of ‘sense of place’ if the proposed mine transforms the landscape*”.⁸⁴³

Ms Carruthers, submitting on behalf of MFG, spoke of the community’s “*deep-felt connection*” with the Fingerboards area and the sense of:

place, heritage, history, landscape, and community, which is multi-generational, binding, and ties people to the land and country. This connection goes to one’s very soul.⁸⁴⁴

The IAC heard from a number of multi-generational families living close to the Project Area about their connection to the land and sense of place. For example, the Wallers are fifth and sixth generation members of the Glenaladale community, farming merino sheep on their property adjacent to the Project Area on which their historical family homestead of ‘Glenloch’ is situated.⁸⁴⁵

Ms Grace Waller made the following submission on the impacts of the Project:

Glenaladale is my home and has been the home of my family for many generations. The mine is proposed directly adjacent to my home and property. Should the mine proceed my home will be uninhabitable and my extensive family history in the area would be lost. I have a strong connection to the area, not just as the place I have lived and grown up but the extended ecosystem. The centuries old trees slowed down during the drought but are now in larger bloom than I’ve ever seen following the good rains. The breeding pair of eagles have successfully raised another chick that has been learning to hunt the rabbits. A Crimson Rosella was investigating a nest of belonging to Eastern Rosellas this afternoon and was

⁸⁴⁰ Document 25b, page 43 referring to Submissions 268, 468, 554, 614, 652, 680, 688, 693, 698, 703, 711, 744, 745, 813, 831 & 838. See also Document 616, page 28 & Submission 319 referring to solastalgia.

⁸⁴¹ Oral submissions Day 21, 3 June 2021.

⁸⁴² *Gloucester* case quoting expert evidence of Dr Lawrence, page 325.

⁸⁴³ Submission 319, page 3.

⁸⁴⁴ Document 484, page 3.

⁸⁴⁵ Submission 652, Mr Ewan Waller; Submission 766, Ms Honor Waller; Submission 506, Mr Rhys Waller; Submission 781; Ms Yvette Waller.

promptly shooed away. My nephew has affectionately called the resident magpie ‘Mr Swoopy’.⁸⁴⁶

The Waller’s have been farming the land for generations. We are experienced land managers with a strong connection to the land and the inter-connectedness of this area.⁸⁴⁷

The land is a gathering point and essential to our family. Our family would not be able to spend the quality time together if the industrial mine were to go ahead.⁸⁴⁸

A tree chopped down for timber cannot be nailed back together and called a tree again. The same is true for the land.⁸⁴⁹

They submitted their land is productive and has supported their family for generations.⁸⁵⁰

Ms Barnes described the location as a “*special place within an already fragmented landscape*”, referring to the area’s many mature hollow-bearing trees supplying vital homes for fauna, numerous rare and endangered vegetation communities, threatened fauna and rich Aboriginal cultural heritage.⁸⁵¹ She expressed deep concern about the significant impacts of the Project on these values which she described as “*unacceptable*”.⁸⁵² Ms Johnston submitted the landscape of the area is tied to the community’s sense of place, identity and continuity with the past, acting as a cultural record and a source of memories, inspiration for learning and for art and creativity.⁸⁵³

Ms Rose spoke of the community’s ‘place attachment’ referring to the emotional bonds between local residents and their environment. As a resident who had moved to Fernbank 40 years ago, rather than being from a multi-generational lineage like many others in the area, her emotional bond with the area was formed first from her appreciation of the landscape values of the area and later as a gradual sense of identity followed by a feeling of belonging.⁸⁵⁴ Mr Stagg submitted that he, like many in the area, has a strong connection with the land and it is the reason people live here.⁸⁵⁵

Many submissions focussed on the Fingerboards as a place that represents the strong local community and its connection with place. Numerous objected strongly to its proposed destruction by the Project. Submitters explained the Fingerboards was used historically for stock yards and rabbit trappers, who would leave their catch to be picked up under the huge old cypress, more recently as the staging area for fire trucks safe place during fires, and regularly used as a meeting place for locals and visitors such as cyclists and motor-cyclists.⁸⁵⁶ The meeting place is situated on private land that was sectioned off for use by the community after the 2014 fires.

Ms Rose described the Fingerboards:

The Fingerboards is the junction where several local communities intersect – Upper and Lower Glenaladale, Fernbank, Walpa, and Woodglen, which is why people in these communities feel both physically and emotionally connected to this area. Historically the Fingerboards has been the meeting place for these communities. Sale yards were once located here where stock was bought and sold, and families gathered in horse drawn carts

⁸⁴⁶ Submission 745, PDF page 2.

⁸⁴⁷ Submission 745, PDF page 4.

⁸⁴⁸ Submission 745, PDF page 24.

⁸⁴⁹ Submission 745, pdf PAGE 26.

⁸⁵⁰ Document 569, PDF page 23.

⁸⁵¹ Document 488, page 8.

⁸⁵² Document 488, page 10.

⁸⁵³ Submission 268, page 47.

⁸⁵⁴ Document 643.

⁸⁵⁵ Submitter 442, Day 28, 1 July 2021.

⁸⁵⁶ Submission 652, page 6. See also Submission 831, page 3.

before travelling to Church or for shopping in Bairnsdale. It is today still a convenient central meeting place, an emergency gathering point and the location of a tank for firefighting water to protect these communities.⁸⁵⁷

MFG submitted:

The Fingerboards intersection is at the crossroads of four adjoining communities, Fernbank, Upper Glenaladale, Woodglen and Walpa. As the site of the former sale yards for the local communities, it was extensively used as a social meeting place for families gathering there in their horse drawn wagons to travel together to Bairnsdale. It has a historical and cultural significance for the older residents.

It is still used as a meeting place for families, friends and colleagues and also as a rest stop for visitors to the area. During the Easter break it is a popular stop for visitors from Melbourne on their way to the Walnut Festival at Dargo, for 4x4 drivers, campers and trout fishermen.

The Country Fire Authority (CFA) uses it as a staging area, and gathers there for strategic deployment. It is also the designated local “safe area” in an emergency.

The Fingerboards is the gateway to the Mitchell River National Park. The culturally significant ‘Den of Nargun’ is one of the most popular tourist attractions in East Gippsland. The rugged upper stretches of the Mitchell River are a major attraction of this beautiful area, much loved by bushwalkers and White Water kayakers.⁸⁵⁸

16.4.3 Discussion

The IAC accepts the community has a strong sense of place, both in and around the Fingerboards and more generally in and around the Glenaladale - Lindenow area, and more broadly. The IAC observed during the site visits and during the Hearings, the passion and pride with which locals spoke about the land and their connection to it. The IAC considers this is a lived landscape with strong ongoing place-making and sense of place which is demonstrated perhaps most clearly at the Fingerboards intersection.

The IAC considers the community’s sense of place will be harmed if the Project proceeds. In particular, the loss of the Fingerboards intersection with its mature trees and those planted more recently, together with the nineteenth-century structures nearby, will have a significant impact on the community’s sense of place. The IAC accepts, based on submissions, that for many, even the thought of the mining process (clearing, bulk earthworks, minerals processing and landscape reformation and rehabilitation) is deeply distressing.

The IAC acknowledges the Proponent has suggested, as one of the proposed mitigation measures, that it would move the Fingerboards meeting place and notice board to a suitable location so that locals could continue to have a meeting place. The IAC considers that this would be unlikely to be successful and would be another reminder to the community of what has been lost.

16.4.4 Findings

The IAC finds:

- The local community have a deep sense of place with respect to the Project Area and its surroundings, in particular the Fingerboards meeting place.
- The Project would have a significant adverse impact on this sense of place with resulting loss of connection with the land.

⁸⁵⁷ Document 643, page 1.

⁸⁵⁸ Submission 813, page 9.

16.5 Community cohesion and wellbeing

16.5.1 Background

The EES reported that residents value living in a close, supportive community and would relocate if the Project proceeds, while others indicated the Project's employment opportunities would encourage them to remain.⁸⁵⁹

The EES identified the Project has the potential to have a significant impact on community cohesion, and subsequently community wellbeing, with a key issue being the division among members of the community between those who support the Project or stand to gain financially from the Project, and those who do not.⁸⁶⁰ The EES considered the higher wages likely to be paid to mine workers compared to wages in the existing agriculture and horticulture industries could lead to community division. Community division would influence how residents interact with each other socially and engage with their community. The SEIA reported that some community members felt the Project had already resulted in community division.⁸⁶¹

The EES assessed the risk of community division as 'high' for residents adjacent to the Project Area and 'moderate' for those within 10 kilometres, even after application of standard and additional mitigation measures.⁸⁶²

16.5.2 Submissions

MFG submitted the local community of Glenaladale and its surrounds "*possess that special feature of a rural community where higher levels of bonding and social capital exist*".⁸⁶³ In support, MFG referred to Fernbank and Glenaladale recreational and sporting facilities as being social hubs which bring together people from neighbouring larger towns who prefer to join local teams for "*the camaraderie and mateship a smaller community can offer*".

MFG submitted the community organises local events which celebrate their history and identity and noted community functions, such as Santa's Visit and Christmas Party at the Fernbank Hall and the Glenaladale Cricket Club and Recreation Committee's regular functions and BBQs are open-invitation and welcoming to the whole community.⁸⁶⁴ Reference was also made to the impact of events such as the 2014 bushfires, the six years of drought and how the community supported each other, but that had been stressful for the community.⁸⁶⁵ Ms Clerke, who lives 2.4 kilometres from the Project Area, described the warmth of the Glenaladale community and how it welcomed her when she arrived 30 years ago with her partner:

The local community welcomed us with open arms ... Unless you have experienced country hospitality at its best, you have no idea what it is like to live in Glenaladale.⁸⁶⁶

MFG submitted the Project would have a significant adverse impact on the social cohesion and well-being of nearby communities. It said the Project had already caused division between those

⁸⁵⁹ EES Chapter 9.13, section 9.13.3.1.

⁸⁶⁰ EES Chapter 9.13, section 9.13.3.1. See also Appendix A018, section 6.1.6.

⁸⁶¹ Appendix A018, page 125.

⁸⁶² Appendix A018, pages 128-129.

⁸⁶³ Submission 813, page 11.

⁸⁶⁴ Submission 813, page 11.

⁸⁶⁵ For example, Documents 546, page 19 & 686; Submission 679, page 45; MFG oral submissions Day 21, 3 June 2021; Submitter 564, Day 27, 30 June 2021; Submitter 893, Day 31, 13 July 2021.

⁸⁶⁶ Document 686, pages 1-2.

who support the mine and those who oppose it.⁸⁶⁷ MFG submitted that a significant factor in the high degree of division in the local community was the pressure being put on landowners by the Proponent to sell.⁸⁶⁸

Other submitters also expressed the view the Project had created division and conflict in the community. One submitter told the IAC that she felt apprehensive before community events, wondering whether she should attend because it would be hard to interact with other community members. She spoke of concern about whether neighbours would still speak to her or whether to talk to someone in the supermarket. She expressed concern that people would leave the area, not speak to each other and that community spirit would be broken.

Some submitters acknowledged that while the Project had created division within the community between those who support it and those against it, it had also created a rallying point for those in opposition, drawing them closer together.⁸⁶⁹

Dr Campbell AM, GP and clinical academic, submitted the tension and division amongst the local community *“is perhaps the most revealing illustration of the immediate and potential impact”* of the Project on the community.⁸⁷⁰ Dr Campbell’s submission was based on qualitative research in the affected community and is discussed in more detail in Chapter 18. He noted that several interviewees had commented on the impact of the proposal on their long-term involvement with local sporting and volunteer organisations such as cricket and football clubs, the CFA, and SES. Their comments included:

“I avoid these meetings now”

“I’ve lost lifetime friends who I have worked with for years to build up this club”

“Their donations to sporting clubs and other organisations have just split the community -- these are just bribes – they are trying to buy their social licence”

“this has split the community”

“this has caused massive friction between those that see financial gain if they sell and those that want to preserve the environment and the local agricultural industries”

“one of our neighbours couldn’t handle the harassment. They eventually wore him down and he sold his property”.⁸⁷¹

Mr Ewan Waller, submitted the Project would cause a breakdown of the social fabric of the area and severely negatively affect the social connections that hold the community together.⁸⁷² He submitted:

The social network and relationships that link this community will be fractured. Families will move away. There will be a constant industrial activity in the middle of the community with rerouted roads, heavy laden trucks and strangers moving continually through the district.⁸⁷³

Concerns were expressed both ways. A supporter of the Project, submitted:

⁸⁶⁷ Submission 813.

⁸⁶⁸ Counsel for MFG in closing oral submissions, Day 36, 22 July 2021.

⁸⁶⁹ For example, oral submission from Mr Stephenson and Ms Moore (submitters 693 and 680), Day 27, 30 June 2021; Ms Aquila (submitter 79), Day 27, 30 June 2021; Ms Rose (submitter 875), Day 30, 12 July 2021; Document 669, page 3.

⁸⁷⁰ Document 669, page 2.

⁸⁷¹ Document 669, page 3.

⁸⁷² Submitter 652, Day 28, 1 July 2021. Submission 652, PDF page 6.

⁸⁷³ Submission 652, PDF page 5.

A group of anti-mine people have bullied, harassed and threatened anyone who dares to have a different opinion. They have continually manipulated fact, encouraged adverse comments knowing these to be inaccurate and canvassed people to object to the project based on inaccurate propaganda.⁸⁷⁴

Council submitted the risk of harm to the wellbeing of the community is one of the key adverse impacts of the Project.⁸⁷⁵

The MFG submission was critical of the mitigation measures proposed. For example, MFG submitted the Proponent's proposals to fund local events to promote community cohesion would create division rather than cohesion. Further, it submitted the Proponent's proposal to pay staff to participate in volunteer community groups, such as the CFA, lacked an understanding of the community and its dynamics.⁸⁷⁶

Council submitted that there could be *"no satisfaction as to any legacy benefit to the community on the conclusion of the Project"* and the IAC could not be satisfied the proposed mitigation measures:

- (a) will address the right impacts;
- (b) will address impacts in a proportionate way (i.e. will mitigate impacts to an acceptable level); or
- (c) will deliver any benefit – let alone to an extent that would result in net benefit to the community.⁸⁷⁷

Council was critical that no draft of the proposed Social Management Plan had been provided by the Proponent⁸⁷⁸ and expressed concern regarding the proposed Community Reference Group.⁸⁷⁹

In closing submissions, the Proponent acknowledged that it is not uncommon for proposed developments to produce opposing views but that *"social rifts are likely to heal"*.⁸⁸⁰ It accepted the Proponent has a role to play in this *"healing process"* and should proactively seek to mitigate any negative social impacts. It submitted the social impacts of the Project could be adequately managed by the monitoring and management conditions set out in the Mitigation Register (EES, Attachment H).⁸⁸¹

16.5.3 Discussion

The IAC accepts the submissions of MFG and many individuals the local community is active and tightly knit with strong social ties and a well-developed sense of community identity. It is defined by the strength of its community institutions such as sporting clubs and the CFA which rely on a high degree of interdependence and commitment to help each other out.

The IAC considers the Project has already led to some community division and impacted on people's enjoyment of their community and its activities and would continue to do so if the Project

⁸⁷⁴ Submission 108, page 1.

⁸⁷⁵ Document 407, page 10.

⁸⁷⁶ Submission 813, page 357. See also submission 679.

⁸⁷⁷ Document 407, page 73.

⁸⁷⁸ Document 407, pages 72-73.

⁸⁷⁹ Document 748, pages 29-30. It submitted that the Draft Community Engagement Plan (Draft CEP) was not adequately reflected in the Mitigation Register and did not adequately reflect the issues identified in the SEIA with regard to the independence of the Chair of the Community Reference Group (CRG), the membership of the CRG and frequency of the Proponent's review of the operation of the CRG and that *"the most recent iteration of the mitigation register does not alter SE20 to better reflect the SEIA or the Draft CEP"* (at page 30).

⁸⁸⁰ Document 699, page 78.

⁸⁸¹ Document 698, page 200.

were to proceed. Even where community members may not experience direct, physical impacts of the mine or loss of property and amenity, the IAC believes they may feel badly for their neighbours who do. The IAC accepts the submissions regarding negative impacts on sporting clubs and the CFA, for example, as demonstrating the impact on the community's institutions.

Chapter 12 has canvassed submissions on the incompatibility of mining and rural lifestyle and individual submitters indicating they may move away from the area if the Project were to proceed, a result that is likely to further diminish the community's cohesion and wellbeing, at least during the mine life.

The IAC considers that many of the proposed mitigation measures designed to address community cohesion and well-being would do little to address the concerns of the community.⁸⁸² The IAC accepts the submissions the community grants program has already caused some division and would continue to do so as clubs and groups decide whether to accept grants or not. It also has concerns about the impact on key community institutions such as emergency services, if Project staff are participating in volunteer activities such as the CFA,⁸⁸³ particularly where groups such as the CFA play such an important role in community cohesion and well-being.

The IAC also takes note the Draft Evaluation Objective for 'Amenity and environmental quality' places a high standard on the Proponent using the word "*protect*" in relation to the health and wellbeing of residents and communities:

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 [emphasis added].

The IAC considers that this draft evaluation objective has not been met with respect to the health and wellbeing of the local community.

It is clear to the IAC the Project has caused significant concern, debate and considered thinking amongst the broader community and the outcome of those deliberative processes has been a unifying of opinion among individuals, families and businesses opposing the Project.

The IAC has seen no evidence and only a very small number of submissions in support of the Project. It is difficult to accept the 'silent majority' argument and the key local business sector, namely agriculture and horticulture, is not supportive.

The IAC considers that if the Project were to proceed, it will in all likelihood impact on the sense of community cohesion that exists now.

16.5.4 Findings

The IAC finds:

- The local community is active with strong social ties and a well-developed sense of community identity.
- Community cohesion and wellbeing in and around the Project Area has been adversely impacted by the Project, and if the Project proceeds would continue to be so.

⁸⁸² For example, the IAC considers that mitigation measures such as SE21, "Close dialogue with East Gippsland and Wellington Shire councils will be maintained to identify opportunities to encourage social interaction" would have little real benefit to the community. Revised Appendix H.

⁸⁸³ Refer to revised mitigation measure SE11: "Incentives will be provided to encourage employees to become emergency services volunteers. For example, Kalbar will pay its employees for their time to attend training and respond to incidents on behalf of these organisations." Revised Attachment H.

- The mitigation measures proposed to address impacts on community cohesion are unlikely to mitigate the division in the community the Project has already caused.

16.6 Social licence

16.6.1 Background

The EES does not refer specifically to the concept of a ‘social licence’.

16.6.2 Submissions

Submitters asserted there is no social licence for the Project.⁸⁸⁴ Ms Carruthers, on behalf of MFG, submitted as evidence of ‘no social licence’:

- East Gippsland Shire Council decision in December 2020 to oppose Project
- 910 submissions largest response to a mining EES; 1% support Project
- 85% of directly impacted landholders (within 3km) oppose Project (survey)
- Large proportion of the land on mine footprint is not secured, with landholders prepared to contest access to their land
- 75% of horticulture business owners openly oppose Project since Jan 2019
- 100% of impacted certified organic growers oppose Project since Jan 2019
- 31 community groups are partners with MFG opposing the Project including the Organic Agriculture Association which has over 150 members
- Petition of 4,558 signatures presented to Parliament on 19 June 2019
- Over 240 signatures on a petition from business owners
- GetUp and Change.org petitions (over 6,000 signatures)
- Amount of communication to Minister Wynne from community
- MFG Facebook following is 2,611; Kalbar’s Fb Project page likes is 182
- Over 100 people made the early 4 hour train trip to Melbourne to participate in a rally on the steps of Parliament on 19/6/2019
- Over 400 people rallied at Glenaladale Recreation Reserve on 3/5/2021
- Media MFG website: minefreeglenaladale.org nearly 200 press items from print, radio and TV since website launched a couple of years ago.⁸⁸⁵

The Proponent submitted the concept of a social licence is not a legal concept⁸⁸⁶ and is a way of saying that a project is unpopular.⁸⁸⁷ It referred to planning case law that supports the proposition that planning decision-making is not a popularity contest and comments of the Crib Point IAC which illustrated the “*particular danger of placing reliance on claims of social licence [being] that it may privilege loud voices over quieter ones*”.⁸⁸⁸ The Proponent referred to results of surveys conducted as part of the SEIA and a map of submitter support to the Project⁸⁸⁹ to demonstrate there is a level of community support for the Project, suggesting that those for and against the Project were evenly balanced.⁸⁹⁰

⁸⁸⁴ MFG’s Submission 813 devotes a whole chapter to the issue of social licence: Submission 813, pages 471ff. See also Submissions 252, 300, 384, 575, 630, 781, 784, 813 & 814.

⁸⁸⁵ Document 483, pages 10-11.

⁸⁸⁶ Document 698, page 194 relying on *No TasWind Farm Group Inc. v Hydro-Electric Corporation (No. 2)* [2014] FCA 348, per Kerr J at [38].

⁸⁸⁷ Document 698, page 194.

⁸⁸⁸ Document 698, pages 194-195.

⁸⁸⁹ Document 653.

⁸⁹⁰ Document 698, page 195-196.

On the issue of social licence, Council submitted the IAC is required to consider the relevant draft evaluation objective and that reference to the term ‘social licence’ should not distract the IAC from this requirement and the need to consider all submissions.⁸⁹¹ In its closing submissions, Council noted it had not had time to scrutinise the Proponent’s map of submitter support, due to it being tabled days prior, it took issue with the accuracy and reliance on the map because the map:

- had not been “ground truthed”
- showed title boundaries rather than landholdings, which could give the impression of greater numbers in support, given that submissions in support had been colour coded together with no submissions
- the reason for an absence of a submission is unknown.⁸⁹²

It submitted the “clear picture” from submitters on the Project was “an overwhelmingly negative one”⁸⁹³ and:

The submissions reveal a fractured, vulnerable and stressed community and one that was in need of healing – which was acknowledged on behalf of the Proponent...⁸⁹⁴

Council submitted that “the absence of a social licence would be manifestly detrimental to the mine operator’s ability to ensure such mitigation is carried forward over the long term”.⁸⁹⁵

MFG took issue with the way the Proponent had characterised submissions on the submitter map and in particular, the conflation of submitters in support of the Project and those that had not made a submission.⁸⁹⁶ MFG submitted:

The Proponent’s reliance on these flawed maps at the final hour reinforces the point that it has no evidence to substantiate its claims that community support for the Project is “evenly balanced”.

Ultimately, the Proponent cannot rely upon any independent expert evidence on social impact because it chose not to call any evidence on the topic.

Instead, the IAC received 910 written submissions, of which only nine were “in support” of the Project.

The IAC has also heard oral submissions from more than 140 submitters, the vast majority of which expressed strong opposition. It is in this context that MFG does support the Proponent’s concession that “members of the community are themselves best placed to articulate the perceived impact of the Project on them and what they value”. [Reference to Document 698, page 196].⁸⁹⁷

16.6.3 Discussion

The IAC agrees with the Proponent’s submissions that the concept of a ‘social licence’ is not legally recognised and that planning decisions are not a popularity contest. In the context of this Inquiry process, the IAC is focussed on the veracity of issues.

⁸⁹¹ Document 748, page 20.

⁸⁹² Document 748, page 21.

⁸⁹³ Document 748, page 22.

⁸⁹⁴ Document 748, page 22.

⁸⁹⁵ Document 748, page 32.

⁸⁹⁶ Document 749, pages 10-11 (MFG).

⁸⁹⁷ Document 749, page 11.

While there were some submissions in support of the Project, they were by far in the minority, with the Proponent's own summary of submissions noting only nine out of 910 submissions supported the Project.⁸⁹⁸ This IAC notes the comments of the IAC in the recent Crib Point Inquiry:

One of the difficulties in assessing social impacts for this Project (and other large scale infrastructure) is there are, no doubt, many silent voices. Due to the campaign waged by Save Westernport, those who perhaps might support the Project might have been reluctant to put their names on a submission. This is not able to be quantified but there may be some unknown local support for the Project.⁸⁹⁹

The IAC considers that in this case, it is highly likely there are additional supporters of the Project who the IAC has not heard from, but this is not able to be quantified.

16.6.4 Findings

The IAC finds:

- There is no requirement for the Proponent to demonstrate the Project has a social licence.

16.7 Overall conclusions on social impacts

The Panel concludes:

- While the SEIA was adequate, it was limited by the paucity of thorough direct social research with community members and local businesses.
- The local community have a deep sense of place with respect to the Project Area and its surroundings, in particular the Fingerboards meeting place.
- The Project would have an adverse impact on sense of place, with resulting loss of connection with the land.
- Community cohesion and wellbeing in and around the Project Area has been adversely impacted and if the Project proceeds would continue to be so.
- The mitigation measures proposed to address impacts on community cohesion are unlikely to mitigate the division in the community.
- There is no requirement for the Proponent to demonstrate the Project has a social licence.

⁸⁹⁸ Document 25b, page 16.

⁸⁹⁹ Crib Point Gas Import Jetty and Crib Point – Pakenham Gas Pipeline: Inquiry, Advisory Committee and Panel Report No. 1, page 237.

17 Economic impacts

17.1 Introduction

Economic effects are discussed in EES Chapter 9.13 and EES Appendix A018. Additional material is provided in TN20.

The relevant draft evaluation objectives are:

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

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 (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.

Appendix A018, the SEIA, was prepared by Coffey Services Australia Pty Ltd. It relied on the EIA prepared by BAEconomics (Appendix D to Appendix A018) (BAEconomics Assessment).

The EES proposes a range of mitigation measures included in Attachment H to manage the economic impact of the Project:

- SE29: A local employment and procurement guideline developed and implemented.
- SE30: Incentives for new residents to buy locally.
- SE31: Capacity building of local community through training.
- SE32: Local landholders engaged on land rehabilitation and future stocking requirements.
- SE35: Tourism authorities engaged regularly.
- SE36: Local businesses providing short-term accommodation engaged.
- SE37: Agricultural landholders consulted on use of local road network.
- SE38: Work placements on the Project.
- SE39: Local applicants targeted for Project employment, including encouraging applicants from disadvantaged or vulnerable groups.
- SE40: Opportunities for apprentices to work on the Project.
- SE41: Information sessions for potential employees and careers counsellors engaged.
- SE42: Partnerships with local labour hire providers to fill short-term and contract jobs.
- SE43: A database of local businesses established and maintained.
- SE44: Information provided about roles on the Project.
- SE45: Industry Capability Network (ICN) and GROW industry briefings and tender writing workshops.
- SE46: Skill shortages and training requirements identified and ongoing training supported through local partnerships.
- SE47: Labour force strategy including managing employment impacts on other sectors.
- SE52: Strategies to manage housing availability and affordability impacts during construction.
- SE53: Strategies associated with accommodating the non-local workforce.
- SE54: Workers living in long-term accommodation encouraged to share with other project workers.

- SE55: Regular consultation with local housing support agencies and house prices monitoring.
- SE59: Work with GROW Gippsland to support local economic development.
- SE60: Engage with organisations such as the GLaWAC and GEGAC
- SE61: Develop a database of people interested in Project opportunities.
- SE63: Advertising of tenders in local newspapers and relevant procurement portals.

The IAC benefited from submissions in its consideration of potential impacts on economic matters at the local, regional, state and national levels. Table 19 lists the economic evidence that was called.

Table 19 Economic evidence

Party	Expert	Firm	Evidence
MFG	Roderick Campbell	Australia Institute	- Economics Expert Witness Statement, January 2021 ⁹⁰⁰ - Economics Supplementary Expert Witness Statement, March 2021 ⁹⁰¹

17.2 Key issues

The key issues are:

- economic impacts on existing industries including agriculture, horticulture and tourism
- employment impacts
- the availability of compensation under the MRSD Act
- whether the EES over-stated the benefits of the Project and under-stated its disbenefits

17.3 Economic impacts on existing industries

17.3.1 Background

(i) Agriculture and horticulture

Chapter 14 discusses the impacts of the Project on the existing agricultural and horticultural industries, including economic impacts.

The EES acknowledges the agri-food sector is very significant for the economy of the East Gippsland Shire “with food manufacturing and production being fundamental drivers of the regional economy”.⁹⁰² It states the “agri-food sector provides the primary source of income and employment in the area surrounding the project area”.⁹⁰³

The AIA identifies the Project Area as comprising dryland agricultural grazing land (sheep and beef) and forestry plantations (blue gum and radiata pine) on freehold land, with areas of remnant native vegetation along gullies, creeks and roadside reserves. There is no dairy production within the Project Area but there is one dairy farm within a kilometre of the Project Area boundary and

⁹⁰⁰ Document 93.

⁹⁰¹ Document 187.

⁹⁰² Appendix A018, page 66.

⁹⁰³ EES Executive Summary, page xiv.

several other nearby dairy farms. More generally, land use in the area includes agriculture, plantation forestry and native forests.⁹⁰⁴

Based on an average area of 443 hectares per annum out of agricultural production over a 20-year Project life, the EES estimated the Project would result in a loss in agricultural gross margin of between \$57,750 to \$83,000 per annum, a lost value of production of around \$87,250 to \$125,250 per annum and a small associated loss of employment.⁹⁰⁵

The Lindenow Valley currently supports a high value, irrigated horticultural industry, with two major Bairnsdale businesses that employ around 800 people (excluding service industries).⁹⁰⁶ The EES, based on ABS statistics, estimated the total farmgate value of vegetable crops produced in the Lindenow Valley at \$62.6 million in 2018, although the AIA notes this is generally regarded by the local industry as an under-valuation.⁹⁰⁷ The EES states:

The project will be managed to avoid or reduce to low levels potential impacts on the surrounding agricultural and horticultural production.⁹⁰⁸

Employment impacts are discussed in the next section of this chapter.

(ii) Tourism

The SEIA identified the value of the tourism industry as follows:

... tourism across the Gippsland region was estimated to be worth \$785 million to the region's economy in direct and indirect GRP in 2016-17 (Tourism Research Australia, 2018). In 2015, tourism within the Lakes tourist region contributed \$344 million to the region's economy (Tourism Research Australia, 2015b). During the same period, tourism in the Gippsland tourist region contributed \$495 million to the region's economy (Tourism Research Australia, 2015a). In 2014, the most common reasons for visiting the Gippsland region were for holidays or leisure (56%) and to visit friends and relatives (31%) (Tourism Victoria, 2015b). Compared to all domestic overnight visitors to regional Victoria, visitors to the Gippsland region are more likely to go to the beach, visit national parks, undertake bushwalks, rainforest walks, water activities and sports or go fishing (Tourism Victoria, 2015b).

The Gippsland region is seen as an area with great tourist potential, especially if it can increase the awareness of its nature-based experiences. The 'inspired by Gippsland' campaign which focuses on intrastate and interstate markets supports this approach by focusing on diverse and inspiring nature experiences and the benefits of exploring Gippsland (East Gippsland Shire Council, 2017c).⁹⁰⁹

The SEIA acknowledged the Project would take place in an area with popular tourist destinations nearby and that tourism-reliant businesses (such as short-term accommodation providers, tour operators and eating establishments) may be impacted due to perceptions of the negative impacts of mining on the amenity of the area.⁹¹⁰ The Project Area is situated approximately 20 kilometres to the northwest of Bairnsdale, 10 kilometres south of the Mitchell River National Park (which includes the Mitchell River and Den of Nargun) and 25-30 kilometres north of the Gippsland Lakes and tourist towns of Lakes Entrance, Metung and Paynesville. At its closest point, the Project Area will be 350 metres from the Mitchell River which flows into the Gippsland Lakes.

⁹⁰⁴ EES Appendix A015 at 2.6.3.

⁹⁰⁵ Appendix A018, page 140. See also Chapter 14.

⁹⁰⁶ Horticultural Impact Assessment, Appendix A016.

⁹⁰⁷ Appendix A016, pages 1 and 23.

⁹⁰⁸ EES Chapter 9, section 9.11.9.

⁹⁰⁹ Appendix A018, page 68.

⁹¹⁰ Appendix A018, pages 140-141.

The SEIA also identified the availability of tourist accommodation may be impacted by increased demand from workers during the construction phase of the Project which could lower visitor numbers.⁹¹¹

The SEIA concluded that because the visual and amenity (dust and noise) impacts of the Project would generally be low, tourism businesses within 5-10 kilometres of the Project Area would not be adversely impacted. It did, however, acknowledge there may be impacts on tourist enjoyment of the area due land disturbance, mining infrastructure and traffic impacts (B-doubles) when travelling through the area and to the Mitchell River National Park and other natural attractions.⁹¹²

The SEIA noted the concerns of Business & Tourism East Gippsland and East Gippsland Marketing Inc. that:⁹¹³

Should the project proceed, it is critically important that it does not brand East Gippsland as a mining region.

The area is heavily dependent on having adequate and a high-quality water supply for drinking, irrigation and also recreation.

Dust generation and potential contaminants in dust are a potential concern to growers, residents and tourists.

Traffic will need to be carefully managed particularly during peak tourist periods. Safety is also a key concern.

Tourism can be impacted by negative publicity about the region.

Perception of community conflict has the potential to impact on tourism.

East Gippsland is building a reputation as a provider of high-quality food and wines which is a strong drawcard for tourists. Potential impacts on the reputation of the Lindenow Valley as a source of high-quality fresh produce need to be carefully managed.

The SEIA assessed that with implementation of the proposed mitigation measures, the residual risks of adverse impacts on the tourism industry was low.

17.3.2 Evidence and submissions

(i) Agriculture and horticulture

Evidence and submissions relating to the economic impact of the Project on the existing agricultural and horticultural industries are covered in Chapter 14. The key issues raised were:

- market influences and the impact on the area's 'clean green' image
- impacts on agricultural accreditations
- loss of productivity.

Mr Campbell gave evidence that the BAEconomics Assessment had understated the economic disbenefits of the Project,⁹¹⁴ a matter which is discussed in detail in Section 17.6. He produced a table indicating the impacts on horticultural value of production, surplus and employment of arbitrary reductions of 1 per cent, 5 per cent and 10 per cent to demonstrate that even seemingly minor impacts on the local horticultural industry's output could lead to significant loss in production values and profits in the horticultural industry (see Table 20).

⁹¹¹ Appendix A018, pages 141.

⁹¹² Appendix A018, page 141.

⁹¹³ EES Appendix A018, pp141-142.

⁹¹⁴ Document 93.

Table 20 Basic estimates of impacts on annual horticultural output and employment⁹¹⁵

Reduction	Value of production	Surplus/profit	Employment
1%	\$630,000–\$1.2m	\$188,000–\$235,000	14–23
5%	\$3.2m–\$6m	\$940,000–\$1.2m	72–116
10%	\$6.3m–\$12m	\$1.9m–\$2.4m	145–232

Source: Agricultural impact assessment, author calculations

The Proponent submitted:

... the HIA was not intended to provide an economic assessment in the nature of cost benefit analysis. Kalbar's case is not the economic benefits of the mine outweigh those of horticulture in the Lindenow Valley, but rather that both industries can coexist. This is so notwithstanding that, during the period the mine operates, the gross revenue of the mine is likely to be greater than the gross revenue of production in the Lindenow Valley.⁹¹⁶

The Colemans submitted the economic analysis in the EES was flawed and misrepresented its value:

The EES uses turnover to represent economic benefits in some areas and profit when referring to the Agriculture/Horticulture section. This misrepresentation creates huge numerical anomalies in favour of the purported turn-over figures and the grossly under-rated profit margins in agriculture.⁹¹⁷

(ii) Tourism

The Proponent's submissions did not focus on the potential impacts of the Project on the tourism industry.

In contrast MFG submitted:

Our astoundingly beautiful area with its natural assets attracts numerous tourists. These include visitors who participate in various recreational activities such as canoeing/ kayaking, bush walking, fishing, bike riding (including regular regional and state social and competitive cycle races, including the Great Victorian Bike Ride), cultural heritage trail tours, horse trail riding, field naturalists, walking groups, vintage and classic car clubs, football, golf club, cricket, tennis, netball, lawn bowls, hunting etc. The impact of the proposed mine within the community should not be permitted, it will diminish participation in and detract from the public's enjoyment of their recreational activities and severely impact our tourism industry.⁹¹⁸

The MFG submission also raised concerns about potential negative impacts of the Project on the established tourism industry including:

- the impact of inadequate rehabilitation of the Project Area on tourism based around the high country, the Mitchell River and the Gippsland Lakes
- impacts on the quantity and quality of the Mitchell River and the flow on impacts for tourism (including the impact on recreational use and tourism caused by increasing siltation and sedimentation)
- destruction of the visual gateway to the Mitchell River National Park, Alpine National Park and the Victorian Alps
- impacts on the Perry River which flows into the Gippsland Lakes

⁹¹⁵ Document 93, page 13.

⁹¹⁶ Document 698, page 186.

⁹¹⁷ Submission 812, page 15.

⁹¹⁸ Submission 813, page 439.

- further expansion of the tourism industry through adventure tourism, eco-tourism and gastro-tourism.⁹¹⁹

Council submitted the analysis of the impact on tourism in the EES (Appendix A018) was not compelling.⁹²⁰ Relying on the SLR Report, the Council submitted the impact analysis was insufficient as no specific Tourism Impact Assessment had been undertaken, nor had the cumulative impacts of multiple concurrent regional infrastructure projects been assessed. In addition, there had been little assessment of impacts on tourist businesses beyond the area of 5 – 10 kilometres around the Project Area. Instead, it submitted, the SEIA assessment of impacts on the tourism sector had been primarily based on visual and landscape analysis.⁹²¹

Council also took issue with the proposed mitigation measures, such as ongoing engagement with tourism authorities on opportunities to promote the region to tourists and maintaining current levels of access to national parks and other natural assets, and timing of project works around peak visitation periods.⁹²²

Council submitted:

It is difficult, however, to see how those comments genuinely address the concerns expressed, such as – the critical importance of not branding East Gippsland as a mining region, or not affecting the reputation East Gippsland is building as a provider of high-quality food and wine, and the potential impact on the reputation of the Lindenow Valley.

While maintaining access to the National Park ought be a given, as ought engagement with local tourist businesses, it is unclear how the Proponent engaging with the tourist operators would realistically mitigate the risks identified.

The proposed mitigation measures are couched in terms which are incapable of enforcement. They indicate proposals to consult (or to encourage) landowners to seek accreditations which are likely already known or available to them. There may be targeted measures that would assist, such as potentially advertising the area for its clean green image (or others), but these have not been proposed for consideration in order to realistically mitigate the risks of this proposal.

In all, while some positive impact on the local economy seems likely, the IAC is invited to conclude they are overstated by Kalbar and they are too uncertain.⁹²³

Ms Reefman of Reefman Arts Estate Retreat submitted the likely impacts of the Project would threaten the viability of her tourism business.⁹²⁴ She explained that Reefman Arts Estate Retreat hosts tourists - local, interstate and international – as well as students visiting for local placements and professional needing short term accommodation as well as “*workawayers*”.⁹²⁵ Its focus is:

To provide a retreat in a serene, natural, picturesque and peaceful environment, where folks can rest, relax, reflect and restore, away from city pollution, noise, light and frenzy ... Our guests remark about our beautiful views, the clean air, the unspoilt drinking water, the night sky full of more stars than they have seen at home, the quiet, often reporting they had never slept so well anywhere else.⁹²⁶

She submitted the views enjoyed by tourists visiting her property, which is in direct sight of the proposed mine site, will be impacted by dust and visitors will no longer be able to enjoy the views

⁹¹⁹ Submission 813, page 65, 105, 141, 153, 415, 418, 437, 439 & 462.

⁹²⁰ Document 407, page 78.

⁹²¹ Document 14, PDF page 49.

⁹²² Document 407, page 79.

⁹²³ Document 407, page 79.

⁹²⁴ Document 588, page 3: “Our business would no longer be viable”.

⁹²⁵ Tourists who provide 25 hours’ work in exchange for free board: Document 588, page 1.

⁹²⁶ Document 588, page 2.

as they will be looking at the “*scar of an open mine site*”.⁹²⁷ Ms Reefman submitted that past guests have indicated that, should the Project proceed, they would not return, due to concerns about the Project’s impacts.⁹²⁸

Ms Grant, a local tourism operator for over 20 years with a Bed and Breakfast approximately 9 kilometres from the Project Area, submitted the Project would have significant impacts on her business.⁹²⁹ She submitted that visitors enjoy “*the peace and serenity of the area and the beauty of the landscape*” and would be reluctant to return if they have to travel through the “*unsightly disturbed landscape and experience dust, noise and vibration 24/7*”.⁹³⁰ She also expressed concern the amenity impacts of the Project on her business “*as the whole ambience of the area will change*”.⁹³¹

Ms Rose submitted the loss of amenity from the Project would translate into lost income for the hospitality industry, including restaurants, hotels and motels, together with those businesses who serve the industry.⁹³² She referred to the Mitchell River National Park and associated recreational activities such as white water rafting, kayaking, bush walking, and the Den of Nargun and the Mitchell River flows into the Gippsland Lakes which offer boating, swimming, sailing, recreational fishing and tourist dollars.⁹³³ She described the Fingerboards as being the gateway to the tourist hotspots of Angusvale, Dargo (walnuts and trout fishing, and Alpine National Park and Wonnangatta Station):

The visual impact of an open cut mine is not consistent with the image of a pristine natural environment free from pollution.⁹³⁴

Ms Rose submitted that mining and tourism are not compatible in this location due to the adverse impact of the mine on the “*most important landscape features of the area*”.⁹³⁵ She submitted that potential visitors to the area will have a negative perception of the area because of the mine.⁹³⁶

Several submitters expressed concern about the impacts of the Project on the Gippsland Lakes, the clean green image of East Gippsland and the flow on impacts for tourism.⁹³⁷

East Gippsland Community Action Group submitted the region is reliant on agriculture and tourism industries, both of which would be severely adversely affected if the Project were to proceed.⁹³⁸ This sentiment was echoed by Ms Wagner, a local business owner of 47 years living in Paynesville. She submitted the area survives on agriculture and tourism, both of which would be impacted if the Project were to proceed. She expressed concern the impacts on those sectors could lead to other businesses closing.⁹³⁹

⁹²⁷ Document 588, pages 1-3.

⁹²⁸ Submission 784.

⁹²⁹ Submission 546 and Document 564.

⁹³⁰ Document 564, page 2.

⁹³¹ Submission 564, page 2.

⁹³² Submission 875, page 10.

⁹³³ Submission 875, page 10.

⁹³⁴ Submission 875, page 11.

⁹³⁵ Submission 875, page 11.

⁹³⁶ Submission 875, page 11.

⁹³⁷ For example, submitters 34 (Day 33), 94 (Day 25), 264 (Day 31), 288 (Day 33), 509 (Day 26), 628 (Day 33), 713 (Day 32), 737 (Day 14), 814 (Day 32), 866 (Day 30), 870 (Day 26).

⁹³⁸ Submission 355, page 4.

⁹³⁹ Submitter 288, Day 33, 15 July 2021.

17.3.3 Discussion

(i) Agriculture and horticulture

The IAC considers the impacts of the Project on the existing agricultural and horticultural industries have been downplayed in the EES.

As discussed in Chapter 14 the area in and around the Project Area, particularly the Lindenow Valley horticultural area, is a major economic contributor and source of employment in the East Gippsland economy. The Project would have direct impacts on existing farming businesses, and a high likelihood for indirect impacts on farming operations and quality assurance certifications, leading to losses in production. The ‘clean green’ image of the area would be put at risk.

The IAC notes the evidence of Mr Campbell that a modest impact on the horticultural area leading to a 5 per cent reduction in output – could result in losses to the region of about \$3.2 million to \$6 million, reduce horticultural profits by around \$1 million and affect around 100 jobs.

The IAC does not accept that the industries (horticulture/agriculture and mining) can coexist in this context where there are no buffers between uses and likely significant offsite impacts from mining.

(ii) Tourism

The IAC considers the impacts on the local and regional tourism industry, a key sector for East Gippsland, have been understated in the EES. The analysis of impacts on tourism relied heavily on the visual and landscape impacts of the Project being assessed as low, a conclusion with which the IAC disagrees (refer to the IAC’s conclusions in Chapter 13).

The IAC accepts the East Gippsland region is known for its scenic values and natural beauty, its clean air, a place to get away and unwind, and to enjoy a range of recreational and nature-based activities such as camping, canoeing and kayaking, boating, fishing, bush walking, bike riding, horse trail riding, vintage and classic car clubs, and so on. Tourism relies on these values, including the perception of these values and East Gippsland’s ‘clean green’ image. Increasingly, East Gippsland is also focussing on regional produce and gastro-tourism with cafes and restaurants offering local produce as a draw card.

The IAC considers there is potential for decline in tourism in the immediate area of the Project Area, and beyond as far as the Project can be seen or heard, due to the change in land use of the Project Area from rural to mining, the negative impacts on amenity, visual and landscape values of the area, together with the impact of the area becoming known as a mining area, rather than a rural or natural area (as applicable). This could include areas of the Mitchell River and the Mitchell River National Park. Further, the IAC concludes in Chapter 13 the Project would have a significant impact on the landscape values of the journey to the Mitchell River National Park and could thereby detract from the landscape and recreational values of the Park itself, but would not have a significant impact on the views *from* the Mitchell River National Park.

The IAC is concerned the negative impacts on tourism could be felt more broadly, should the region of East Gippsland become associated with mining and its heavy industrial nature and negatively impact on the region’s image as a tourist destination. The IAC also notes that submitters had concerns about the potential tourism impacts of the impacts on the water quality of the Mitchell and Perry Rivers and the downstream Gippsland Lakes.

The IAC concludes in Chapter 7 the impacts of the Project on water quality of the Mitchell and Perry Rivers, and downstream to the Gippsland Lakes, are likely to be manageable under normal operating conditions but if there were to be an unplanned event at the mine, there could potentially be impacts on the Gippsland Lakes. However, the IAC consider there is insufficient material before the it to make any firm conclusion on the impacts on tourism beyond the area nearby to the Project.

The IAC is not convinced the mitigation measures proposed would address the potential adverse impact on the tourist image of the area should the mine proceed. The IAC considers that, like the agricultural and horticultural industries, the tourism industry is likely to be adversely affected by the Project which may harm the existing industry and growth prospects.

17.3.4 Findings

The IAC finds:

- The area in and around the Project Area, particularly the Lindenow Valley horticultural area, is a major economic contributor and source of employment in the East Gippsland economy.
- The Project would have direct impacts on existing agricultural and horticultural businesses, and a high likelihood for indirect impacts on farming operations and quality assurance certifications, leading to losses in production.
- Losses in vegetable production in the Lindenow Valley horticultural area would also impact on downstream businesses that rely on those vegetables, both of which would have negative economic impacts for the East Gippsland region.
- The Project would have a negative impact on the existing tourism industry in the immediate area of the Project, and possibly to existing tourism operations related to the Mitchell River and the Mitchell River National Park.
- There is potential for the tourism industry in Gippsland more broadly to be impacted should the region of East Gippsland become associated with mining and its heavy industrial nature and negatively impact on the region's 'clean green' image as a tourist destination.

17.4 Employment impacts

17.4.1 Background

The EES estimated the Project would generate an average of 180-200 FTE⁹⁴⁰ direct jobs and at least a further 200 indirect jobs in the region but would cause an estimated loss of 0.34 to 0.62 of an FTE equivalent labour unit associated with the loss in agricultural production.⁹⁴¹ The workforce is expected to be sourced from both within and outside the local area with around half being contractors associated with mining activities and the transport of the HMC.⁹⁴²

⁹⁴⁰ Full time equivalent.

⁹⁴¹ Appendix A018, page 140. The Proponent stated in closing submissions that the Project is expected to generate approximately 200 direct jobs during construction and approximately 200 jobs during operations: Document 698 page 1. Also note Appendix A018, page 150 states that the Project would create 200 direct jobs during construction and 200 during operations, with a further 200 indirect jobs.

⁹⁴² Appendix A018, page 28.

The Project's commitment to maximise opportunities for locals to secure employment on the Project is stated as being one of the key benefits of the Project given the higher unemployment rates for East Gippsland (in 2018 unemployment in East Gippsland was 8.2 per cent as compared to the State average of 5.3 per cent) and suggesting there is an unemployed pool of people the Project could draw on.⁹⁴³

The SEIA states:

Specialist skills and previous experience will be required for some positions on the mine. These include roles such as mine manager, mining and metallurgical engineers, geologists and environment, health and safety personnel whereas others will be non-professional such as truck drivers and equipment operators. In line with its Local Content Guidelines (Kalbar Operations Pty, 2019a), Kalbar intends to source the majority of the project workforce locally and is working internally and with employment and training organisations to identify strategies to increase opportunities for local workers to gain employment on the project.⁹⁴⁴

The SEIA suggests there is a substantial degree of local interest in obtaining work on the Project.⁹⁴⁵

The EES identified competition for labour as a potential impact of the Project and the HIA found the Project would create competition for labour in the horticultural sector, due to the higher wages in mining. The EES stated:

A comparative analysis of earnings between the mining and horticulture sectors indicated that a full-time mining employee in 2018 earned between \$5,000 to \$7,000 more than employees in horticulture (assuming 2,000 hours worked). While casual mining workers were estimated to earn between \$6,000 and \$9,000 more than those in horticulture (see Section 9.11: Agriculture and horticulture).⁹⁴⁶

The SEIA acknowledged that across Australia agricultural and horticulture production "*faces skills and labour shortages at all training and skill levels*".⁹⁴⁷ In the East Gippsland area, it reported the agri-food sector in East Gippsland relies on temporary foreign workers due to the shortage of young people working in the sector. It also reported the Mineral Council of Australia has expressed concerns about skills shortages in the mining sector by 2020 because of low levels of enrolments in engineering and geology degrees and there is a shortage of candidates for blue collar jobs in the mining sector with the increase in construction projects in Victoria drawing away candidates from the resources and mining sector.⁹⁴⁸

Mitigation measures to address competition for labour included:

Skill shortages and training requirements will be identified to allow local people to gain qualifications within these areas. Ongoing training will be encouraged and supported through local partnerships with a view to keep abreast of the changing landscape of the mining industry (SE46).

A labour force strategy will be prepared in consultation with local employment networks prior to construction commencing; including targeted strategies to manage potential impacts of project employment on other sectors (SE47).

Local applicants will be targeted for employment opportunities on the project, working with GROW Gippsland and other organisations, including to encourage applicants from disadvantaged or vulnerable groups (SE39).⁹⁴⁹

⁹⁴³ Appendix A018, page 150.

⁹⁴⁴ Appendix A018, page 150.

⁹⁴⁵ Appendix A018, page 151.

⁹⁴⁶ EES Chapter 9.13, section 9.13.3.1.

⁹⁴⁷ Appendix A018, page 72 relying on the conclusions of Appendix A016 (Horticultural Impact Assessment).

⁹⁴⁸ Appendix A018, page 72.

⁹⁴⁹ Appendix A018, page 158.

The SEIA concluded that after the application of mitigation measures the risk of disruption to agricultural practices and other industries due to increased competition for labour leading to reduced income was low.⁹⁵⁰

17.4.2 Evidence and submissions

All parties appeared to accept that an estimate of 200 direct jobs to be created by the Project was reasonable, but uncertain.⁹⁵¹ Submitters took issue with the value to the economy of those jobs, how many would be taken up by local residents, and whether they would come at the expense of jobs in existing industries. Mr Baker, a submitter with 30 years' experience in mining and five years' experience in mineral sands mining, submitted that in his experience the mining industry was increasingly becoming automated with consequently less on-site jobs.⁹⁵² Council submitted the Project should be subject to a *“clear and enforceable requirement to actually create the proposed number of jobs and for those to be taken by local people (where there is feasible)”*.⁹⁵³

Mr Campbell gave evidence there were problems with the approach of BAEconomics in valuing benefits to workers from employment on the Project. The BAEconomics Assessment's cost benefit analysis had identified a net present value to workers of \$25 million which had assumed:

... that all (non-contract) workers on the project are paid \$101,882/year and that in the absence of the project all of these workers would earn the East Gippsland regional average wage of \$49,543.11 This results in each worker earning \$52,339 more with the project than they otherwise would have.⁹⁵⁴

Mr Campbell gave evidence that it could not be assumed that all mine workers would have otherwise earned the average regional wage, pointing out that many workers on the Project would likely come from other mining or civil engineering jobs and would receive similar wages in the absence of the Project.⁹⁵⁵ In his oral evidence Mr Campbell explained the correct approach was not make a comparison with the average wage, but instead to undertake a detailed assessment to establish the relevant reservation wage and compare it to the proposed wage for that job on the Project.⁹⁵⁶ He also gave evidence the higher wages in mining reflect the nature of the works as being *“dirty, dangerous, inconvenient and require considerable skill to work safely and efficiently”* and thus were not directly comparable to the average East Gippsland wage.⁹⁵⁷ He gave evidence the BAEconomics approach was misleading and served to overstate the benefits of the Project.⁹⁵⁸

Mr Campbell concluded:

Like benefits to suppliers, the benefit to workers of the project is unlikely to be zero, but is almost impossible to measure, as it is unclear which workers have other opportunities of similar value and the compensation they require to work in the mining industry. It is for this

⁹⁵⁰ Appendix A018, page 158.

⁹⁵¹ See for example, Document 40-7, page 74. However, note that Ms Rose challenged the figure of 200 submitting that there was no evidence to support the jobs numbers put forward by Kalbar noting that it had previously been estimated at 60 direct jobs (Document 643, page 18). She submitted that based on other mineral sands mines of similar size and scale, 30-40 workers are needed on site during operations during a 12 hour shift which would amount to 80 jobs per 24 hours.

⁹⁵² Submission 628.

⁹⁵³ Document 748, page 28.

⁹⁵⁴ Document 93, page 10.

⁹⁵⁵ Document 93, page 10.

⁹⁵⁶ Day 5, 7 May 2021.

⁹⁵⁷ Document 93, page 10.

⁹⁵⁸ Day 5, 7 May 2021.

reason that most cost benefit analysis excludes this value and the NSW Guidelines cited by BAEconomics consider that “a zero wage premium is a useful starting assumption”.⁹⁵⁹

Mr Campbell also gave evidence the BAEconomics Assessment had understated the economic impact of the Project on jobs in the local area. He produced a table (Table 20 above) indicating the impacts on horticultural value of production, surplus and employment of arbitrary reduction of 1 per cent, 5 per cent and 10 per cent to demonstrate that even seemingly minor impacts on the local horticultural industry’s output could lead to a loss of local jobs in the horticultural industry.⁹⁶⁰

Mr Campbell gave evidence these figures raised distributional questions regarding the impacts of the Project:

Is it right for a mine to reduce horticultural output by \$5 million if it pays \$7 million to the state government in royalties? Is 15 years of 200 mining jobs worth a longer-term reduction of 100 horticultural jobs? These are not questions that economists can answer.⁹⁶¹

Dr Blaesing, the Proponent’s expert on horticulture, gave evidence that, based on annual water use, when comparing projected jobs per megalitre for the Project and estimated jobs per megalitre at peak employment time in the Lindenow area, the overall direct employment opportunities in both industries (mining and vegetables) are comparable.⁹⁶²

She also gave evidence the Project would create competition for labour with the existing Lindenow horticultural industry due to higher wages and the work would not be affected by seasonal fluctuations. She identified shortages in the horticultural industry for “*truck, tractor and forklift drivers as well as trades*”.⁹⁶³

The Proponent submitted the competition for labour that would result from the Project was “*an entirely acceptable consequence*” and would create economic opportunity for local workers in an industry other than horticulture.⁹⁶⁴ It argued:

An EES inquiry is not the place to protect one category of employer from competition for labour from another employer who offers higher wages. Such protection is incompatible with a free market for labour and penalises workers who would otherwise benefit from receiving higher wages. Moreover, labour is mobile, and workers can be drawn from outside East Gippsland, whether for horticulture or mining, to meet any shortfall.⁹⁶⁵

The Proponent also submitted there was a conflict in the evidence given by Mr Campbell and Dr Blaesing in whether the Project would pay higher wages and thereby cause competition for labour between the Project and existing industries:

Opponents of the Project cannot have it both ways: either the Project will pay higher wages and attract agricultural workers, conferring a wage benefit, but affecting the ability of agricultural business to source and retain labour; or it does not, in which case it poses no threat to agricultural labour.

The IAC should find the jobs provided by the Project will likely provide a wage premium and may attract agricultural workers. It should also find, contrary to Council’s assertions, the payment of higher wages is unambiguously a good thing, especially in the context of several years of wage stagnation.

⁹⁵⁹ Document 93, page 11 and citing NSW Department of Planning and Environment (2015) Guidelines for the economic assessment of mining and coal seam gas proposals, page 4.

⁹⁶⁰ Document 93, page 13. See also Submission 738, pages 6-7.

⁹⁶¹ Document 93, page 14.

⁹⁶² Document 73, pages 3 & 27.

⁹⁶³ Document 73, pages 3 & 28.

⁹⁶⁴ Document 698 page 183.

⁹⁶⁵ Document 698 page 183.

Council also suggests the gaps in the availability of local workers to take up jobs and trainers to train them undercuts the employment benefits of the Project. In fact, the SIA [Social Impact Assessment] specifically acknowledges those gaps and identifies the need to take steps to address skills shortages, potentially providing longer term benefits even after the closure of the Project.⁹⁶⁶

While acknowledging that for some, the Project would have a negative impact, the Proponent submitted there would be positive flow on social impacts for those who obtain Project employment and for Project service providers (and their families).⁹⁶⁷ Negative impacts would be addressed by the proposed mitigation measures that are aimed at sharing the Project's benefits with the local community, such as through local purchasing arrangements, training and apprenticeship opportunities.⁹⁶⁸ These would be implemented through the proposed Social Impact Management Plan, the Environmental Review Committee and the Community Reference Group required by the MRSD Act and Regulations.⁹⁶⁹

Council submitted there was potential for significant temporary and permanent negative impacts on existing local industries including agriculture, tourism, and other businesses in terms of:

- competition for labour and water
- the ability of mining and horticulture to co-exist
- the re-characterisation of historically agricultural land for mining.⁹⁷⁰

It submitted these matters are relevant in terms of both local impacts and the evaluation objective that requires the best use of the mineral resource while maintaining viability of other local industries.

The issue of whether the existing horticultural industry would create more jobs than the Project if it had access to the water that would be used by the Project was raised by several submitters. After expressing some caution with respect to the value of Dr Blaesing's evidence overall, Council submitted, in effect, that her evidence the number of jobs that would be created by the Project per megalitre of water was comparable to the horticultural industry should be accepted.⁹⁷¹

However, Mr Rose submitted that Dr Blaesing's calculations were "*questionable*" and "*a creative use of statistics*".⁹⁷² He submitted her use of four megalitres of water annually per hectare for the Lindenow Valley flats in her calculation of jobs per megalitre was unsubstantiated and submitted that SRW's statistics (said to be validated by SRW), which state that annual usage for the Lindenow Valley varies from seven to ten gicalitres with a maximum of 13.8 gicalitres, should be preferred.⁹⁷³ Mr Rose also submitted that employment on the Lindenow Valley flats is closer to 1,500 jobs than the 1,363 jobs used by Dr Blaesing for her calculations.

Having converted Dr Blaesing's calculations into figures of jobs per megalitre of water (the Project would generate one job for every 15 megalitres of water whereas in the existing Lindenow Valley horticultural industry would create one job for every 14.3 megalitres), Mr Rose submitted:

⁹⁶⁶ Document 689, pages 192-193.

⁹⁶⁷ Document 698, page 193.

⁹⁶⁸ Document 698, page 193.

⁹⁶⁹ Document 698, pages 193-194.

⁹⁷⁰ Document 407, page 33.

⁹⁷¹ Document 407, page 78.

⁹⁷² Document 654, page 16.

⁹⁷³ Document 654, page 16.

So using a reasonably conservative figure of 10 gigalitres and 1500 jobs, this equates to one job per 6.6 megalitre or 2.3 times as many jobs created in horticulture per megalitre compared to what would be created by the mine.

And if it is not acceptable to quote grower statistics [for jobs in the Lindenow Valley], then a similar calculation can be done with [Dr Blaesing's] own figures, presumably from ABARES but not clearly referenced, which gives a result of one job per 7.3 megalitres which is still twice the number of jobs compared to that created by Kalbar's mine for the same water consumption.⁹⁷⁴

Others submitted that three times more jobs could be created in the existing horticultural industry than would be created by the Project for use of the same amount of water.⁹⁷⁵ On this basis, Mr Hine, one of the Lindenow Valley vegetable growers, submitted that allocating water to agriculture rather than to the Project would be better value economically.⁹⁷⁶

In a similar vein, the Colemans also submitted there would be a net loss of jobs because of the Project based on the number of jobs per megalitre of allocated water. They submitted there would be 600 new (direct) jobs if the horticultural industry had access to the 3 gigalitres of water the mine would use. In addition, these 600 jobs would create 2,500 new indirect jobs leading to a total of 3,100 new jobs if the Project does not proceed (and assuming the water is allocated to horticulture). They submitted the Project would create a net loss of employment opportunities of 2,700 jobs.⁹⁷⁷

East Gippsland Community Action Group submitted the predicted job losses in the existing meat farming and vegetable growing industries would exceed the number of jobs created by the Project (based on 80 jobs when in production).⁹⁷⁸

Ms Seymour submitted:

Kalbar says the mine will employ 200 people during the operation of the project, which would have a spin-off effect in creating 200 indirect jobs. This compares to the existing 1500 workers that are directly employed by horticulture in the Lindenow Valley, each job of which indirectly generates another four jobs, so 6000 jobs. But there is no analysis in the EES of how many existing agricultural jobs could be lost if the horticultural industry is negatively affected through dust, contamination of water sources, and disruption to the irrigation water from the Mitchell River and the aquifer.⁹⁷⁹

Bulmer Farms, a fourth-generation family run horticultural enterprise located in the Lindenow Valley, submitted:

We believe the value of irrigated production has been grossly undervalued ... For every direct job in agriculture, a figure of 4.26 indirect jobs are created (National Farmers Federation; 2017). Only one indirect job will be created for every direct job from the Kalbar mine ... It follows that every job lost in horticulture has four times the multiplier flow-on loss effect which will have a major impact on the local economy and is a significant adverse effect should loss of jobs occur to the horticultural industry as a result of the mine. It is believed there are over 2,000 jobs associated to the horticultural industry in the Mitchell River Valley.⁹⁸⁰

⁹⁷⁴ Document 654, page 16.

⁹⁷⁵ Document 644, page 8; also referred to in submission 373, page 4. Mr Hine submitted that, based on Southern Rural Water figures of an average annual usage of 9 gigalitres in the Lindenow Valley, with employment of 2000 jobs, use of water in the Lindenow Valley creates one job per 4.5 megalitres, or three times the number of jobs the Project would create: Document 546, page 14.

⁹⁷⁶ Document 546, page 15.

⁹⁷⁷ Document 634a, page 13

⁹⁷⁸ Submission 355, page 2.

⁹⁷⁹ Document 562, page 3.

⁹⁸⁰ Submission 711, page 1.

This submission by Bulmer Farms was supported (and quoted) by the VFF.⁹⁸¹ In addition, many other submitters also expressed general concern the 200 jobs to be created by the Project would be filled by non-locals, but the number of jobs is low in comparison to the jobs that could be created in tourism and horticultural industries.⁹⁸²

Council also relied on Dr Blaesing's evidence there would be a risk of competition for labour in the local agricultural sector in terms of the jobs to which agricultural workers can readily adapt. Council's submissions also relied on the SLR Report which stated:

Cumulative impacts associated with known/planned and potentially concurrent regional infrastructure projects are not considered. Concurrent projects might create competition and associated impacts for labour/skills supply/availability in local and regional communities. Competing projects (depending planning approvals, financing and construction timing), might include road, rail, renewable energy – including the Star of the South Offshore Wind Farm, hospital, education, tourism, irrigation projects, bushfire recovery projects etc. which could commence across Gippsland over the coming years.⁹⁸³

In this respect, Council noted the SEIA indicated that around half the workforce will be contractors associated with mining activities and the transport of HMC. Council submitted that jobs requiring particular skill would not go to local residents. Council also submitted the SEIA had demonstrated skill and availability gaps locally, which it argued undermined the position there is a ready pool of local workers available to fill Project positions.⁹⁸⁴

Mr Geoff Banks, a local resident (within 2 kilometres of the Project Area) and fourth generation farmer,⁹⁸⁵ expressed concerns about the impact of the Project on competition for labour. He submitted that many of the mine jobs would be for drivers, and it was already difficult to get bus and truck drivers. He also expressed concern the Project's jobs would be subcontracted out and there would not be many jobs for locals. He drew a distinction between these jobs on the project and the existing horticulture and agriculture sector.⁹⁸⁶

Bulmer Farms also expressed concern about competition for labour:

As there is a lack of machinery operators and drivers in the region we believe the mining operations will lead to a key loss of personnel [sic] from the local horticultural business sector, labour market testing conducted by Bulmer Farms this year showed that approximately a dozen tractor driving positions were being advertised throughout the Gippsland Horticulture footprint. From our business experiences in East Gippsland no suitable applicants were sourced for these roles.⁹⁸⁷

Mr Osler, a remote mine worker recently made redundant because he is unable to travel to Western Australia due to COVID restrictions and now living in Paynesville, submitted the jobs the Project would bring to the area are much needed given the recent loss of jobs due to the Hazelwood closure, the decline in coal mining, the power industry, fisheries and timber industries, as well as the loss of retail and hospitality jobs due to COVID.⁹⁸⁸ He submitted that he would value

⁹⁸¹ Quoted in submission 738, at page 10. Mr Hine also made a similar point: Document 546, page 15.

⁹⁸² Document 25b, page 42 refers to "Concern that the 200 jobs that will be created by the Project will not only go to non-locals, but is low in comparison to the jobs that could be created/lost in tourism and horticultural industries" expressed by Submissions 178, 212, 255, 259, 263, 268, 299, 306, 308, 313, 314, 335, 355, 382, 411, 452, 455, 481, 484, 488, 500, 509, 516, 526, 541, 554, 565, 582, 593, 594, 600, 630, 724, 758, 760, 765, 778 & 813.

⁹⁸³ Document 14, PDF 49.

⁹⁸⁴ Document 407, pages 75-76.

⁹⁸⁵ Submission 94, page 1.

⁹⁸⁶ Submitter 94, Day 25, 16 June 2021.

⁹⁸⁷ Submission 711, page 2.

⁹⁸⁸ Submission 666, page 1.

an opportunity to work locally and not be a fly-in-fly-out worker so that he could spend more time with his children who live locally. He also submitted the Project would keep skilled people in the area and be an opportunity for young people allowing them to stay in the area and build a future. In response to questioning from the IAC, Mr Osler submitted that as a mechanical fitter, he would expect to be paid \$32-\$35/hour locally but in heavy industry (mining) it would be double.⁹⁸⁹

17.4.3 Discussion

The IAC is in no doubt that some of the Project's jobs would be filled by local workers. Based on the information before the IAC, it is difficult to determine how many of the 200 jobs said to be created by the Project would be filled locally and how many, particularly those requiring specialist skills, would be filled by those outside the region and perhaps from outside Victoria and internationally.

The IAC considers the offsite impacts of the Project, primarily dust (as discussed in Chapters 8 and 14), would negatively affect local industries with flow on job losses for the agricultural, horticultural and tourism industries.⁹⁹⁰ Again, based on the material before the IAC, it is difficult to assess what that loss would be. However, the hypothetical figures given in evidence by Mr Campbell provide an indication of the number of existing jobs that could be lost in the horticultural industry even with small reductions in production. When these are considered alongside the potential local jobs the Project would provide, the Project's offering of approximately 200 jobs (only some of which would be filled by locals) looks less compelling.

There is also the potential impact of the lost opportunity cost of the allocation of water to the Project. The IAC accepts the evidence of Dr Blaesing the number of jobs which would be created by the Project and the existing Lindenow Valley per megalitre of water are roughly comparable. The IAC notes that submissions of Mr Rose and others suggest the horticultural industry in the Lindenow Valley could provide a higher number of jobs per megalitre of water, but these submissions are untested by evidence and references for the sources of figures were not provided. However, the IAC is satisfied that if the Lindenow Valley growers had access to more water and land, it is likely they would expand their operations with consequential increases in jobs in the area. Again, on the information before the IAC, this amount cannot be quantified.

The IAC also takes note of the fact that any jobs created by the Project will last only for the life of the Project, currently expected to be 20 years. In contrast, jobs in other local industries are more likely to be ongoing.

The IAC accepts the evidence of Dr Blaesing the Project would create competition for local agricultural workers, particularly in jobs where skills are readily transferable to Project activities such as drivers causing further negative impacts on local industries. The IAC notes there are national shortages for workers in agricultural and horticultural sectors and accepts the submissions of local horticultural businesses that it is already difficult to get machine and truck operators in East Gippsland.

17.4.4 Findings

The IAC finds:

- The Project would create jobs, some of which would likely be filled by local residents.

⁹⁸⁹ Day 31, 13 July 2021.

⁹⁹⁰ See also Chapter 12 on the land use impacts of the Project.

- The Project would likely have negative impacts on existing industries (agriculture, horticulture and tourism) potentially leading to job losses in those industries.
- There is likely to be a lost opportunity cost to the existing agricultural and horticultural industries from allocating water to the Project, with the potential for at least the same or more jobs per megalitre of water to be created in the Lindenow Valley as compared to use of that water for the Project.
- The Project would create competition with the existing agriculture and horticulture industries for labour due to the higher wages in mining. This would occur in the context of there already being a shortage of labour in these industries.

17.5 Compensation under the MRSD Act

17.5.1 Background

The SEIA reported that stakeholders had expressed concerns about the lack of compensation for those whose land would not be directly impacted by the mine.⁹⁹¹ The SEIA noted that landowners within the Project Area would be compensated for the acquisition of land and the effects of mining⁹⁹² and noted generally that compensation arrangements with landowners would be in accordance with the MRSD Act.⁹⁹³

The SEIA, relying on the BAEconomics Assessment, concluded the Project was unlikely to have an impact on land values in the region but noted also that increased demand for housing during construction and operations has the potential to affect housing availability and affordability in the region.⁹⁹⁴

It concluded that after applying the mitigation measure of regularly consulting with local housing support agencies and monitoring of house prices (SE55), the potential risk the presence of the mine would diminish the value of property adjacent to the Project Area and settlements within 10 kilometres of the Project Area was low.⁹⁹⁵

17.5.2 Submissions

The Proponent referred to the compensation available to private landowners under ss 85(1) and 85(1A) of the MRSD Act. Section 85(1) provides compensation for land affected by mining, and s85(1A) for other private land outside the mining area, for any loss or damage that has been or will be sustained as a direct, natural and reasonable consequence of the approval of the work plan or work under the licence. It submitted that compensation under the MRSD Act is fair,⁹⁹⁶ covers the full gambit and includes a right to solatium.⁹⁹⁷ The Proponent also submitted the requirement to pay compensation under the MRSD Act was an important incentive for the Proponent to minimise the offsite impacts of the Project.⁹⁹⁸

In relation to assessing the offsite impacts of the Project, Mr Campbell gave evidence that having a right to go to court to seek compensation did not necessarily lead to the conclusion that offsite

⁹⁹¹ Appendix A019, page 34.

⁹⁹² Appendix A018, pages 3 & 146.

⁹⁹³ Appendix A018, page 39.

⁹⁹⁴ Appendix A018, page 163.

⁹⁹⁵ Appendix A018, page 166.

⁹⁹⁶ Day 35, 20 July 2021 in closing oral submissions.

⁹⁹⁷ Day 1, 3 May 2021.

⁹⁹⁸ Day 12, 18 May 2021.

impacts were completely offset and could be assessed as zero (as in the BAEconomics Assessment) due to the transaction costs involved (for example, Court costs).⁹⁹⁹

Several submitters questioned the adequacy of compensation available under the MRSD Act, particularly in relation to impacts on land outside the mining area. For example, Ms Anton, on behalf of MFG, submitted the MRSD Act does not contain any presumption of liability on the part of the mining licence holder and that it is up to the landowner to prove that (offsite) impacts have been suffered which would require them to have sufficient baseline data.¹⁰⁰⁰ Ms Carruthers submitted that putting the onus on farmers to prove impacts and the source of contamination is a costly process and puts an unreasonable burden on growers.¹⁰⁰¹ The VFF submitted the compensation provisions in the MRSD Act required farmers to engage lawyers and was often too hard or too complex for impacted farmers to take advantage of.¹⁰⁰² Ms Carruthers submitted that this would be the fate of impacted farmers if the Project proceeds.¹⁰⁰³

BDEC submitted that it was misleading of the Proponent to suggest that it would be easy for farmers impacted by dust from the Project to get compensation for lost value of crops under the MRSD Act. It submitted that it would be almost impossible to prove causation and was not aware of compensation being paid for other than physical acts or for dust impacts.¹⁰⁰⁴ Council submitted the scope of compensation available under s85(1) of the MRSD Act does not cover impacts on water (in particular, groundwater and spring-fed dams).¹⁰⁰⁵

The Colemans, who own land within the Project Area, made detailed submissions on their personal experience dealing with the Proponent regarding access to their land for exploration drilling. They submitted the Proponent had failed to adhere to the required statutory notice periods, had threatened them with legal proceedings and instated proceedings before the mining warden, failed to comply with the terms of the access arrangements, damaged their land (which was still recovering at the time of presenting their submission), and had still not paid any compensation for damage to their land.¹⁰⁰⁶ The Colemans presented a number of photos as evidence of the damage they said was caused by the Proponent.¹⁰⁰⁷

Mr Arbuthnot, a supporter of the Project and former President of the VFF and Chair of its subcommittee for mining, submitted there were success stories of farmers being properly compensated for mining but that in most cases he recommended that farmers move away.¹⁰⁰⁸

Several submitters were concerned about the impact on land values.¹⁰⁰⁹ MFG submitted the offsite impacts of the mine would have a negative impact on land values.¹⁰¹⁰ The Alexanders, whose property is adjacent to the Project Area and part of which is inside the extended mining licence

⁹⁹⁹ Under cross-examination by Counsel of the Proponent, Day 5, 7 May 2021.

¹⁰⁰⁰ Day 23, 7 June 2021.

¹⁰⁰¹ Document 644, page 8.

¹⁰⁰² Day 13, 19 May 2021.

¹⁰⁰³ Document 484, page 2.

¹⁰⁰⁴ Day 34, 16 July 2021.

¹⁰⁰⁵ Document 407, page 45 and oral submissions Day 18, 27 May 2021.

¹⁰⁰⁶ Document 634a, pages 21-24.

¹⁰⁰⁷ Document 634, PDF pages 77-79 & 91-95.

¹⁰⁰⁸ Day 32, 14 July 2021.

¹⁰⁰⁹ Document 25b, page 16 states the following submissions expressed concern about impact on land values: Submissions 74, 77, 157, 172, 212, 305, 335, 375, 389, 439, 466, 488, 673, 761, 781, 795, 813, 834, 837, 839, 843, 862 & 893.

¹⁰¹⁰ Submission 813, pages 448.

area, expressed concern about the devaluation of their property value and whether they would be compensated.¹⁰¹¹

17.5.3 Discussion

The IAC notes the MRSD Act provides a compensation framework for both onsite and offsite mining impacts. Land directly affected by mining, meaning land to which entry is required during mining,¹⁰¹² is covered by s85(1), while other land that may be impacted by offsite effects is covered by s85(1A). Both sections include a right to receive compensation for “*any decrease in the market value of the owner or occupier's interest in the land*”.

While compensation for land directly affected is mandatory and compensation arrangements must be in place *before* mining can commence, compensation for offsite impacts is left to be pursued by the individual or entity affected *after* the harm has occurred and who must prove the mining activities caused the damage.

The IAC accepts that, for offsite impacts, this would likely mean the affected party must establish the relevant pre-mining baseline and collect evidence on how the baseline conditions have changed sufficient to demonstrate causation. This places a considerable burden on the affected party who must bear and hold the costs of consultants and lawyers, as well as any lost production, as they pursue their legal rights. In addition, unless pre-mine baseline data is of sufficient detail and accuracy, and available to an affected party, there is likely to be little prospect of success. Of course, if successful, much of this will be reimbursed. However, the IAC notes that it is very rare that a plaintiff in litigation is made whole by an award of damages. In this respect, the IAC accepts Mr Campbell’s evidence that a right to compensation is unlikely to completely offset the offsite impacts of the Project.

Submitters also raised issues regarding the *scope* of compensation available under the MRSD Act, and whether compensation is payable for dust impacts or water quality impacts (surface water or groundwater). The IAC cannot give an opinion on the proper interpretation of the scope of compensation potentially available under ss85(1) and (1A) of the MRSD Act, only noting in passing the matters listed in ss85(1)(a)-(h) and 85(1A)(a)-(f) do not make mention of dust or water, but neither are they limited to the matters listed suggesting there is a potential uncertainty in the drafting. However, the issues raised highlight that obtaining compensation will not always be a straightforward exercise or a foregone conclusion.

Given the potential uncertainty as to the scope of compensation available, and the potential complexity and effort of making a claim for compensation for offsite impacts, the IAC understands why Mr Arbuthnot, former President of VFF, submitted that in most cases he recommended that farmers move away from mining impacted areas.

17.5.4 Findings

The IAC finds:

- The right to compensation afforded to affected landowners under the MRSD Act is unlikely to completely offset the impacts of the Project.
- Baseline data should be made available to the public to provide benchmark information for future enforcement and/or compensation claims.

¹⁰¹¹ Submission 157, PDF page 3.

¹⁰¹² MRSD Act, s 4(1).

17.6 Economic benefits and disbenefits

17.6.1 Background

Relying on modelling by BAEconomics, the EES estimated the net economic benefit from the Project as \$392.4 million in net present value terms, which included \$158.9 million in direct benefits to the state of Victoria and \$234.4 million in indirect benefits associated with higher wages and benefits to local Victorian suppliers.¹⁰¹³

The total indirect costs were modelled to be \$20.1 million (mostly incorporated into capital costs), with incremental indirect costs associated with greenhouse gas emissions and losses to other industries at \$0.85 million.¹⁰¹⁴

Further:

The modelling predicts that if the project is approved, gross state product will peak at \$375 million higher in 2022 compared to if the project is not approved. Real gross state income for Victoria is projected to peak at \$246 million in the same year. Between 2020 and 2035, gross regional product is predicted to increase in the East Gippsland region by just over \$1.4 billion in net present value terms.

Over the same period, gross regional income is predicted to be just over \$2 billion in net present value terms with an increase in employment averaging 93 FTE.¹⁰¹⁵

The EES assessed the Project would likely lead to increased employment and business opportunity and thereby to local and regional economic growth.¹⁰¹⁶

17.6.2 Evidence and submissions

Mr Campbell's evidence was the BAEconomics Assessment, on which the SEIA relies, over-stated the economic benefits of the Project and under-stated its costs, and used "*unorthodox and non-transparent calculations*" in reaching those conclusions.¹⁰¹⁷ He spoke of an "*incredible lack of transparency*" in the assessment and an "*extremely simplistic*" approach to valuing impacts on other industries.

Mr Campbell also gave evidence the BAEconomics Assessment did not provide sufficient information about the financial strength of the Project, or whether the Project is likely to be economically viable.¹⁰¹⁸ He highlighted the assessment contained no discussion of operating costs, no discussion of revenue (other than a ballpark figure), producer surplus, tax and royalty payments, and no discussion about the timing of costs. His expert witness statement states:

The BAEconomics analysis includes no detailed discussion of what minerals are to be produced, the timing and quantities of production and commodity prices and exchange rates. Given the fundamental importance of these issues to the economics of any mining project, omitting discussion and disclosure of them is extraordinary.¹⁰¹⁹

Mr Campbell's evidence was that an economic assessment should provide as much detail as possible to help decision makers understand the likelihood of estimated benefits being realised

¹⁰¹³ Appendix A018, pages vi, 31 & 140.

¹⁰¹⁴ Appendix A018, page 140.

¹⁰¹⁵ Appendix A018, page 140.

¹⁰¹⁶ EES Chapter 9.13, table 9.81.

¹⁰¹⁷ Document 93 page 1.

¹⁰¹⁸ As required by section 16(6B) of the MRSD Act.

¹⁰¹⁹ Document 93, page 1.

and that provision of the omitted information was usual in such assessments, including other assessments written by BAEconomics.¹⁰²⁰

Mr Campbell pointed out that according to the BAEconomics Assessment, the largest benefit of the Project would be the value it would bring to local suppliers to the mine, rather than profits or royalties.¹⁰²¹ Mr Campbell's evidence cast doubt on the value given to the 'indirect benefits' of the Project. He gave evidence that while there may be benefits to some local businesses such as coffee shops and fuel suppliers, there was insufficient justification provided in the BAEconomics Assessment for a value in the range of \$200 million and noted the estimate "*is based on just two paragraphs of discussion and unsourced data*".¹⁰²² Under cross-examination by the Proponent, Mr Campbell gave evidence that a value in the order of \$1 million could be reasonable, but that \$200 million was not.¹⁰²³

A further concern raised by Mr Campbell was the BAEconomics Assessment assumes that environmental impacts in relation to air quality, visual amenity, transport, water, biodiversity, and noise impacts are perfectly offset by the mitigation measures outlined in the EES and are therefore given zero value in terms of the external costs of the Project. Mr Campbell gave evidence the assumption of perfectly offset external impacts was "*unrealistic*".¹⁰²⁴

However, despite these concerns Mr Campbell conceded the Project would provide some level of economic benefits and if a mine were to create 200 jobs, that would be beneficial.¹⁰²⁵ He also appeared to concede the capital expenditure figure of \$200m during the construction phase and the employment estimates was reasonable.¹⁰²⁶

Overall, Mr Campbell gave evidence that in his view "*the net present value of the project could be negative, meaning the project would make Victoria worse off overall*".¹⁰²⁷

Counsel for the Proponent took issue with Mr Campbell's criticisms of the cost benefit analysis undertaken in the BAEconomics Assessment and there was somewhat of a tussle between the two in cross-examination on this issue. In the Proponent's closing submissions, it described the issue as "*an interesting diversion*" because, it submitted, nothing in the Scoping Requirements required a cost benefit analysis to monetise the impacts of the Project, positive and negative.¹⁰²⁸

The Proponent submitted that:

While Mr Campbell professed serious scepticism about certain figures used in the BAEconomics economic assessment, he did not give evidence the Project would not have positive economic effects. As he observed, the spending of significant sums of money within East Gippsland would inevitably have some positive effect on the local economy. He also

¹⁰²⁰ Document 93, page 6.

¹⁰²¹ Document 93, page 1.

¹⁰²² Document 93, page 1.

¹⁰²³ Day 5, 7 May 2021.

¹⁰²⁴ Document 93, page 2.

¹⁰²⁵ Under cross examination by Counsel for the Proponent, Day 5, 7 May 2021.

¹⁰²⁶ Document 698 page 191.

¹⁰²⁷ Document 93, page 5. In Mr Campbell's supplementary witness statement he gave evidence that the addition of the centrifuges increased both capital and operating costs. He stated: "It remains my opinion that the economic case for the Fingerboards project has been misrepresented, with benefits overstated and costs understated. The proposal for centrifuge use would increase capital costs, with the aim of reducing environmental impacts. Useful analysis of this proposal would have been relatively simple if data was provided and if the original cost benefit analysis had followed standard methods. Unfortunately, this is not the case, adding to the uncertainty around the economics of the project." Document 187, page 9.

¹⁰²⁸ Document 698 page 191.

appeared to concede the payment of royalties would provide economic benefits at a State and national level.¹⁰²⁹

The Proponent submitted that in addition to the economic benefits of the jobs expected to be created by the Project, which would be filled by locals where possible, the following economic benefits would accrue:

- community grants – prior to commencement of the Project, the Proponent would commit \$40,000 a year in grants. Once the Project commences operation, that amount would rise to \$250,000 a year for the life of the mine, leading to a total of \$3.75m in community grants during the operational life of the Project¹⁰³⁰
- the contribution to the local economy by employees of the mine spending locally¹⁰³¹
- capital expenditure of in the order of \$200 million¹⁰³²
- royalties and company tax¹⁰³³
- railway returns.¹⁰³⁴

The Proponent also referred to the benefits that would result from use of the materials to be extracted by the Project, such as the contribution that rare earths would make to the global transition away from fossil fuels.¹⁰³⁵

Council submitted that at face value the Project would generate significant income but noted that it should be kept in mind that royalties are in essence a payment to the State for a state-owned resource.¹⁰³⁶ Further, while accepting the Project would deliver some benefits to the local community, Council submitted the existence, magnitude and extent of those benefits are too uncertain to rely on.¹⁰³⁷ Council also submitted there is a tension in the costs and benefits to be considered at a State-wide and at the local level.¹⁰³⁸ Some submitters also expressed concern the profits from the Project would accrue to the owners of the Project, of which the largest stakeholder is an overseas entity.¹⁰³⁹ Ms Beacham questioned who stood to benefit from the Project, submitting that it would be the locals who have their quiet amenity spoilt by noise, dust and trucks.¹⁰⁴⁰

East Gippsland Community Action Group submitted:

A mine exporting minerals overseas for a short term versus the growing need and strategic importance of feeding an increasing national and international population and the economic benefit to our region and Victoria, has not been properly quantified, nor has the detrimental impact of the mining project.¹⁰⁴¹

In its closing, Council submitted the project, if approved, would impose a significant, ongoing regulatory burden on it, regardless of the statutory body that is the decision-maker in relation to

¹⁰²⁹ Document 358 page 24.

¹⁰³⁰ Document 698 page 1.

¹⁰³¹ Document 698 page 192.

¹⁰³² Document 698 page 1.

¹⁰³³ Document 698 page 2.

¹⁰³⁴ Document 699, page 77.

¹⁰³⁵ Document 698, page 2.

¹⁰³⁶ Document 407, pages 32-33.

¹⁰³⁷ Document 407 page 73.

¹⁰³⁸ Document 407, page 74.

¹⁰³⁹ Document 562, page 3. See also Document 25b, page 42 referring to “Concerns that profits from the mine will not be retained locally. There is no value adding in Australia given that mineral concentrate will be sent overseas to be processed” expressed by Submissions 186, 191, 192, 194, 203, 227, 246, 259, 266, 268, 320, 481, 484, 495 & 813.

¹⁰⁴⁰ Submitter 58, Day 31, 13 July 2021.

¹⁰⁴¹ Submission 355, page 3.

each of the relevant approvals.¹⁰⁴² It also submitted that this regulatory burden would be made worse due to the high level of uncertainty and lack of specificity in relation to important aspects of the Project.¹⁰⁴³ It submitted that, should the project proceed, the IAC should recommend the State government allocate “*ample resources for implementation in particular to Council for its role*”.¹⁰⁴⁴

MFG submitted:

Ultimately, the IAC simply cannot find there to be economic benefits of the proposal in the order suggested by BAEconomics, and certainly not such as to outweigh the economic disbenefits.¹⁰⁴⁵

Many submitters supported the view the economic benefits of the Project would not outweigh its negative impacts.¹⁰⁴⁶ Mr Ewan Waller neatly summarised these sentiments:

Considering the disruption this operation will cause and the many risks, the returns for the state are minimal and compared to the well-established and prosperous vegetable industry. The only real beneficiaries are the company directors and ten maybe twenty years employment for mainly truck drivers. The enterprise returns a surprisingly small return and has a short but dramatic and harmful life and a legacy that will well remain for centuries.¹⁰⁴⁷

Some submitters supported the Project, referring to its economic benefits. For example, Wellington Shire Council submitted in support of the Project:

Significant local procurement and employment benefits are expected to arise in the Wellington Shire, with further diversification of the economic base of the region also seen as a positive to support future social and economic wellbeing.¹⁰⁴⁸

Ms Karolina Reed and Mr Peter Reed each described themselves as a “*100% supporter*” of the Project.¹⁰⁴⁹ The Reeds submitted the Project would provide much needed jobs and flow on positive economic and social effects on the community. Mr Arbuthnot submitted the Project would bring welcome benefits, jobs and expertise to the region.¹⁰⁵⁰ Similarly, Mr and Mrs Treasure submitted the Project would have positive economic impacts:

The approval of this project would bring significant economic benefits to our area and provide employment opportunities for our young people. With the demise of the timber industry, the commercial fishing industry and the Corona Virus pandemic East Gippsland is desperate for projects that attract workers to the area. Not only would the area benefit from the additional 200 plus workforce but the associated economic benefit would be substantial ... With stringent Government regulations in place we believe this project should be viewed as a positive economic contribution for East Gippsland.¹⁰⁵¹

17.6.3 Discussion

The IAC considers that Mr Campbell’s key criticisms of the BAEconomics Assessment withstood the robust cross-examination by the Proponent and the IAC found him to be a credible expert witness.

¹⁰⁴² Document 748, pages 14-15.

¹⁰⁴³ Document 748, page 15.

¹⁰⁴⁴ Document 748, page 16.

¹⁰⁴⁵ Document 451, page 10.

¹⁰⁴⁶ Document 25b, page 41 identified in summary that many submitters express concern that the “*perceived economic benefits of the Project will not outweigh losses and impacts*”.

¹⁰⁴⁷ Submission 652, PDF pages 4-5.

¹⁰⁴⁸ Submissions 113, PDF 2.

¹⁰⁴⁹ Submissions 125 and 151, respectively.

¹⁰⁵⁰ Submission 10, Day 31, 14 July 2021.

¹⁰⁵¹ Submission 108, page 1. See also Submission 232 in support on similar grounds.

The IAC agrees the BAEconomics Assessment has over-stated the economic benefits of the Project and under-stated its costs. In particular, the IAC considers the BAEconomics Assessment has not adequately included the disbenefits to the existing industries, notably the agricultural and horticultural enterprises in the immediate area, as well as tourism more generally, in its analysis. The economic impacts on existing industries are discussed in more detail in the next section.

Despite this, the IAC accepts there would be some economic benefits if the Project were to proceed including royalties, railway rents, taxes and contributions to the local economy as a result of the Project's capital expenditure (some of which would be spent locally) and mine workers spending locally. The quantum of these benefits and whether there is an overall benefit remains unclear.

In addition, the IAC notes the Proponent pointed to the economic benefits of the community grants program proposed (total \$3.75 million during the operational life of the Project). While the IAC accepts that such a program would provide economic benefits to the local economy, it gives this little weight in the current analysis because the community grants program has been put forward as a measure to mitigate the non-monetary adverse impacts on the local community and this would be double counting.¹⁰⁵² Also, as discussed in Chapter 16, the IAC considers the grants program may lead to further negative social impacts.

Significantly, the IAC does not agree with BAEconomics' assumption that all residual adverse impacts of the Project would be effectively managed to zero. The IAC agrees with Mr Campbell's evidence that this assumption is unrealistic and notes that it is not supported by the findings elsewhere in this report. In the IAC's view, this is a flaw in the BAEconomics assessment with the result the IAC considers the EES cost benefit analysis cannot be given significant weight.

Given the paucity of other data, in part due to the Proponent's choice not to lead economic evidence in support of its economic analysis, the IAC considers the amount of the economic benefits claimed by the Proponent cannot be substantiated.

As a result, the IAC is not convinced the economic benefits of the Project would outweigh its economic disbenefits.

The IAC also notes there is a disparity in where the benefits of the Project would accrue and where the disbenefits would be suffered. Project profits would accrue to shareholders, the majority of which are currently offshore. Company taxes would be enjoyed at the national level, with royalties and rail rents enjoyed at the state level. Council would not receive any rates from the Project Area, as is standard for large projects of this nature, but would incur a considerable regulatory burden. The IAC agrees that unless the State Government provides Council with additional resources, as Council submitted should occur, the cost of this regulatory burden would be borne by East Gippsland ratepayers. Local and regional businesses would experience a level of positive economic benefit, but its amount is uncertain, and some local jobs would be created (discussed further above).¹⁰⁵³

In contrast, almost without exception, the negative (economic, social and environmental) impacts of the Project would accrue at the local (and possibly also regional) level.

¹⁰⁵² EES, Appendix H, SE04: "A community fund will be established to support community events and initiatives that encourage *social* interaction such as sporting teams and community festivals [emphasis added]".

¹⁰⁵³ See Chapter 17.4.

To address this issue (at least in part) and ensure that local benefits accrue, if the Project were to proceed the IAC considers the Proponent should work with local employment providers and training organisations to maximise the number of local employment opportunities.

17.6.4 Findings

The IAC finds:

- The amount of the economic benefits claimed by the Proponent cannot be substantiated.
- The Proponent has under stated the disbenefits of the Project.
- There is no certainty the overall economic benefits of the Project would outweigh the economic disbenefits.
- Most economic benefits would accrue outside the local area, but the majority of disbenefits (economic, social and environmental) would accrue locally.

17.7 Overall conclusions on economic impacts

The Panel concludes:

- The area in and around the Project Area, particularly the Lindenow Valley horticultural area, is a major economic contributor and source of employment in the East Gippsland economy.
- The Project would have direct impacts on existing agricultural and horticultural businesses, and a high likelihood of indirect impacts on farming operations and quality assurance certifications, leading to losses in production.
- Losses in vegetable production in the Lindenow Valley horticultural area would also impact on downstream businesses that rely on those vegetables, which would have negative economic impacts for the East Gippsland region.
- The Project would likely have adverse impact on the existing tourism industry in the immediate area of the Project, and possibly to existing tourism operations related to the Mitchell River and the Mitchell River National Park.
- The Project would create jobs, some of which would likely be filled by local residents, but would also have negative impacts on existing industries (agriculture, horticulture and tourism) potentially leading to job losses in those industries.
- There is likely to be a lost opportunity cost to the existing agricultural and horticultural industries of allocating water to the Project, with the potential for at least the same or more jobs per megalitre of water to be created in the Lindenow Valley as compared to use of that water for the Project.
- The Project would create competition with the existing agriculture and horticulture industries for labour due to the higher wages in mining. This would occur in the context of there already being a shortage of labour in these industries.
- The right to compensation afforded to affected landowners under the MRSD Act is unlikely to completely offset the offsite impacts of the Project.
- The amount of the economic benefits claimed by the Proponent cannot be substantiated and the Proponent has understated the disbenefits of the Project.
- There is no certainty the overall economic benefits of the Project would outweigh the economic disbenefits.

- Most economic benefits would accrue outside the local area, but the majority of disbenefits (economic, social and environmental) would accrue locally.

18 Human health

18.1 Introduction

Human health was addressed in the EES in Chapter 9 (risk assessment and impact assessment) and in the Human Health Risk Assessment (HHRA) in Technical Appendix 019.¹⁰⁵⁴

The relevant draft evaluation objective is:

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.

Human health effects and outcomes are often derivative of other potential environmental effects as seen in other chapters of this report.¹⁰⁵⁵ Specific mitigation measures mentioning health in Attachment H to the EES are, in summary:

- SE50: engage local health service providers, education providers and relevant support networks to monitor and identify strategies to manage any potential peaks in demand.
- SE64: investigate best practice, evidence-based health and wellbeing programs in collaboration with local councils.

TN relevant in whole or part to the human health risk assessment included:

- TN2: Response to expert recommendations
- TN13: Additional Expert recommendations
- TN19: Evaluation of potential exposures to sensitive receptors associated with dust particulates and fallout

Expert evidence was called in human health risk assessment as shown in Table 21.

Table 21 Human health risk assessment

Party	Expert	Firm	Evidence
Proponent	Ms Karen Teague ¹⁰⁵⁶	Coffey Pty Ltd	- Human Health Risk Assessment Expert Witness Statement, 21 January 2021 ¹⁰⁵⁷ - Supplementary Expert Witness Statement, 6 February 2021 ¹⁰⁵⁸

Ms Teague attended the Radiation and Human Health expert witness meeting.¹⁰⁵⁹

18.2 Key issues

The issues are:

- The HHRA methodology and results
- Mental health

¹⁰⁵⁴ The Technical Appendix was prepared by Coffey.

¹⁰⁵⁵ For example radiation, air quality and noise.

¹⁰⁵⁶ Ms Teague was the principal author of EES Technical Appendices 019.

¹⁰⁵⁷ Document 82.

¹⁰⁵⁸ Document 136.

¹⁰⁵⁹ Documents 234.

18.3 The HHRA methodology and results

18.3.1 Background

There are many elements of the Project where if environment effects are not managed to an acceptable level then adverse health outcomes could result. The HHRA is an attempt to consider the range of potential effects that could give rise to adverse health outcomes in an integrated way.

18.3.2 Evidence and submissions

Ms Teague prepared the HHRA in the EES and provided expert evidence for the Proponent. As outlined in her evidence, in summary:

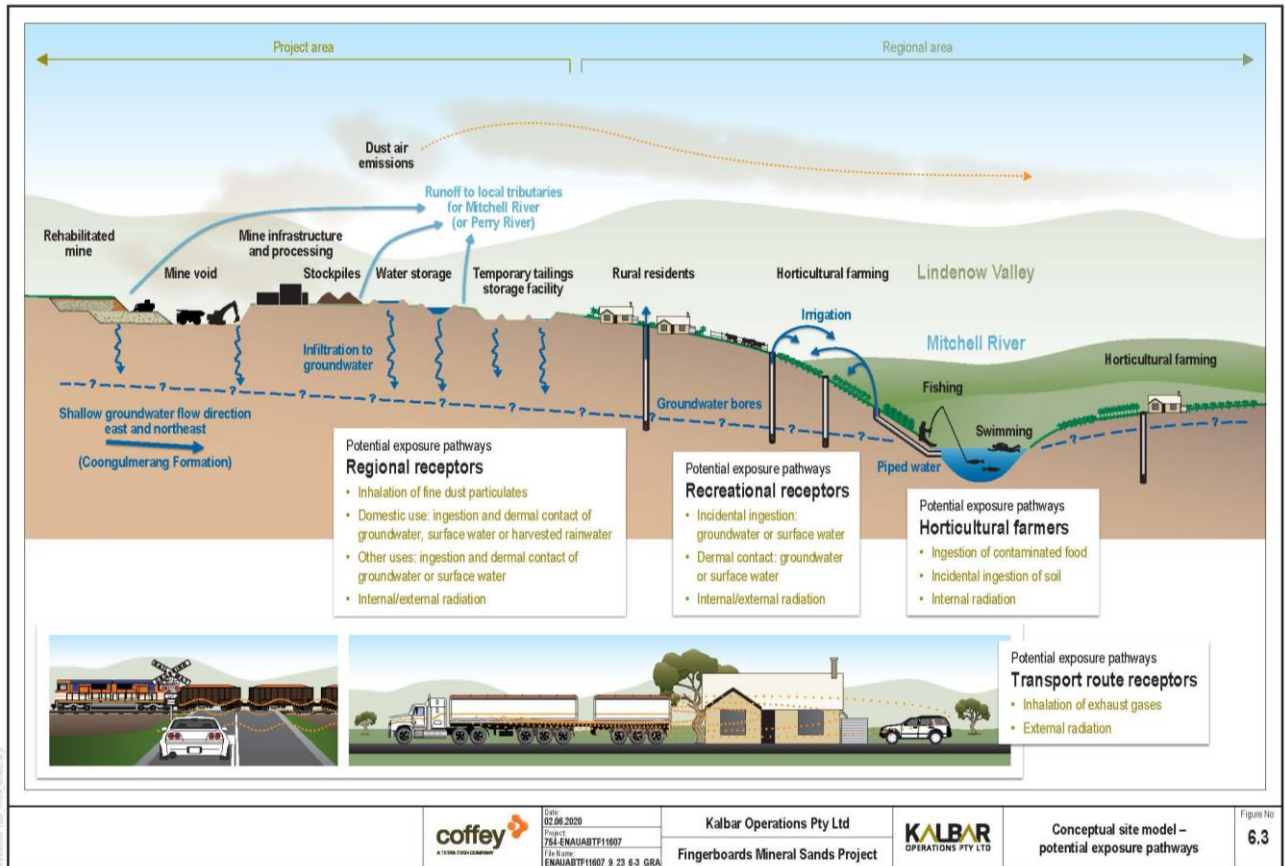
- The HHRA was based on the *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013* (ASC NEPM) which in turn is based on the revised *Environmental Health Risk Assessment - Guidelines for assessing human health risks from environmental hazards (EHRA)*, published by enHealth in 2012. The ASC NEPM provides detailed guidance specific to the derivation and application of health screening levels for chemical contaminants, and a tiered approach to undertaking health risk assessments.
- The HHRA's methodology included a baseline assessment that:
 - Undertook a desktop review to inform a conceptual site model including pollutant source identification, migration pathways and points of exposure
 - Identified off site receptors and exposure routes
 - Identified chemical and radioactive substances that may potentially migrate off-site via water and air
 - Reviewed the relevant baseline studies in the EES's specialist reports including:
 - Radiation
 - Groundwater and surface water
 - Air quality and greenhouse gases
 - Landform geology and soils
 - Horticultural assessment
 - Landscape stability and sediment transport
 - Socioeconomic assessment
 - Overburden geochemistry
 - Land use planning.

In her evidence Ms Teague outlined that she had undertaken a Tier 1 screening assessment, using relevant and appropriate Australian or international guidance for the screening criteria. The HHRA adopted a 5 kilometres radius, based on the distance used in the air quality assessment.¹⁰⁶⁰

The Conceptual Site Model is shown in Figure 30.

¹⁰⁶⁰ In response to submissions Ms Teague noted that the distance was not to signify that there would be no impact beyond 5km but that beyond this distance the exposure would be lower (and of less concern).

Figure 30 Conceptual site model - potential exposure pathways¹⁰⁶¹



Following the baseline assessment, Ms Teague undertook an impact assessment which was included in Technical Appendix A019 and summarised in her expert evidence. The impact assessment “evaluated potential health risks associated with predicted off site conditions to identified populations as a result of project activities”.¹⁰⁶²

The impact assessment methodology included:

- Utilising modelling from specialist studies
- Using predicted concentrations from modelling to assess impact on receivers
- Undertaking a qualitative assessment where necessary
- Undertaking a Tier 2 assessment for potential radiation impacts
- Evaluating uncertainties in accordance with the ASC NEPM framework.

The modelled predicted impacts in the HHRA are shown in Table 22 below.

Table 22 Tier 1 screening assessment – modelled/predicted project impacts

Media	Contaminant	Relevant receptors in off-site areas	Construction	Operations / rehabilitation
Air				
Particulate matter	PM ₁₀	Regional residents		Additional management measures may be required on days where meteorological conditions indicate a greater potential for dust migration offsite.

¹⁰⁶¹ EES Appendix A019, page 36.

¹⁰⁶² Document 84, page 4.

Media	Contaminant	Relevant receptors in off-site areas	Construction	Operations / rehabilitation
	PM _{2.5}		Below criteria	Below criteria
	Respirable crystalline silica ⁽¹⁾		Below criteria	Below criteria
	Metals		Below criteria	Below criteria
	Radionuclides		Low and acceptable	
Dust	Deposition		Low and acceptable	
Exhaust gases	NO ₂ , SO ₂	Transport route residents	Negligible	
		Regional residents	Negligible	
Ambient air	Radiation	Transport route residents	Negligible	
		Regional residents	Negligible	
Soil				
Topsoil	Metals	Regional residents	NA	NA
	Radionuclides		NA	Low and acceptable post rehabilitation
Crops	Radionuclides ⁽²⁾	Horticultural farmers	Low and acceptable	
Water				
Surface water	Metals	Regional residents	Low and acceptable	
		Recreational users	Low and acceptable	
	Radionuclides	Regional residents	Low and acceptable	
		Recreational users	Low and acceptable	
Rainwater tanks and dams	Metals	Regional residents	Negligible	
		Recreational users	Negligible	
Groundwater	Metals	Regional residents	Low and acceptable	
		Recreational users	Low and acceptable	
	Radionuclides	Regional residents	Low and acceptable	
		Recreational users	Low and acceptable	

In response to submissions Ms Teague did further work on the exposure of sensitive receptors to metals and metalloids. Her work and results were provided in detail in TN19.¹⁰⁶³ The objective of this further work was to:

...evaluate potential exposures to identified metal/metalloid contaminants in particulates that have been predicted to migrate to sensitive receptors of concern as a result of project activities. The migration pathways of concern in this evaluation include contaminants in airborne particulates and dust fallout. Specific objectives of the technical note include:

- Estimation of contaminant concentrations in dust deposited on crops, feed and soil based on ambient air modelling undertaken by Katestone (2020, 2021), uptake modelling in edible plants and intake modelling for cattle with subsequent transfer to milk and meat.
- Exposure modelling to estimate and characterise the potential health risks to sensitive receptors who consume local crop produce, and/or animal products associated with beef cattle and dairy cattle.¹⁰⁶⁴

¹⁰⁶³ Document 302.

¹⁰⁶⁴ The TN did not address radionuclides.

The TN evaluated chemicals of potential concern (COPC) detected in dust in the Katestone dust modelling work, being:¹⁰⁶⁵

...Arsenic, Bismuth, Cadmium, Cerium, Cobalt, Chromium, Copper, Lanthanum, Lead, Manganese, Nickel, Selenium, Tin, Thorium, Titanium, Uranium, Vanadium, Tungsten, Zinc, Zinc Oxide and Zirconium. Whilst most of these COPCs were evaluated for exposures to sensitive receptors, Titanium and Bismuth were not quantitatively assessed due to the lack of sufficient toxicity data.

The TN provided a detailed analysis of the methodology and results and concluded the Hazard Index (HI) for chosen recipients (young children (total exposure HI 0.54) and agricultural workers (total exposure HI 0.4)) were below 1, the level of concern. Ms Teague went on to conclude:¹⁰⁶⁶

The potential future exposures to sensitive receptor populations to the selected COPCs predicted in air, associated with the multiple exposure pathways evaluated in this technical note, are considered to be low and acceptable.

In response to the introduction of centrifuges, Ms Teague concluded they would generally have a positive impact on releases to ground and surface water and would not change her opinion on the overall health risk.¹⁰⁶⁷

There were other expert witnesses who covered health issues, but no other experts were called in HHRA.

In its original submission Council included a technical review of the HHRA by SLR Consulting, which concluded that human health would be protected from the Project with the following provisos:¹⁰⁶⁸

- The HHRA assumes mitigation measures are adequate and SLR cannot confirm this without reviewing detailed management plans
- Additional baseline data is required
- The HHRA would need to be revised if the underlying data changes
- Risk from extreme weather events has not been considered
- Some criteria may not be appropriate.

Council made extensive submissions on human health, while noting that Ms Teague did not address issues of social impact or wellbeing.¹⁰⁶⁹ Council submitted the HHRA is contingent on other specialist work, which is appropriate, but noted that this means the HHRA is subject to the same data gaps identified in relation to those specialist technical reports.

Council also noted the HHRA is reliant on mitigation measures:¹⁰⁷⁰

The situation is therefore the Proponent's human health assessment depends entirely upon the achievement of certain ends by reliance on mitigation measures, where it is known that:

- (a) the inputs upon which those mitigation measures are based are deficient; and
- (b) the mitigation measures are vague, with uncertain application and capacity to produce the circumstances assumed by Ms Teague in her work.

Council pointed out several weaknesses it saw in Ms Teague's assessment including, in summary:¹⁰⁷¹

¹⁰⁶⁵ Document 302, page 6.

¹⁰⁶⁶ Document 302, page 24.

¹⁰⁶⁷ Document 136.

¹⁰⁶⁸ Addendum 1 to SLR Report, attached to Submission 716B.

¹⁰⁶⁹ Document 407.

¹⁰⁷⁰ Document 407, page 59.

¹⁰⁷¹ Document 407, para 255 onwards.

- Omission of important baseline data
- Limited consultation in preparing the HHRA
- Unhelpful presentation of results
- Inappropriate data sources for some air quality measures
- Not addressing important matters such as the health effects of mine water releases into the environment and the filling of Perry Gully
- No assessment of chemical usage for Project activities such as dust suppression.

It concluded:¹⁰⁷²

In this case, where so many witnesses have demonstrated paucity of information, largely through reliance on instructions from Kalbar representing assumptions and facts that cannot be established or tested, it means Ms Teague's assessment is fundamentally flawed and unable to provide the IAC with an understanding of likely health effects.

MFG in their original submission identified weaknesses in the HHRA including:¹⁰⁷³

- The need for mitigation only if a risk was rated 'high'
- The need to address cumulative and indirect effects
- Lack of clarity around how risk ratings were chosen
- The HHRA does not meet the guidelines under the ASC NEPM including:
 - Using worst case for evaluation
 - Cumulative consideration of impacts
 - Lack of stakeholder consultation¹⁰⁷⁴
 - Only undertaking a Tier 1 assessment and inappropriate consideration of Health Investigation Levels (HIL) in making this decision
- Significant limitations put on the HHRA from the general Coffey disclaimer in relation to reliance on other specialist input.¹⁰⁷⁵

MFG in their original submission also provided detailed submissions on various individual health impacts and issues they suggested have not been adequately addressed, many of which are issues derived from other environment effects such as noise, radiation and air quality.

MFG submitted, and Ms Teague confirmed under questions in the Hearing, that noise was not included in the HHRA.

In the Hearing submitters for MFG including Dr McCubbin and Dr Parkington¹⁰⁷⁶ provided detailed submissions and analysis on what they saw as general and particular health risks associated with the Project that have not been adequately assessed.

Dr McCubbin concluded:

Finally, I believe the potential health impacts of this project are so significant that it should not proceed at all. If it does there needs to be high level oversight of the project throughout its life, by qualified Independent health experts.

There will need to be transparent information sharing with the public, Not just as a subclause of an annual report tabled in parliament once a year.

¹⁰⁷² Document 407, para 263.

¹⁰⁷³ Submission 813, page 117 onwards.

¹⁰⁷⁴ Ms Teague confirmed in the Hearing that the HHRA was a desktop study and she had not visited the area or consulted with landowners.

¹⁰⁷⁵ Council also noted the disclaimer in Technical Appendix 019.

¹⁰⁷⁶ Submissions 468 and 469 respectively.

Other submitters, notably Mr Helps,¹⁰⁷⁷ questioned the investigative work undertaken to date for the presence of metals and the screening levels used in the HHRA. He submitted that a number of toxic metals have either not been assessed or not been adequately assessed. In his submission he concluded:

The Kalbar management have failed to provide the high level of visibility to the toxic metals in the KALBAR ore body and have failed to provide the detailed plan as to how the risk to the Lindenow Farmers, the Farmers crops and the downstream impacts of the down stream Ramsar Wetland will be handled.

Many individual submitters, particularly those who live in proximity to the mine site, expressed concerns about the health impacts of the mine resulting from dust (potentially with radiation and toxicants in it) both in drinking water and contaminated food, the potential for water supply contamination and noise effects on health.

18.3.3 Discussion

The IAC considers that methodologically the HHRA is reasonable, based on the information used to inform its preparation and within the limitations acknowledged by its author.

As submitters pointed out, and Ms Teague acknowledged, the HHRA by its nature is contingent on the input of other specialist technical reports. As discussed elsewhere in this report, some of those specialist investigations require additional work to be undertaken in collecting baseline data. This data will then need to inform further modelling and predictions to achieve a higher degree of certainty than presented in the EES.¹⁰⁷⁸

Some of the specialist work relies on mitigation measures being effective to show that environment effects will be managed to an acceptable level. However, there is limited detail in the EES and no evidence that mitigation will be effective to the level suggested, or indeed required, to bring amenity and health effects to an acceptable level. For example, in relation to particulate matter (PM₁₀), the Tier 1 screening assessment notes that additional management measures may be required on days where meteorological conditions indicate a greater potential for dust migration offsite.¹⁰⁷⁹

To address these issues, the IAC considers it would be appropriate to review and revise the HHRA in future as additional data becomes available and underlying specialist work is refined, including for example the input into specialist technical studies from the material that could be obtained from the exploration pit. In addition, the IAC notes the general environmental duty (GED)¹⁰⁸⁰ will require the Proponent to take all reasonably practicable measure to minimise risk of harm to human health from pollution and waste from the Project. Any future revised HHRA should address this and demonstrate how the proposed mitigation measures demonstrate the Project will meet the GED.

Considering the sensitivity of this issue, the IAC also considers it would be appropriate to have a peer review by an independent third party of the revised HHRA.

Further, given the Project is proposed relatively close to a rural population and adjacent to productive horticultural and agricultural areas, the IAC considers there needs to be a high degree

¹⁰⁷⁷ Submission 639, Document 219f. Mr Helps indicated he has been working with farmers in the Lindenow area.

¹⁰⁷⁸ For example see the discussion in Chapter 10 about additional baseline radiation data to be collected and the exploration pit in Chapter 1.3.

¹⁰⁷⁹ Document 82, page 8.

¹⁰⁸⁰ Section 25 of the EP Act.

of confidence the direct and indirect health effects have been appropriately assessed, addressed and management measures put in place. The IAC does not consider that high degree of confidence exists at present.

18.3.4 Findings

The IAC finds:

- If the Project were to proceed, the HHRA would need to be revised to include additional baseline data and revised inputs from other EES specialist technical reports as new and additional data becomes available.
- This revision should include:
 - A review of toxicants and screening levels for emissions to ensure they are in accordance with the ASC NEPM and that all toxicants present in the topsoil, overburden and ore are addressed.
 - Consultation with stakeholders, including the local community, to ensure the method and results are clearly communicated and understood, and opportunities for feedback provided.
 - Allowance for sensitivity around the likely feasibility and effectiveness of mitigation measures.
 - Measures to ensure that issues raised in the HHRA are fed back to influence detailed Project design.
 - Consideration of other physiological health impacts, including noise
 - Consideration of mental health (see next Chapter).
- The revised HHRA should be reviewed by an independent third party.

18.4 Mental health

18.4.1 Background

The EES identified a range of factors that could lead to increased stress levels in the local community as a result of the Project. These included the change in land use from agriculture to mining and associated amenity impacts (such as dust and noise emissions and landscape changes), the Project has created a sense of uncertainty in the lives of local residents, concerns regarding potential health impacts, community concern that future generations of residents will not be able to enjoy the area as much as past generations due to the presence of the Project, and community concern the mine approvals processes do not provide adequate opportunity for input.¹⁰⁸¹ Most impacts were assessed as 'medium' or 'low' after the application of proposed mitigation measures.

The EES considered that residents adjacent to the Project Area would be more likely to experience elevated stress levels associated with the Project, while residents within 10 kilometres of the Project Area were not expected to experience elevated stress levels as a result of the Project. The EES noted that additional mitigation measures, such as supporting community events and initiatives (see SE04), would encourage social interaction within the community.¹⁰⁸²

¹⁰⁸¹ EES Chapter 9.13.

¹⁰⁸² EES Chapter 9.13, section 9.13.3.1.

18.4.2 Evidence and submissions

In her evidence, Ms Teague for the Proponent addressed the issue of mental health identified in submissions.¹⁰⁸³

A large number of submissions indicated their concerns relating to the potential negative impacts on the community's mental health associated with the Project. I acknowledge these concerns, however it is beyond my expertise to evaluate the potential mental health impacts related with Project activities. The scope of the [HHRA] focussed on substances that may cause health effects if they were to be released to the environment as a result of Project activities.

Dr Campbell AM,¹⁰⁸⁴ submitted the results of qualitative research into the impact of the Project on the receptor population which he undertook in the period from lodging his original submission and appearing at the Hearing. Dr Campbell conducted in-depth semi-structured interviews with nine community members resident within 10 kilometres of the proposed mine footprint, the majority within 5 kilometres. His research question was *"What has been the impact of the proponent's proposal on individuals and families living in or adjacent to the mine's proposed footprint?"*¹⁰⁸⁵

Dr Campbell observed *"anger, resentment, anxiety, hypervigilance, depressed mood, helplessness, grief, despair and loss of trust to varying degrees in the interviewees"*.¹⁰⁸⁶ Dr Campbell considered that this range of emotions is at least consistent with Post-Traumatic Stress Disorder (PTSD).¹⁰⁸⁷ Research participants reported being unable to sleep, inability to plan for the future, tension and division within families and within the local community (including withdrawal from long-term involvement with local sporting and volunteer organisations such as cricket and football clubs, CFA, SES and so on), and stress and grief regarding the long-term viability of their farming businesses and value of their land, often which have been handed down through the generations. He also reported that interviewees expressed feelings of disempowerment and loss of control leading to anger and desperation.

He submitted:

It is clear from these interviews the proposed mining project has already had a major negative impact on the social cohesion, health and wellbeing of the communities in the vicinity of the project. Contrary to the proponent's position that "residents within 10 kilometres of the project area are not expected to experience elevated stress levels as a result of the project" [referring to Chapter 9 of the EES], in some of these residents the stress experienced as a result of the activities of the proponent may have already brought about irreversible psychological harm.¹⁰⁸⁸

¹⁰⁸³ Document 84, page 11.

¹⁰⁸⁴ Dr Campbell described himself as "a rural general practitioner in Lakes Entrance and Bairnsdale for the past 38 years. I also have had 18 years academic experience as Director of the Monash University Rural Clinical School in Bairnsdale from 2000 until 2018. In that role I developed expertise and experience in both qualitative and quantitative research, with a focus on rural medical workforce and education for rural medical practice. In my current role as national Censor in Chief with the Australian College of Rural and Remote Medicine, I have responsibility for standards of educational programs delivered by the College as well as ensuring Fellows and Trainees have attained and retain required qualifications and continue to deliver appropriate levels of care to rural communities. This is underpinned by a commitment to the overall health and well-being of Australia's rural populations.": Document 669, page 1. See also Submission 40.

¹⁰⁸⁵ Dr Campbell declared that he had no professional, financial or personal relationship with any of the participants in the study, and none is a patient of his local medical practice. Document 669, page 1.

¹⁰⁸⁶ Document 669, page 2.

¹⁰⁸⁷ Document 669, page 5. See also Submission 40, page 3.

¹⁰⁸⁸ Document 669, page 4.

Dr Campbell considered the Proponent has not offered any strategies to reduce, ameliorate or compensate for this harm to those living close to the Project Area. Further, he was of the view the Proponent has not acknowledged or addressed *“the potential impact of more widespread fear, anxiety, anger and sadness amongst the larger East Gippsland community as more details of this project become publicly available, and/or if the proposal is approved”*.¹⁰⁸⁹ He submitted:

The potential for this project, if approved, to cause widespread disruption to social cohesion, psychological health and natural human optimism within the East Gippsland community is very real.¹⁰⁹⁰

Ms Carruthers, on behalf of MFG, put it thus:

The community fears the environmental consequences of failure. On even a small scale it could have catastrophic consequences given the Project’s location so close to where many people live, work, farm, children play and go to school, there is a major horticulture industry as close as 500m downwind and our internationally protected Gippsland Lakes Ramsar wetlands downstream, including the internationally significant Mitchell River silt jetties, which are the longest digitate delta in the world, running over 8 km.¹⁰⁹¹

The East Gippsland Landcare submission referred to the ‘Kalbar Mental Health Effect’ and ‘Eco-Anxiety’ which it submitted has been felt across the region for 6 years due to the threat of the Project and which resulted a suicide attempt by a person with no previous mental health history. The direct trigger was said to be:

The feeling of helplessness and powerlessness to protect the people they loved from the mine’s 24/7 noise pollution, environmental contamination and the destruction of the natural beauty of their area, where the family have lived for more than 30 years.¹⁰⁹²

Concerns around suicide and other mental health impacts were expressed by a number of submitters. Ms Aquila¹⁰⁹³ referred to studies showing high rates of suicide in Australian rural communities (especially rural-based men) and submitted that this area has been identified as having the highest level of suicide per capita in Australia.¹⁰⁹⁴

Many individual submitters at the Hearing also expressed concern about mental health impacts of the Project, including concerns that suicides would increase. The IAC heard submitters express their anxiety, anger, depression and mental anguish about the prospect of the Project. Some submitters were visibly distressed, brushing away tears as they spoke or had to stop to regain composure. Many submitters explained their fears around the Project have added to trauma they and the community have experienced because of the Mt Ray fires, the six years of drought, the Black Summer Bushfires, and more recently COVID-19.

18.4.3 Discussion

Health and wellbeing incorporates both physical and mental health although, as discussed above, the HHRA did not address mental health.

¹⁰⁸⁹ Document 669, page 6. See also Submission 40, page 4.

¹⁰⁹⁰ Document 669, page 6.

¹⁰⁹¹ Document 484, page 2.

¹⁰⁹² Submission 319, page 3. Submitters 812 (Day 31, 13 July 2021), Rural GP, David Campbell, submitter 40 (Day 34, 16 July 2021) and submitter 558 (Day 34, 16 July 2021) also referred to this attempted suicide in their oral submissions (Day 31, 13 July 2021). Bendigo District Environment Council, submitter 429, submitted that there had been suicides as a result of the mines on the Bendigo area (Day 34, 16 July 2021).

¹⁰⁹³ Submission 79.

¹⁰⁹⁴ Document 556. Oral submissions, Day 27, 30 June 2021.

The IAC found the submission of Dr Campbell very compelling. Given that Ms Teague's evidence did not cover mental illness, and in the absence of any other evidence on mental health or social impacts and the paucity of direct, in-depth research conducted for the SEIA, Dr Campbell's qualitative research and interpretation greatly assisted the IAC. His submission was not disputed by the Proponent and the Proponent in its closing submissions accepted the need to be proactive in seeking to mitigate negative social impacts.¹⁰⁹⁵

The mental health impacts that Dr Campbell described were consistent with the tenor of submissions the IAC heard from the local community, and indeed the IAC observed during the face-to-face Hearings in Bairnsdale.

The detailed social impacts are addressed in Chapter 16, but the IAC is deeply concerned at the number and level of suggested mental health concerns expressed in written submissions and by those who attended the Hearing both online and in person. These do not appear to be isolated instances of "unhappy people" but a broad and deep pool of concern that is expressed both by individuals about themselves but also about friends, family and neighbours.

The IAC is not an expert body in health or mental health but is concerned there may be long term mental health concerns for the community in this part of Gippsland, driven in part by many suggested instances of poor engagement and consultation over the past seven years and a potential future Project implementation which submitters are clearly worried could deliver several more decades of the same.¹⁰⁹⁶ The IAC notes that East Gippsland has relatively high rates of suicide compared to the Victorian average.¹⁰⁹⁷

Mining projects by their nature and scale are often disruptive of communities and can be challenging and difficult; this is more the case when there is a clear land use conflict such as for this Project. The IAC is also aware the EES and Hearing process generates a significant degree of stress as submitters prepare their written submissions and prepare to participate in a difficult and sometime arduous process.

As well as adverse mental health effects, the IAC notes there will be positive mental health outcomes for those who support or who obtain financial benefit or employment from the mine if it proceeds.

Even if the Project does not proceed, which is the primary recommendation of the IAC, healing will take time and not be even across the community, and there will be a cohort of people concerned the other way, that is disappointed the project has not proceeded.

¹⁰⁹⁵ Document 698, para 693.

¹⁰⁹⁶ The IAC does not and cannot make any findings against any individuals representing the Proponent. Several current and past employees of the Proponent came under sustained criticism in submissions, but the IAC makes no comment on the merit or otherwise of these criticisms. Elsewhere the IAC has recorded with thanks the assistance provided to it by the Proponent and its employees in it conducting its task.

¹⁰⁹⁷ The age-standardised suicide rate for Victoria in 2019 was 10.7 per 100,000 population: <https://www.aihw.gov.au/suicide-self-harm-monitoring/data/deaths-by-suicide-in-australia/suicide-deaths-by-state-territories> (accessed 7 September 2021). The age-standardised suicide rate for East Gippsland across 2015-2019 was 22.7 per 100,000 population: <https://www.aihw.gov.au/suicide-self-harm-monitoring/data/geography/suicide-by-local-areas> (accessed 7 September 2021).

18.4.4 Findings

The IAC finds:

- While it is not qualified to make formal diagnoses of mental health conditions, it is satisfied the Project has already produced a significant level of mental stress and anguish in the community that was manifested through submissions to the IAC.
- The IAC was not presented with a consistent, clear and articulate program of how the Proponent has attempted to address this issue; with many consultation and engagement mitigation measures to come in the future.
- If the Project were to proceed, either the HHRA or the SEIA would need to be updated to include a thorough assessment of mental health impacts of the Project and additional, appropriate mitigation measures.
- Whether the Project proceeds or not, without a more coherent strategic intervention there are likely to be long term ongoing mental health and stress issues in the local community.

18.5 Overall conclusions on human health risk assessment

The IAC concludes:

- The HHRA is reasonable but is derivative of a range of specialist studies and should be reviewed and expanded with community consultation and independent oversight as additional baseline and specialist modelling inputs are revised.
- It appears there are significant mental health issues in the community from a long period of Project development and appropriate professional resources should be provided to address these issues.
- It has not been demonstrated at this time the health and wellbeing of residents and communities as required in the evaluation objective has been protected.

19 Soils and rehabilitation

19.1 Introduction

Soils and rehabilitation are addressed in the EES as follows:

- Soils in Agriculture and Horticulture, Chapter 9.11
- Rehabilitation in Chapter 11.5 Closure implementation

Soils and rehabilitation are addressed in Technical Appendices as follows:

- Appendix A001: Landform, Geology and Soil Investigation
- Appendix A020: Rehabilitation
- Appendix A021: Soil Profile Reconstruction Study 1
- Appendix A022: Soil Profile Reconstruction Study 2
- Appendix A 023: Proposed Tailings Management Strategy

DELWP commissioned a peer review of the rehabilitation assessment which was included in the EES as Attachment K: *Rehabilitation Independent Peer Review and Proponent Response*.

The relevant draft evaluation objective is:

Rehabilitation – To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.

Mitigation measures for soils and rehabilitation EES Attachment H were, in summary:

- AG15: progressive rehabilitation to restore productive use
- RH01: direct use or separate stockpiling of topsoil
- RH02: site induction for soil management
- RH03: placement of fine tailings to avoid impacts on rehabilitation
- RH04: stockpiles designed to minimise erosion
- RH06: rocks to avoid scour and increase channel stability
- RH07: rehabilitated landscape forms
- RH08: riparian vegetation to stabilise flow channels
- RH09: rates of vegetation reestablishment in flow channels
- RH10: timing of rehabilitation with weather
- RH11: use of hydro mulches or tackifiers
- RH12: use of hydroseeding
- RH13: use of local experience when determining seed timing and rates
- RH14: irrigation of rehabilitation where necessary
- RH15: use of larger plants where practicable
- RH16: use of planting guards
- RH18-RH20: management of hazardous materials to avoid spills
- RH21: use of organic mulches and fertilisers where practicable
- RH22: vegetate stockpiles where appropriate
- RH23: stabilise stockpiles through design
- RH24: increase density of planting to minimise tunnel erosion
- RH25: exclude grazing where necessary
- RH26: manage long-term stockpiles appropriately

- RH27: increase tree density where necessary to maximise erosion stability
- RH28: apply gypsum where necessary on dispersible soils
- RH29: fence revegetated areas where cost effective
- RH30: revegetate over large areas to spread grazing impact
- RH31: use triple interceptor traps to contain hazardous materials
- RH33: schedule tube stock planting for appropriate seasons
- RH34: use higher seeding rates to account for losses.

TN relevant in whole or part to soils and rehabilitation included:

- TN2: Response to expert recommendations
- TN3: Implementation and enforcement
- TN5: Scheduling
- TN13: Additional Expert recommendations
- TN 6: Soil infiltration data
- TN18: Rehabilitation planning and activities
- TN36: Response to rehabilitation issues

A revised Draft Mine Rehabilitation Plan dated 24 March 2021 was tabled in the Hearing.¹⁰⁹⁸ Expert evidence was called in soils and rehabilitation as shown in Table 23.

Table 23 Soils and rehabilitation evidence

Party	Expert	Firm	Evidence
Proponent	Dr Rob Loch ¹⁰⁹⁹	Landloch Pty Ltd	- Rehabilitation Expert Witness Statement, 29 January 2021 ¹¹⁰⁰ - Supplementary Expert Witness Statement, 6 February 2021 ¹¹⁰¹
Proponent	Dr Michael Cheetham	Water Technology	- Erosion and sedimentation Expert Witness Statement, 29 January 2021 ¹¹⁰² - Erosion and sedimentation Supplementary Expert Witness Statement, 29 January 2021 ¹¹⁰³
MFG	Dr Jessica Drake	Murrang Earth Sciences	- Soils and rehabilitation Expert Witness Statement, 27 January 2021 ¹¹⁰⁴ - Soils and rehabilitation Supplementary Expert Witness Statement, 27 January 2021 ¹¹⁰⁵
MFG	Dr Julia Jasonsmith	Murrang Earth Resources	- Tailings Expert Witness Statement, 19 January 2021 ¹¹⁰⁶

¹⁰⁹⁸ Document 215.

¹⁰⁹⁹ Dr Loch was the principal author of EES Technical Appendices 1, and 20-22.

¹¹⁰⁰ Document 75.

¹¹⁰¹ Document 128.

¹¹⁰² Document 74.

¹¹⁰³ Document 127.

¹¹⁰⁴ Document 90.

¹¹⁰⁵ Document 210.

¹¹⁰⁶ Document 91.

Party	Expert	Firm	Evidence
			- Tailings Supplementary Expert Witness Statement, 3 February 2021 ¹¹⁰⁷

Two expert witness meetings were held in relation to soils and rehabilitation.¹¹⁰⁸

19.2 Key issues

The issues are:

- the nature of soils on site and erosion potential
- dam stability
- rehabilitation
 - rehabilitation process and strategy
 - rehabilitation bond
 - peer review

19.3 Soils and erosion

19.3.1 Background

How the soils on site will respond to mining and rehabilitation attracted a broad range of submissions, with many concerned about the dispersive nature of soils and the implications of this for the Project.

19.3.2 The nature of soils on site and erosion potential

(i) Evidence and submissions

Dr Drake in her evidence for MFG was critical of the soil characterisation undertaken in the EES. Dr Loch for the Proponent met with Dr Drake as part of the expert meeting process.¹¹⁰⁹ Following discussions Dr Drake acknowledged the approach of Dr Loch and decisions he had made but recorded that:

...those decisions have not been communicated in the EES, and consequently, the way the information is presented is not in the context of those decision. The background information, including any decisions made, is essential to understand how the effects of the mine have been assessed.

The expert meeting statement contains a detailed description of the general methodology used in the assessment of soils.

The propensity of some soils on site to be dispersive was acknowledged in the EES:¹¹¹⁰

Chemical properties of HHF (IAC Note: Haunted Hills Formation) overburden relevant to clay dispersion considerations are shown in Table 5. Importantly, the exchangeable cation data show both samples to have levels of sodium and magnesium sufficient to cause strong dispersion of clay within those materials.

¹¹⁰⁷ Document 211.

¹¹⁰⁸ Documents 236 and 237. The meeting recorded in Document 236 addressed a number of matters including radiation. Radiation including rehabilitation criteria is addressed in Chapter 10 of this report.

¹¹⁰⁹ Document 237.

¹¹¹⁰ Appendix A001, page 15.

Dispersive overburdens can be associated with increased risk of tunnel erosion, and typically require a range of management actions such as application and thorough mixing of appropriate rates of gypsum, and control of surface conditions to eliminate concentration and ponding of overland flows (Landloch 2004; 2006).

Dr Cheetham in his evidence for the Proponent addressed the issue of erosion and how it might affect rehabilitation.¹¹¹¹ In his evidence he indicated that he adopted his conclusions from his earlier work¹¹¹² adding that, in summary:

- 10 years of monitoring post closure should be adequate except where vegetation less than 5 years old at closure is being used for erosion stabilisation; in these cases monitoring should occur for 10-20 years.

His work largely focused on:

- the need to stabilise gullies with revegetation downstream from mining
- containment and management of surface water to prevent sediment leaving the site
- ensuring monitoring of bed instability.

In the expert meeting¹¹¹³ he noted that while there is some erosion occurring in gullies, it is not occurring at a rapid rate, and not at the rate that might lead to concerns about rapid dam destruction if it were to occur below a dam.

There was some discussion in the expert meeting regarding the need to map erosion on site, with the experts agreeing there was no need to map erosion in areas to be mined. Dr Drake suggested however it would be useful to know if there is erosion in offsite areas and areas not used for tailings.¹¹¹⁴

Dr Loch in his evidence noted the CAESAR landform evolution model is proposed to be used to assist predicting water and sediment movement on site, but the results for this were not yet available.¹¹¹⁵

The presence of tunnel erosion on site was submitted as significant by some submitters. The Coleman Partnership submitted that a multi-year very expensive trial on their property (part of the Project Area) with DELWP to combat tunnel erosion was ultimately unsuccessful, with the erosion now returning. They submitted:¹¹¹⁶

The number of active tunnels reported in the EES is far lower than that which exists; they are indeed to be found within the project area. Tunnel erosion and its malignant consequences are one of the most significant risks and outcomes of the proposed Fingerboards project. The consequences of excavating and building massive dams on unstable soils are potentially catastrophic. The lack of knowledge of tunnel erosion, with its manifestations and behavior in our particular area, makes it impossible to rely on the suggested simplistic remediation strategies to produce an effective and realistic risk assessment.

Images of tunnel erosion were provided by MFG as shown in Figure 31.

¹¹¹¹ Document 74.

¹¹¹² Appendix C to Appendix 006 of the EES.

¹¹¹³ Document 236.

¹¹¹⁴ Document 236, page8. There was also discussion in the Hearing as to what might occur with water ingress and erosion potential at the boundary between mined and non-mined areas.

¹¹¹⁵ Document 75.

¹¹¹⁶ Submission 812.

Figure 31 Submitter 813 images - Tunnel erosion¹¹¹⁷**(ii) Discussion**

The presence of significant areas and depths of dispersive soils on the Project Area is not disputed. This will mean soil, and more particularly water, management during mining and post-closure will be a critical element to achieve a stable, long-term landform.

The gullies leading offsite, and particularly the steeper and deeper ones north to the Mitchell River, will need careful management to assist in dam stability but also timely rehabilitation and revegetation to ensure they do not erode and create offsite sediment loads and gully instability.

In theory, stabilisation through revegetation¹¹¹⁸ is a sound and often used approach in mining and other rehabilitation. In practice, it requires significant input in terms of a reliable water source, species selection, vegetation establishment, time to reach an acceptable level of stabilisation effect, and significant ongoing maintenance.

All these things should be possible, but there is significant design and development work to be done including onsite trialling (discussed in terms of rehabilitation below) to determine how to best approach stabilisation given the dispersive soils.

Of note, Dr Cheetham has suggested dam removal is contingent on successful rehabilitation stabilising gullies. The timing of dam removal is unclear and the IAC notes there could be an imperative to remove dams as part of closure but a much longer timeframe for stabilising revegetation; leading to an inherent tension in rehabilitation timing.

The submissions in relation to tunnel erosion are noted and there is clearly long experience in the area with this issue. Managing the potential for tunnel erosion and ensuring it is avoided will be an important part of rehabilitation planning.

(iii) Findings

The IAC finds:

¹¹¹⁷ Document 297.

¹¹¹⁸ With rock armouring in some steeper areas.

- The management of dispersive soils on site will be a critical element in detailed rehabilitation planning if offsite sediment impacts and unstable landforms post mining are to be avoided.

19.3.3 Dam stability

(i) Evidence and submissions

Twenty dams are proposed on site for managing and storing water across the life of the Project. These will all be removed and rehabilitated post closure of the mine.¹¹¹⁹

Due to the nature of the soils on site, a number of submitters suggested that dam construction will be difficult and there have been a number of farm dams fail due to the dispersive nature of the soils and the lack of appropriate clay material for dam base sealing.

It was submitted that 'east coast lows'¹¹²⁰ can produce rainfall in excess of 300mm in a relatively short time and the risk of catastrophic dam failure with consequent flooding and sedimentation impacts on the Gippsland Lakes and downstream properties is too severe for the dam construction and Project to proceed.

In response to questions around these issues from the IAC, the Proponent provided TN31.¹¹²¹

The Proponent submitted in relation to design standards:

Kalbar confirms that all runoff water storage dams will be designed and constructed in accordance with the requirements of all relevant guidelines developed by the Australian National Committee on Large Dams (ANCOLD), including the *ANCOLD Guidelines on the Consequence Categories for Dams* (2012).

In saying this, not all of the runoff water storage dams meet the definition of a 'large dam' as set out in the ANCOLD Guidelines. Nonetheless, those Guidelines recognise the standards they set may be useful for the design of all dams, regardless of whether they are formally 'large dams'.

The Proponent in TN31 indicated that subject to further testing, design and treatment, it expected dam construction to occur using materials found on site and that imported materials would not be required.

In response to a question around the potential for catastrophic dam failure, the Proponent in TN31 submitted that initial 2-D modelling of TSF failure had been undertaken but the TSF is no longer proposed to be used. In relation to water storage dams the Proponent submitted:¹¹²²

Dam break analysis has not been undertaken for the catchment storage dams. All of the water management dams are sized to capture the runoff from the 1:100-year ARI, 72-hour rainfall event, and water from the dams will be transferred to the process water dam as soon as practically possible. Emergency spillways for all the water management dams will be designed in accordance with the *ANCOLD Guidelines on the Consequence Categories for Dams* (2012).

¹¹¹⁹ Noting in his evidence that Dr Cheetham (Document 74) suggested dams should remain on site until downstream vegetation is established to control erosion. There appears to be an inherent tension in wanting to remove dams post-closure but potentially needing to leave some for a considerable time if rehabilitation as not established in expected timeframes.

¹¹²⁰ Discussed in Chapter 7.

¹¹²¹ Document 500.

¹¹²² Document 500, page 3.

(ii) Discussion

The IAC accepts the proposed dams will be constructed in accordance with the appropriate design standards (ANCOLD). These design standards cannot be compared on a ‘like for like’ basis with the standards required for farm dam construction.

Nevertheless, the risk of catastrophic dam failure is not zero, and the consequences of failure on livelihoods and the environment could be very significant. There are challenges to dam construction and maintenance for the Project including the need to ensure appropriate materials are used, the planning of spillways in dispersive soils, the need to plan for extreme rainfall events and other factors.¹¹²³

The risk of failure may also be exacerbated if the Project is either abandoned or an unplanned closure occurs, when the maintenance and management of dams may fall below agreed requirements.

These are not far-fetched intellectual considerations. The IAC was provided with examples of dam failures in mining projects (generally tailings dams), and whilst the water storage dams may not have the same issues of toxicity as tailings dams, the consequences of a catastrophic failure could still be great.

Appropriate rigour in dam design, construction and maintenance will be essential to reducing the risk to an acceptable level.

(iii) Findings

The IAC finds:

- Dams should be able to be constructed and maintained to an appropriate standard to manage the risk of catastrophic failure, including using the ANCOLD guidelines for all dams.
- There must be appropriate independent engineering oversight of dam design and construction to ensure dams are constructed to account for the extreme rainfall events that can occur in the region.
- Dam maintenance will be important in maintaining dam integrity, particularly during times of unplanned closure or care and maintenance.
- Bond calculations should allow for adequate dam maintenance and/or decommissioning costs.

19.4 Rehabilitation**19.4.1 Background**

Rehabilitation is proposed to be undertaken on a progressive basis meaning the entire area to be mined is not disturbed at once. The EES describes the process as:¹¹²⁴

...areas of topsoil, then overburden being removed prior to the removal of ore. Mined areas will be progressively backfilled with coarse sand tailings, overburden and fines tailings. Fines tailings will be covered with overburden (including manufactured subsoil) and topsoil, and then rehabilitated.

¹¹²³ It was submitted that some major dams had failed due to be being weakened by Wombat burrows.

¹¹²⁴ EES page 11-15. Note the proposed 200 hectares woodland restoration project is not included in this chapter; please see Chapter 4.

The timing for from topsoil removal to revegetation establishment at any location on site would range from 19 months up to 68 months. A schematic of the mining process is shown in Figure 2.

Return to an agricultural land use is anticipated to occur within three to five years after rehabilitation is completed. The maximum amount of area disturbed at any one time would be approximately 285 hectares.¹¹²⁵

Groundwater seepage impacts from placed fine and coarse tailings are discussed in Chapter 6.5.

19.4.2 Evidence and submissions

Rehabilitation process and strategy

The poor nature of the subsoils on site and their suggested lack of suitability for use in rehabilitation is discussed in the previous chapter.

In his evidence for the Proponent, Dr Loch indicated that many of the difficult issues associated with mining rehabilitation are not present for the Project, including sulfidic materials, radioactive and asbestiform materials, and highly saline wastes. He also gave evidence the climate and landscape of the Project Area did not give rise to rehabilitation difficulties found at many mine sites.¹¹²⁶

Because of this, he concluded that “*rehabilitation for the fingerboards project should be of relatively low difficulty and risk*”.¹¹²⁷ He acknowledged the dispersive materials of the Haunted Hills formation overburden do present a moderate challenge. He noted that successful rehabilitation in such material has been undertaken for other mining projects and in other mining areas.¹¹²⁸

Dr Loch’s evidence was the establishment of grazing pasture species is a common rural practice and the progressive nature of the rehabilitation proposed means there would be advantages in terms of training and continuous improvement that could be utilised as the rehabilitation proceeds.

Dr Loch in evidence said:¹¹²⁹

Effectively, rehabilitation will entail amendment and fertilisation of the existing surface soil, and its direct transfer and placement over a blended material that is more physically and chemically productive than the current subsoils.

The second main part of the conceptual rehabilitation strategy will be to establish revegetation to manage water movements and erosion and ensure ecological functionality.

Following the introduction of centrifuges, Dr Loch’s supplementary evidence statement outlined, there were several benefits to the elimination of TSF:¹¹³⁰

- there will be less delay in draining of TSF and thus rehabilitation can occur sooner
- the mine voids will not contain layers of relatively impermeable fine tailings.

¹¹²⁵ The EES indicated 360 hectares. This figure is taken from the revised rehabilitation plan Document 215.

¹¹²⁶ Document 75, para 20 onwards.

¹¹²⁷ Document 75, para 21.

¹¹²⁸ Document 75, para 22.

¹¹²⁹ Document 75, para 26. Dr Loch noted and this was reinforced in questions in the Hearing that only limited trials on bulk samples (Technical Appendix A21 and A22) have been undertaken and field trials are needed to establish the best subsoil mix. In response to a question from the IAC Chair he indicated that a year is not long enough for trials, two years would be better and ideally it would be three to four years.

¹¹³⁰ Document 128.

Dr Loch was unclear in evidence as to whether manufactured subsoil will include fine tailings from the centrifuge or not, but if it were, he gave evidence that a procedure to ensure even distribution would need to be developed.¹¹³¹

Dr Loch indicated he is aware PAM flocculant is commonly used but acknowledged he is not aware of information on the long term mobility persistence or breakdown products from such compounds when placed at depth in the soil profile.

In evidence for MFG, Dr Drake's view was the trials undertaken to date and reported in Appendices A021 and A022 of the EES are not reliable, and she gave a detailed critique of methodological weaknesses she considered lead to this conclusion.¹¹³²

Dr Drake's view was that:¹¹³³

...the information provided on soils, overburden and tailings as part of rehabilitation and closure planning and criteria in the Fingerboards EES, which I reviewed as part of this expert witness statement, is not complete. There is a lack of certainty and clarity about how soil, manufactured soil, overburden and tailings will be used in rehabilitation...

She went on to point out in detail inconsistencies in the EES about how materials will be used or placed in the rehabilitation process; leading in her view to a lack of clarity as to how, or if, closure targets and criteria in the EES will be met.

Dr Drake also gave evidence the natural subsoils on site did not appear to have been critically evaluated against the proposed manufactured subsoils so their relative advantages and disadvantages could be assessed. On this she concluded:¹¹³⁴

Therefore, the purpose of using tailings and overburden in place of subsoils is also unclear to me (despite similar issues and risks in using these materials) and, thus, how this approach represents best practice or is 'most appropriate.

She noted the risks of using overburden and tailings in manufactured subsoil did not appear to have been considered adequately and concluded:¹¹³⁵

Overall, given the information presented in the EES sections, I am not confident the risk report and mitigation strategies have adequately considered the information presented in the technical reports/sections of the EES in relation to soil, manufactured soil, tailings and overburden aspects of rehabilitation and closure.

Dr Drake provided a supplementary statement which did not materially change her views.¹¹³⁶ Essentially the concerns she expressed in her original statement about the methodology around rehabilitation research and the lack of certainty in whether rehabilitation is likely to be successful and the disconnect with risk management were reiterated, with the addition of the need to consider how the centrifuge cake is used or placed.

In the expert witness meeting there were more detailed discussions about the rehabilitation process. Dr Drake noted that a lot of the material is not provided in the EES and thus readers would not have been able to understand the purpose or context of the work. While

¹¹³¹ The proponent in TN014 (Document 194) indicated it was unlikely the centrifuge cake would be used in subsoil.

¹¹³² Document 90, paras 66-90.

¹¹³³ Document 90, para 91.

¹¹³⁴ Document 90, para 139.

¹¹³⁵ Document 90, para 159.

¹¹³⁶ Document 210.

acknowledging the feasibility of rehabilitation, Dr Drake observed that it does not contain prescriptive work for how to undertake the rehabilitation and trials are still needed.¹¹³⁷

MFG submitted the Proponent has failed to demonstrate the rehabilitation evaluation objective can be met and specifically that, in summary:¹¹³⁸

- there is a lack of costings for rehabilitation
- whether safe and stable landforms can be reinstated has not been adequately investigated
- the Proponents own experts were unaware of some of the Project elements
- a lack of consideration of known tunnel erosion risk
- failure to characterise physical and chemical properties of overburden to be used in rehabilitation
- the lack of understanding about manufactured soils makes it difficult to assess the likelihood of successful rehabilitation

On rehabilitation MFG submitted:¹¹³⁹

This issue is of significant concern in a context where the Victorian-Auditor General recently published a report on the systemic regulatory failures for mine rehabilitation in Victoria and in which the Department for Jobs Precincts and Regions (**DJPR**) was identified as not effectively regulating operators' compliance with their rehabilitation responsibilities.

Council also expressed concern about the prospects for rehabilitation and remaining uncertainties, and submitted it is not possible to conclude at this point “...*the proposed strategies for progressive rehabilitation, or the proposed rehabilitation and closure timetable, can be achieved...*”.¹¹⁴⁰

Council also submitted there are no contingency rehabilitation measures for unplanned closure, whether unplanned closure be temporary or final. It provided figures on the significant number of mines which suffer from unplanned closure across Australia and the relatively small number that have achieved planned closure and been fully rehabilitated.¹¹⁴¹

Council submitted that industry guidance clearly articulates that good closure planning is a critical element of overall mine planning and it is not appropriate to wait to prepare such plans until unplanned closure is imminent.

It concluded, similarly to MFG, the evaluation objective cannot be achieved given the absence of certainty about the progressive rehabilitation proposed and the failure to identify contingency measures for unplanned closure.

Council submitted the evidence of Dr Loch supported its view in relation to timing and compliance for rehabilitation success auditing.¹¹⁴²

As discussed in Chapter 3, ERR regulates the mining industry under the MRSD Act and will be responsible for issuing subsequent approvals for the Project through the Work Plan process as well as ensuring rehabilitation is undertaken.

¹¹³⁷ Document 237, page 8-9.

¹¹³⁸ Document 451, para 181 onwards.

¹¹³⁹ Document 451, para 182.

¹¹⁴⁰ Document 407, para 376 onwards.

¹¹⁴¹ Document 407, para 383.

¹¹⁴² Document 407, para 393.

In response to questions from the IAC, ERR provided responses in writing to issues raised in submissions.¹¹⁴³ On the issue of poor regulation raised by the Auditor General¹¹⁴⁴, ERR responded that a number of changes and improvements have already been made and are continuing. It submitted:¹¹⁴⁵

Over recent years, key improvements have been made in the areas of regulatory governance and assessment of work plans. Further work is underway to improve the regulator’s compliance operating model, licensing administration and regulation of site rehabilitation. In parallel, substantial legislative reforms have been made, such as the introduction of risk-based work plans.

In relation to any future approval of the Work Plan and Rehabilitation Plan, ERR indicated the following factors would be considered:¹¹⁴⁶

- The ability to achieve a safe, stable and sustainable landform after mining, including progressive rehabilitation.
- The risk of erosion causing land instability and sediment entering waterways during the revegetation and post-closure stages of the project, taking account of the local soil types and deeply incised landform.
- Contingency measures for addressing any land instability.

The Proponent in submissions acknowledged that further work is needed to refine its approach to rehabilitation, but there is nothing before the IAC to suggest the rehabilitation proposed is not feasible.¹¹⁴⁷ It attributed trial delays (in part) to the inability to obtain material from the proposed demonstration pit.¹¹⁴⁸

The Proponent also conceded there is limited information on unplanned closure in the draft rehabilitation plan, but this can be addressed post approval but prior to mining commencing.

Many individual submissions drew the IAC’s attention to the suggested failure of rehabilitation in other projects in Victoria; both mineral sands mines in Western Victoria and gold and other mines in western and eastern Victoria.

BDEC made extensive submissions and at the Hearing, including on rehabilitation. Drawing on its experience around Bendigo, BDEC submitted that the regulation of rehabilitation is flawed:¹¹⁴⁹

It is a general view of the wider Bendigo community the Victorian government is unlikely to provide the many tens of millions of dollars of ‘make up’ funding that would be required by ERR to carry out rehabilitation of the four [abandoned] mine sites and the most likely outcome is these sites, like many others currently in “care and maintenance” will remain in their current circumstance for perhaps decades.

Mr Ross (part of the MFG submission) gave his views on the success or otherwise of rehabilitation of a mineral sands mine in the vicinity where he lives near Hamilton in western Victoria, submitting that not only was the mine poorly run when operating but has left a legacy for the community of radiation, unrestored areas, and groundwater impacts.¹¹⁵⁰

¹¹⁴³ In Documents 11, 17 and 497.

¹¹⁴⁴ *Rehabilitating Mines*, Victorian Auditor General, tabled in Parliament on 5 August 2020.

¹¹⁴⁵ Document 497, page 5.

¹¹⁴⁶ Document 17, page 1.

¹¹⁴⁷ Document 698, para 590 onwards.

¹¹⁴⁸ The test pit is discussed in Chapter 1.3.

¹¹⁴⁹ Document 502.

¹¹⁵⁰ Document 685.

Many other submitters referred to failed rehabilitation at mines elsewhere in East Gippsland and the ongoing threat to waterways and the Gippsland Lakes.

Submitters were also critical of the suggested lack of understanding of the local area for rehabilitation planning. Ms Alison Waller articulated some of these concerns in her original submission¹¹⁵¹ and at the Hearing as, in summary:

- lack of consideration of highly variable climate and its implication for dam planning and pasture establishment
- the threat from weeds, particularly African Lovegrass
- Lack of consultation.

The Proponent provided a specific response to her concerns.¹¹⁵²

Rehabilitation bond

A rehabilitation bond is provided for under the MRSD Act as outlined in Chapter 3 and discussed in Chapter 17. Many submitters were critical of the magnitude of bonds for other projects, suggesting the amount held in bonds by ERR did not cover the rehabilitation costs of legacy projects.¹¹⁵³ The implication is the bond for the Project may be insufficient to fully and properly rehabilitate the site in the event of Project failure.

The Proponent provided an extract from the ERR website¹¹⁵⁴ which explains how the rehabilitation bond process works and is calculated.

In response to questions from the IAC, ERR provided further information including a link to the bond calculator that was updated in March 2021.¹¹⁵⁵ In its response it submitted that:¹¹⁵⁶

Rehabilitation bonds are calculated based on the estimated cost for the State to rehabilitate a mine site in accordance with an approved work plan (rehabilitation plan), if a licensee defaults on their obligation.

ERR went on to advise the bond calculator includes, in summary:

- maintenance of rehabilitated areas
- pest and weed management
- monitoring and maintenance of rehabilitation
- post-closure environmental monitoring.

Peer review

The peer review of the initial EES work on rehabilitation¹¹⁵⁷ highlighted several issues, including the role of stakeholders in rehabilitation, decommissioning and closure and particular technical elements:

- the geotechnical and geomorphological design assumptions for the permanent landform
- uneven consolidation of the materials and how this could affect surface and subsurface drainage

¹¹⁵¹ Submission 743.

¹¹⁵² Document 534, TN036, which also responded to issues raised by Council regarding the woodland restoration project

¹¹⁵³ The VAGO report noted that \$222 million is held in bonds by ERR against 1,391 mines and quarries, identifying a low estimate shortfall of at least \$361 million.

¹¹⁵⁴ Document 265.

¹¹⁵⁵ <https://earthresources.vic.gov.au/legislation-and-regulations/guidelines-and-codes-of-practice/rehabilitation-bonds/bond-calculator>.

¹¹⁵⁶ Document 497, page 6.

¹¹⁵⁷ Attachment K to the EES.

- how water quality draining from landform over time could impact downstream/gradient water quality
- volumes of topsoil, subsoil and manufactured subsoil to create sustainable landform
- lack of decommissioning risk consideration.

19.4.3 Discussion

The relatively time-limited impact of the mine has been put as a significant benefit of the Project. Whilst the impact within the life of the mine may be severe, it is only for an approximately 15-20 years. This limitation of impact assumes rehabilitation of the site to a stable landform with a mix of native ecosystems and agricultural use is successful. The timeline also assumes the Project has ongoing access to water and the operation is not 'scaled-down' leading to a longer mine life.

The IAC considers there is a high degree of uncertainty about the development and placement of manufactured subsoil that is said to be critical to rehabilitation success. The early work done suggests the approach may be feasible, but the Proponent's own expert acknowledged that a multi-year trial is needed to get the best approach in terms of topsoil depth, soil treatments, manufactured subsoil mix and other elements of rehabilitation. It seems to the IAC that such a fundamental issue would have been investigated and resolved, prior to the Project being put forward for assessment.

As it is, the IAC is left to consider a concept which is dependent on the results of the proposed demonstration pit work, on which the IAC has already expressed concern as to why it was brought forward so late in the Project's development, as discussed in Chapter 1.3.

The IAC accepts there is deep concern in the local community about rehabilitation, which can be categorised at two levels:

- The sense the Proponent does not have a deep understanding of the soil and landscape of the Project site and is treating the approach to mining and rehabilitation as just another mine site.
- A lack of trust in the State to regulate mining and rehabilitation to ensure the land is returned to the local community in an acceptable state and within a reasonable timeframe.

The peer review commissioned by DELWP in 2019 raised several issues, some of which have been addressed to some extent by the Proponent. However, the IAC considers the reference in the peer review to effective two-way stakeholder engagement in rehabilitation planning is still a live and important issue. Seven years into project planning, the bulk of two-way consultation and engagement on future rehabilitation still seems to be future work. A well-developed scheme put forward for assessment with a high level of community awareness and understanding (if not unequivocal support) would have been preferable.

The IAC is also concerned that many of the fundamental future final landform investigations and proposals are still to be developed and are put forward on the basis they are feasible and 'should work', rather than having been trialled and tested to a high degree of certainty. It appears to the IAC the Proponent's approach has once again engendered a distinct lack of trust in whether acceptable outcomes can be achieved when mining finishes and the Proponent has moved on. It appears there are also significant uncertainties around rehabilitation and early or unplanned closure, or potential economically driven periods of care and maintenance remaining.

In relation to the rehabilitation bond, the IAC notes the submissions and Auditor General’s report into rehabilitation regulation. The IAC also notes that ERR appears to be undertaking a concerted effort in trying to improve the regulation of mining rehabilitation. The success or otherwise of these efforts will probably not be known for many years, and in the interim, there appears to be significant scepticism among submitters the Proponent will be required to provide a rehabilitation bond commensurate with the level of effort required for rehabilitation in the event of Mining Licence and Work Plan obligations not being met.

19.4.4 Findings

The IAC finds:

- Progressive rehabilitation of the Project Area to stable landforms, native ecosystems and productive agriculture should be feasible based on work done to date, but there remains significant uncertainty which is likely to remain until onsite multi-year trials with in-situ materials are complete.
- The capacity for rehabilitated areas to sustain future productive land uses is thus unproven at this time.
- At this point in time the rehabilitation planning work is not advanced to the point where a statutory approval should be granted; significant further work is required to confirm the likely success of long-term final land uses, stable landforms and water management.
- This further work should be undertaken in consultation with stakeholders, including relevant agencies and the local and regional community who have a strong interest in successful long-term rehabilitation.
- The statutory framework is in place to enable an appropriate rehabilitation bond to be calculated, and this should include consideration of the mining context which includes a sensitive heritage river catchment of a Ramsar area (the Gippsland Lakes) and in the midst of a highly productive agricultural and horticultural setting.
- The requirement for adequate water supplies for rehabilitation will be critical; if there is limited water availability this should be factored into the bond calculation for a longer rehabilitation period.

19.5 Overall conclusions on soils and rehabilitation

The IAC concludes:

- The soils on site have particular characteristics, including dispersiveness in areas, that will require careful management through dam construction, site works and rehabilitation.
- The risk of dam failure is low, but the consequences would likely be severe for the local environment, downstream landowners and the Gippsland Lakes.
- It should be feasible to rehabilitate the Project Area post mining, but there is considerable uncertainty at this time about the manufactured subsoil process and results and the ability to form and maintain long term stable landforms.
- There appears to be some tension between dam removal for rehabilitation and the stabilisation of waterways prior to their removal.
- Any rehabilitation bond calculation will need to include these uncertainties and ensure there are adequate resources to successfully and safely rehabilitate the Project Area in the event of the Mining Licence being prematurely relinquished.

20 The draft planning scheme amendment

20.1 Background

The draft Amendment is contained in Attachment C to the EES. It was publicly exhibited together with the EES. Matters relating to land use impacts and relevant planning policies are discussed throughout the EES, including Appendix A013 (Land Use and Planning Impact Assessment).

The IAC's Terms of Reference also encompass a review of the Amendment prepared to facilitate the Project, together with public submissions. The IAC is requested to advise whether this suite of documents contains provisions and controls appropriate for the Project and whether changes are recommended.

Key components include:

- including the land outside the mining licence area which is required for the Project in a Specific Controls Overlay (SCO)
- introducing a SCO in the East Gippsland Shire Planning Scheme
- introducing a new Schedule 1 to the SCO at Clause 45.12
- introducing a new Incorporated Document titled "Fingerboards Mineral Sands Project Incorporated Document" into the Schedule at Clause 72.04 (Incorporated Document)
- associated mapping changes.

The Amendment is proposed to regulate infrastructure works required for the Project outside the mining licence area. Such works include road diversions, construction and operation of powerlines and water pipelines, the proposed bore field, easements, a rail siding, noise bunding, subdivision for the purposes of acquiring land for road and roadworks improvements and upgrades and native vegetation removal associated with these activities. The draft Incorporated Document would permit the use and development of land for listed Project uses within the area specified in the SCO. Provided the conditions set out in the Incorporated Document are met, these listed Project activities would not require a planning permit.

The Incorporated Document as exhibited requires the development of additional plans to be prepared to the satisfaction of the responsible authority and other authorities (as relevant) including:

- Development Plan
- Traffic Management Plan
- Construction Noise Management Plan and Operations Noise Management Plan
- Environmental Management Plan
- Construction Management Plan
- Native Vegetation Management Plan
- Fire Management Plan.¹¹⁵⁸

According to the EES, *"This type of planning control has been used previously on major projects in Victoria and provides a straightforward mechanism to regulate and control the project"*.¹¹⁵⁹

The Amendment was updated throughout the Hearing.

¹¹⁵⁸ EES Attachment C.

¹¹⁵⁹ EES Chapter 5, page 5-9.

20.2 Key issues

The key issues are:

- whether the Incorporated Document as exhibited was appropriately drafted and included all management plans that would be required
- whether the area to which the SCO applies should be as exhibited, or updated to include changes proposed during the Hearing, and whether the extended mining licence area should be included.

20.2.1 Evidence and submissions

(i) Drafting and scope of the Incorporated Document

All parties generally accepted that, if the Project were to proceed, the proposed Amendment mechanism of the inclusion of a SCO (and the associated Incorporated Document) to regulate infrastructure works required for the Project outside the mining licence area was appropriate. There were differing views as to the appropriate scope of the SCO and Incorporated Document.

The Proponent explained in its opening submissions the Amendment had been modelled on the planning scheme amendment for the for the Stockman Base Metal Project (Amendment C130) which used an incorporated document to regulate and control the use and development of land, including the removal of native vegetation, for infrastructure outside the mining licence area for that project. The main difference between the Amendment and Amendment C130 was the latter did not use the SCO because it did not exist at the time.¹¹⁶⁰

Mr Glossop gave evidence the Project warrants the application of the SCO.¹¹⁶¹

I consider the Specific Controls Overlay to be appropriate given it will allow the necessary facilities and infrastructure to occur with the degree of flexibility required within the overarching framework of an Incorporated Document. The application of the SCO in these circumstances is reasonable in my opinion.¹¹⁶²

The Proponent submitted the requirements under the Incorporated Document, including endorsed plans under it, would be enforceable under the PE Act and the responsible authority or “any person” may apply to the Victorian Civil and Administrative Tribunal for an enforcement order to ensure compliance.¹¹⁶³

Council submitted in its opening submissions the Incorporated Document leaves “*significant uncertainty regarding activities with the real potential to have significant deleterious effects*”.¹¹⁶⁴ It expressed concern that it would “*supersede important provisions of the Planning Scheme*” such as native vegetation controls, allowing construction of infrastructure in locations of the Proponent’s choice, creation of easements over private land, subdivision of private land, and use of land in the SCO for roads without sufficient detail, particularly given the inclusion of the Saplings Morass within the SCO.¹¹⁶⁵

As the Hearing progressed, the Proponent proposed further changes to the Incorporated Document to which parties responded. The Proponent’s final version of the Incorporated

¹¹⁶⁰ Document 243, page 35.

¹¹⁶¹ Document 80, page 19.

¹¹⁶² Document 80, page 19.

¹¹⁶³ Document 243, page 46.

¹¹⁶⁴ Document 251, page 10.

¹¹⁶⁵ Document 251, pages 10-11.

Document was provided on 2 August 2021 (Document 779) together with a table explaining its response to the various drafting changes requested by other parties.¹¹⁶⁶ Document 779 forms the basis of the IAC's recommended Incorporated Document at Appendix E of Volume 2.

Significantly, the Proponent accepted the following changes to the Incorporated Document:

- deletion of the permission for the creation easements in the Infrastructure Area
- change of the Environmental Management Plan to the Environmental Management Framework (EMF)
- the addition of a Decommissioning Plan for the Infrastructure Area
- the addition of considerable detail as to the content and the appropriate approval and consultation authorities for each of the management plans to be developed
- the addition of mechanisms to deal with expiry of the Incorporated Document including, importantly, measures to deal with periods of 'care and management' and periods of discontinued use of the Infrastructure Area (although all details of those mechanisms was not agreed).

The following key issues were outstanding:

- whether the Incorporated Document should require a Master Plan for the Infrastructure Area to be developed as a first step
- whether the Incorporated Document drafting should retain a permit trigger for vegetation removal in the Infrastructure Area
- whether the Proponent should provide a bond to be held by Council to cover work under the Decommissioning Plan (noting that this plan only covers the Infrastructure Area)
- detail about how the expiry provisions should operate.

Council submitted that a Master Plan for the entire area covered by the SCO should be required to be approved by the responsible authority as a first step in order to ensure that planning for the Infrastructure Area would be comprehensive and cohesive. Alternatively, it submitted, it should be made clear in the Incorporated Document the Development Plan is to be approved first and "*must include a comprehensive understanding of the entire site layout in order ensure that staging does not result in the piecemeal or ad hoc planning of the area*".¹¹⁶⁷

Council's proposed drafting was as follows:

4.1.1 Master Plan

1. Prior to the commencement of any use or development, including any use or development of the Project Area, a master plan in respect of the use and development of the SCO1 Land must be prepared and approved to the satisfaction of the responsible authority.
2. The master plan may be amended to the satisfaction of the responsible authority.
3. The master plan must be prepared having regard to each of the plans required by this control, and must show:
 - (a) The location of buildings, works, roads and proposed activities within the SCO1 Land;
 - (b) Areas of vegetation proposed to be removed and retained.¹¹⁶⁸

¹¹⁶⁶ Documents 779 (clean) / 780 (marked up) & 778 respectively.

¹¹⁶⁷ Document 641, page 2. See also Document 763, page 2 maintaining that there should be a requirement for a Master Plan.

¹¹⁶⁸ Document 228, page PDF 6.

The Proponent rejected the need for a Master Plan due to “*the (relatively) limited extent of Project Infrastructure and the requirement for a Development Plan*”.¹¹⁶⁹

In relation to whether the Incorporated Document should permit vegetation clearance, Council submitted:

As indicated in the Council’s TD641, the permit trigger relating to vegetation removal should not be included in this approval. The extent of vegetation removal in this area [the Infrastructure Area] has not been properly considered and should remain the subject of this permit trigger to ensure a proper assessment is made. The approval of vegetation removal within this area which did not form part of the detailed vegetation assessment for the project is not appropriate.¹¹⁷⁰

Council also submitted the Proponent should be required to provide a bond for rehabilitation in the Infrastructure Area because it would not be covered by any bond under the MRSD Act.¹¹⁷¹ Council submitted that overall, if the Project were to proceed it would shoulder a significant regulatory burden even if cost recovery mechanisms were included in the Incorporated Document and the impact that proposed planning provisions will have on the responsible authority’s administrative costs is one of the matters required to be taken into account by the Minister in addressing the Strategic Assessment Guidelines set out in Planning Practice Note 46.¹¹⁷² Council submitted:

The IAC should recommend that, if the Project is approved, the State government provide ample resourcing for implementation in particular to the Council for its role. The Incorporated Document can include some costs recovery measures but that will not meet the burden imposed. Further the inclusion of bonds for performance of all obligations would be critical to any ongoing approval.¹¹⁷³

The Proponent rejected Council’s suggestion the Incorporated Document should include a rehabilitation bond arguing that it had agreed to provide a bond for works to public roads under the Traffic and Transport Management Plan and that it is not usual for a bond to be provided to Council to cover works not on Council land.¹¹⁷⁴

In relation to expiry of the Incorporated Document, Council and MFG both submitted the Incorporated Document should reflect the advertised mine life of 15-20 years and there is no justification to extend the approval period to 25 years.¹¹⁷⁵ In response, the Proponent argued the extended period was justified to cover the range of individual statutory approvals required for construction and commissioning of the Project.¹¹⁷⁶

MFG submitted that if the Project is in care and maintenance for a period of two or more years (rather than the Proponent’s suggested four or more years), the responsible authority should be required to (rather than the Proponent’s suggested “may”) serve on the Proponent a notice requiring it to demonstrate to the satisfaction of the responsible authority the Project is likely to

¹¹⁶⁹ Document 778, page 2.

¹¹⁷⁰ Document 763, page 3. See also Document 641, pages 2 & 7.

¹¹⁷¹ Document 763, page 2.

¹¹⁷² Document 748, page 15.

¹¹⁷³ Document 748, pages 16-17.

¹¹⁷⁴ Document 778, page 4.

¹¹⁷⁵ Document 641, page 7; Document 763, page 2. The MFG submission states: “The Project has been advertised and assessed on the basis that the mine life includes 15 years of production at full capacity with approximately two years for construction and commissioning (See Updated Chapter 3, Tabled Doc 122). The highest estimate for projected mine life is 20 years.” Note to item 8, Document 759, page 20.

¹¹⁷⁶ Document 778, page 4.

exit care and maintenance in the next 12 months.¹¹⁷⁷ Council submitted the Proponent’s drafting (with the potential for five years in care and maintenance) led to residual uncertainty.¹¹⁷⁸ In response, the Proponent maintained the serving of the notice should be at the discretion of the responsible authority and maintained its drafting of four years.¹¹⁷⁹

(ii) The SCO area

Council expressed concern regarding the following issues which emerged during the Hearing and after the Amendment was exhibited:

- the expansion of the mining licence area and how the extended area would interact with the Amendment
- the area to be covered by the Amendment would likely be changed to allow for the changed location of the bore field, an issue which had emerged only by way of a map contained in Mr Georgiou’s evidence on groundwater and after Mr Glossop’s evidence on town planning had been completed, and the impacts of such a change had not been assessed in this EES process.¹¹⁸⁰

Council did not support inclusion of any areas in the SCO that had not been assessed as part of the EES process.

MFG submitted the Incorporated Document should not be updated to reflect the increased mining licence area.¹¹⁸¹

... the community has legitimate concerns about how the expanded Project area contained in the mining licence application has crept its way into the draft planning and environmental management documents before the IAC. The IAC is not in a position to make findings on whether acceptable environmental outcomes can be achieved with respect to the expanded Project area, given the additional 468 ha has not been assessed under the EES.

In its closing submissions, the Proponent submitted the relocation of the bore field could be authorised by a planning permit for a utility installation as this is a Section 2 use in the Farming Zone, presumably as opposed to changing the Amendment.¹¹⁸² It submitted the Incorporated Document should apply to the increased mining licence area because the increase in area did not lead to any impacts that had not been assessed because the mine footprint remained the same.¹¹⁸³

20.2.2 Discussion

The IAC notes that planning scheme amendments have been used to introduce a specific incorporated document to facilitate State-significant public infrastructure projects in recent times¹¹⁸⁴ and the parties did not fundamentally challenge use of the SCO and associated Incorporated Document to facilitate the Project *outside* the mining licence area.

The IAC considers the mechanism proposed is appropriate in the circumstances.

¹¹⁷⁷ Document 759, page 21, clause 8.5.

¹¹⁷⁸ Document 763, page 3.

¹¹⁷⁹ Document 778, page 4.

¹¹⁸⁰ Document 407, pages 3 & 99-100. See also Document 641, page 2.

¹¹⁸¹ Document 749, page 12.

¹¹⁸² Document 698, page 11

¹¹⁸³ Document 788, page 5.

¹¹⁸⁴ NELP Report, page 293.

The IAC agrees with Council that a Master Plan would assist with the high-level planning of the Infrastructure Area to ensure there is clarity before any work commences. This is particularly the case where the Incorporated Document allows the Development Plan(s) to be approved in stages (refer clause 6.3.2. of the proposed Incorporated Document) and that more generally, mining will be progressive and staged.

Reinstatement or rehabilitation of roads in the Infrastructure Area will be covered through the *Decommissioning Traffic Management Plan* in the Incorporated Document, but the IAC notes the bond under the MRSD Act would only extend to rehabilitation and restoration of the mining licence area.

The IAC is concerned there may be other matters requiring rehabilitation or restoration at the end of the Project in the Infrastructure Area. The IAC accepts however these would be left to the Proponent and landowners to resolve via agreement.

The IAC has already noted in Chapter 16 the considerable regulatory burden the Project would place on Council and has recommended that measures be taken to resource the Council.

Given the considerable concern expressed by the local community about the period of the mine and the potential for it to be extended beyond the advertised 15-20 years, the IAC considers the duration of the Incorporated Document should be limited to 20 years from commencement of the Project. The IAC notes the Proponent would have four years (rather than the usual two years) in which to commence the Project which, in its view, allows sufficient time for the range of individual statutory approvals to be obtained.

Further, the IAC accepts MFG's submission that if the Project is in care and maintenance for a period of two or more years (rather than the Proponent's suggested four or more years), the responsible authority should be required to (rather than the Proponent's suggested "may") serve on the Proponent a notice requiring it to demonstrate to the satisfaction of the responsible authority the Project is likely to exit care and maintenance in the next 12 months. This is because the IAC has considerable concern about the high level of care that would be required to effectively manage the Project, particularly dust, which has been expressed throughout this report. The IAC has also expressed concern about the Proponent's proposals 'scale back' or suspend the Project (for example because sufficient water is not available, or mitigation measures cannot be effectively achieved) because such an approach could lead to the Project being extended for a considerable period which may lead to impacts that have not been modelled or assessed in this process. The IAC has also noted that even when in care and maintenance, the Project would need ongoing management to control dust (amongst other things such as dams and so on). It is preferable, in the IAC's view, to therefore ensure the Project does not remain in 'care and maintenance' for any longer than necessary and the IAC considers that a timely and mandatory notice process would assist.

In Chapter 2, the IAC expressed its concern about the number and extent of changes to the Project since the EES was exhibited. Although the Proponent has stated the increase in the mining licence area does not impact on the Project Area or the area to be mined, the IAC notes that it is important that all decision makers are clear that this EES process has not considered the impacts on the extended area (stated at some 468 hectares) or the area of any changed bore field and as a result, the IAC considers the SCO should only apply to the area as exhibited.

The IAC's recommended drafting of the Incorporated Document is set out in Appendix E of Volume 2, with track changes as against the Proponent's proposed final version in Document 779.

20.2.3 Findings

The IAC finds:

- The planning controls in the draft Amendment constitutes an appropriate mechanism to facilitate the Project in areas outside the mining licence area.
- The Incorporated Document should include the requirement to prepare a Master Plan for the Infrastructure Area as a first step.
- The Incorporated Document should be limited to 20 years.
- If the Project is in care and maintenance for a period of two or more years, the responsible authority should be required to serve on the Proponent a notice requiring it to demonstrate to the satisfaction of the responsible authority the Project is likely to exit care and maintenance in the next 12 months.
- The area to which the SCO applies should be as exhibited.

20.3 Overall conclusions on the planning scheme amendment

The IAC concludes:

- Draft Planning Scheme Amendment C156egip is generally appropriate in terms of its use of the Specific Controls Overlay and associated Incorporated Document.
- The IAC's recommended drafting of the Incorporated Document is set out in Appendix E to Volume 2, with track changes as against the Proponent's proposed final version in Document 779.

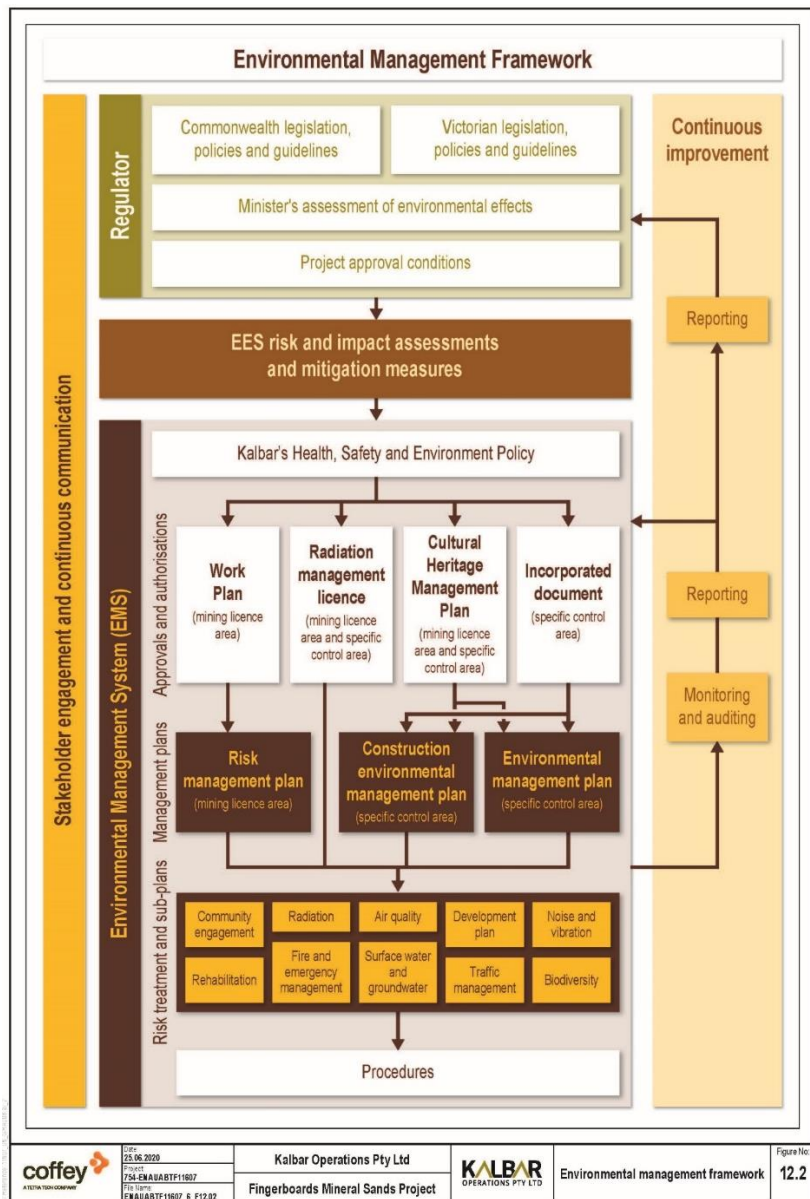
21 The Environmental Management Framework

21.1 Introduction

The EMF sets out the high level governance for managing environmental impacts through Project development, operation and post closure decommissioning.

The EMF is included in Chapter 12 of the EES. It is shown graphically below in Figure 32.

Figure 32 Environmental management framework¹¹⁸⁵



The EMF is referenced in the Scoping Requirements as follows:¹¹⁸⁶

¹¹⁸⁵ EES Chapter 12, page 11.
¹¹⁸⁶ Quoted from Chapter 12, EES.

The proponent needs to provide a transparent environmental management framework (EMF) for the project in the EES with clear accountabilities for managing and monitoring environmental effects and hazards associated with construction, operation, decommissioning, rehabilitation and post-closure phases of the project in order to achieve acceptable environmental outcomes.

The 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. The framework should include:.....

The EMF is the framework that links the Proponent’s legislative responsibilities through detailed environmental management down to onsite operational procedures. Key elements of the EMF include:

- Mitigation measures (contained in the EES and revised through the IAC process)
- Identification of the key approvals that will regulate the Project if approved (discussed in Chapter 3 of this report)
- Management plans and sub-plans to provide the detailed guidance of how risks will be managed to prevent or minimise environment effects.

21.2 The EMF

The EMF itself was not strongly contested, at least in principle, at the Hearing and appears to have become a standard approach to Project governance. As outlined in detail elsewhere in this report, the IAC has concerns about the Project itself, and some of these concerns are central to the effective development and implementation of the EMF (for example, baseline condition assessments).

As part of the ‘on the papers’ without prejudice review of Project documentation, a number of parties, particularly EPA, MFG and Council, provided detailed comments on the EMF and these are collated in Document 774.¹¹⁸⁷

Many of the suggested changes are minor in nature and the Proponent has accepted them or made modifications to the EMF to account for the comments and concerns. Higher order outstanding items relate to the Project approach as a whole, including Council concerns about the accurate representation of the Project Area/Infrastructure Area due to significant Project changes.¹¹⁸⁸ The EPA also has ongoing concerns about the treatment of the new environment protection regime and the GED¹¹⁸⁹ in the EMF.

Other disagreements remain about changes between the Proponent and parties. Given its position in chief on the Project, and the relatively minor impact of these changes in the Project context, the IAC has not undertaken a line-by-line review of the suggested changes. If the Project were to proceed, significant and substantial further baseline investigative and analysis work is required which would, in the IAC’s view, likely result in significant further revision of the EMF.

During the Hearing the Proponent committed to introducing an Independent Technical Reviewer (ITR) in the governance framework. The role of the ITR was described as:¹¹⁹⁰

- a. The first is to review detailed design documents relating to dams and other water management infrastructure and to review and comment on material (including subplans and

¹¹⁸⁷ The IAC has not included the document in this report.

¹¹⁸⁸ Document 774, page 12-1.

¹¹⁸⁹ Section 25 of the EP Act.

¹¹⁹⁰ Document 542.

modelling) to be provided to statutory authorities for approval prior to submission, consistent with the role of the ITR Panel in the Stockman Base Metals Project; and

b. The second is to monitor and audit compliance with statutory approvals once granted and to provide reports to statutory authorities, the Environmental Review Committee (ERC), and the Community Reference Group. This is similar to the role of the Independent Reviewer and Environmental Authority (IREA) found on many State government projects.

The model has been used in many projects and if the Project proceeds the IAC supports the appointment of an ITR.

21.3 The Incorporated Document

This applies to the Infrastructure Area which is the area covering infrastructure such as roads, water supply and electricity supply outside the mining licence area, and thus not covered by the MRSD Act.¹¹⁹¹

The Incorporated Document would be implemented through the planning scheme amendment, and these are both discussed in Chapter 20 above.

21.4 Mitigation measures

The second major element of the EMF is the extensive Mitigation Measures proposed in the EES at Attachment H. The relevant exhibited Mitigation Measures are summarised at the top of each issue chapter in this report.

The Mitigation Measures are Appendix B to the Risk Management Plan¹¹⁹², itself Appendix B to the Work Plan¹¹⁹³ that would need to be approved under the MRSD Act if the Project were to proceed.

Through the course of the IAC Hearings a number of changes were suggested to the Mitigation Measures by:

- the Proponent
- the Proponent's experts¹¹⁹⁴
- EPA
- Council
- MFG
- Other submitters.

As for the EMF and Incorporated Document, the IAC undertook an 'on the papers' review of the Mitigation Measures in the last few weeks of Hearing, allowing the Proponent to circulate a preferred version which was then commented on by other parties on a 'without prejudice' basis.¹¹⁹⁵

As for the EMF, given the IAC's clear position in chief on the Project, it has not undertaken a line-by-line reconciliation of the suggested changes to the Mitigation Measures. Even if a Project

¹¹⁹¹ As discussed elsewhere in this report both the Infrastructure Area and Project Area are in a state of flux due to significant proposed changes to the Mining Licence area and the area where the Specific Controls Overlay would be applied.

¹¹⁹² A revised version was tabled as Document 198a.

¹¹⁹³ A revised version was tabled as Document 197a.

¹¹⁹⁴ Notably Mr Delaire, many of the Proponent's experts did not appear to have viewed or reviewed the Mitigation Measures.

¹¹⁹⁵ The final version circulated including all comments is Document 777 which runs to some 83 pages.

approval is to be considered, the IAC is of the view there will need to be significant and substantial further work undertaken prior to any approval to address uncertainties and ensure management measures are viable and likely to be effective. This in turn, in the IAC's view, will require a further rewrite of the Mitigation Measures.

21.5 Discussion and conclusions on the EMF

The IAC considers the approach in principle to the EMF is appropriate and reasonable for the Project. However, as discussed in this chapter and elsewhere in the report, there is considerable uncertainty about many Project elements and a high degree of risk to the local environment and regionally significant existing industries.

In this context, and because the EMF is founded partly on the principle of adaptive management as discussed in Chapter 2, there is a strong sense in the EMF of dealing with what arises, as it arises, rather than providing a thorough, detailed, evidence-based assessment of the current environment and what might be expected during mining, based on a highly developed and resolved mining approach.

The IAC does not accept that leaving this level of consideration to later is accepted practice, and in its view, is certainly not best practice.

The IAC concludes:

- The EMF will need to be revised to include and respond to the significant and substantial additional work required to reduce risk to the local and regional environment to an acceptable level.

22 Integrated assessment

This chapter provides a response to the assessment of the Project against the EES evaluation objectives and a response to the IAC's Terms of Reference.

22.1 EES evaluation objectives

The following table provides an overall assessment of the Project against the evaluation objectives.

Table 24 Response to evaluation objectives

Evaluation objective	Assessment	Chapter(s)
<p>Resource development - To achieve the best use of available mineral sands resources, in an economic and environmentally sustainable way, including while maintaining viability of other local industries.</p>	<p>The Fingerboards resource is in a relatively densely settled, high value production (horticulture and agriculture) area on the edge of a heritage listed river leading downstream to a Ramsar wetland. Whilst the economic case for the Project may be persuasive in isolation (and economic evidence was not called on this) when assessed on a holistic basis and in the context of significant risks to the environment and existing, well established and growing rural industries, the IAC considers the evaluation objective can not be achieved and Project approvals should not be granted.</p>	All issue chapters to some extent
<p>Biodiversity - To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory 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.</p>	<p>Native vegetation removal for the Project is very significant and, if it proceeds, would be one of the larger native vegetation removal projects in recent years. Removal includes over 700 large old trees which will have a very significant adverse impact on both habitat and landscape values.</p> <p>The IAC is not satisfied at this time the required 'avoid' and 'minimise' steps for native vegetation removal have been adequately addressed.</p> <p>Whilst it was put to the IAC that suitable offsets are likely to be available, this was not proven in evidence and the offsets will not replace the total habitat loss from the Project, leading to a significant local and sub/regional net loss in habitat.</p> <p>The innovative 200 hectare revegetation area proposed as part of the Project is supported, but the timeframes for habitat development of mature overstorey is likely to be many generations.</p>	4
<p>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 Gippsland Lakes</p>	<p>The Project has water needs in the vicinity of 3 gigalitres per year. The right to this water has not been obtained but is proposed to be obtained from winterfill allocations in the Mitchell River, and if necessary, from existing groundwater allocations. If the right to this water is acquired (through allocation auction or on-market purchase) it will have a</p>	5, 6, 7

Evaluation objective	Assessment	Chapter(s)
Ramsar site) over the short and long-term.	<p>significant impact on availability of water resources for other uses such as agriculture and horticulture.</p> <p>Provided the allocation is managed within the broader water system it should not have a significant adverse impact on other beneficial uses, such as recreation and environmental flows.</p> <p>There are a number of uncertainties in surface and groundwater management which are yet to be resolved with any certainty, including the quality and quantity of tailings seepage, the impact of surface water flows (quality and quantity) into surrounding waterways in times of east coast lows and other extreme events. These uncertainties include potential impacts on the Gippsland Lakes Ramsar site.</p>	
<p>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.</p>	<p>The Project will have, and is already having, significant adverse wellbeing impacts on the local community, exacerbated by the seven-year lead time to get to this point. There is already anecdotal evidence of harm to community wellbeing as demonstrated through many written and verbal submissions to the IAC.</p> <p>The change in the noise environment from a quiet rural environment to a 24/7 mining operation will have a significant adverse impact; however, the IAC is satisfied the Project should be able to be operated within regulatory criteria, subject to further consideration of the new general environmental duty.</p> <p>With proposed mitigation measures in place, the Project's effects on air quality (from dust) will be just under regulatory limits according to the EES, but the IAC is not satisfied these standards can be consistently achieved in practice given the scale of operations, climate in the area, soil types and close proximity of sensitive receptors and horticultural areas. Again, there would need to be further consideration of the new general environmental duty.</p> <p>The impacts of radiation should be able to be managed to acceptable levels but the IAC can not conclude at this time the evaluation objective has been met and significant uncertainties remain which require further baseline investigation work. Again, there would need to be further consideration of the new General Environmental Duty.</p>	8, 9, 10, 11, 14, 16, 17, 18
<p>Social, land use and infrastructure - To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and</p>	<p>There will be significant unavoidable adverse impacts on the existing agricultural and horticultural industry in the Project Area and surrounding areas including the state significant Lindenow Valley horticultural area.</p>	8, 10, 11, 12, 14, 16, 17

Evaluation objective	Assessment	Chapter(s)
grazing), forestry, tourism industries and transport infrastructure.	<p>The social environment of the Project area has already undergone significant adverse impacts and the IAC does not understand why there has not been a more rigorous, comprehensive and transparent community engagement process.</p> <p>The IAC considers that while there will be adverse impacts from traffic and transport, these should be able to be managed acceptably, with the rail option from a new siding at Fernbank East being a superior option to others considered.</p> <p>There has been no impact assessment of some Project transport elements such as bulk shipments of HMC to the Port of Geelong.</p>	
Landscape and visual - To avoid adverse effects on the landscape and recreational values of the Mitchell River National Park and minimise visual effects on the open space areas.	The Project will make significant and near permanent adverse changes to the landscape of the mining area itself, with recovery to a similar landscape to today likely to take many generations. However, whilst there will be adverse impacts on the visitor experience on the journey to the Mitchell River National Park, there should be little discernible impact on views from the National Park.	13
Cultural heritage - To avoid or minimise adverse effects on Aboriginal and non-Aboriginal cultural heritage.	<p>Given the scale of landscape change that is a necessary outcome of open-pit mining, there will be unavoidable impacts on Aboriginal cultural heritage and the loss of tangible and intangible heritage. The extent of this loss is not clear at this time and the IAC is not satisfied the Proponent has undertaken all steps possible to minimise adverse effects.</p> <p>There should be no impacts on local or state listed non-Aboriginal heritage.</p>	15
Rehabilitation - To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.	<p>The development of a program to successfully stabilise and rehabilitate the Project Area landform is in its very early stages and significant additional trial and investigation work is required before any Project approvals should be considered.</p> <p>At this point in time, it has not been established the stable landforms capable of supporting native ecosystems or productive agriculture can be established given the particular landforms, soil types and climatic conditions that exist.</p>	14, 19

22.2 Response to Terms of Reference

Clause 34 of the Terms of Reference requires the IAC to produce a written report for the Minister for Planning. The Primary clauses are:

- Conclusions with respect to the environmental effects of the project and their significance and acceptability.

- Findings as whether acceptable environmental outcomes can be achieved, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development

The IAC concludes the environment effects of the Project are significant to the point where they are unacceptable, and the Project should not proceed. The detail of these conclusions is discussed in the various issues chapters of this report and some of them are drawn out in the response to evaluation objectives above but include:

- The extremely high risk to the State strategic horticultural area of the Lindenow Valley (particularly from air quality) and the lack of confidence the impacts could be reduced to a level to protect that industry.
- The uncertainty around water availability and allocation and the introduction of a high water demand use into an area of constrained resource in a drying climate.
- Very significant native vegetation removal including over 700 large old trees including uncertainty as to whether vegetation removal has been avoided or minimised and whether offsets can be provided.
- A significant social impact in what is a quite settled area with a mix of farms, and rural residential uses, including high numbers of farm workers in the environment.

As discussed in Chapter 2, there has been considerable difficulty during the assessment relating to Project changes and the introduction of further information. While the bringing forward of the Project for assessment has been challenging, the IAC's conclusions are not solely founded on these difficulties.

When you look at the Project scale and context and surrounding land use, it is difficult to see a mining Project being developed on this site with acceptable environmental impact.

The specific response for environmental outcomes are provided in the individual issue chapters. Acceptable environmental outcomes are likely to be able to be achieved in some areas, for example traffic and transport (subject to further evaluation of new elements) but in many the IAC finds that acceptable environmental outcomes cannot be achieved or significant further investigation is required to make such a judgement.

(i) Other subclauses in clause 34

In clause 34 of the Terms of Reference, the IAC is asked to respond to the following, in summary:

- Recommendations and/or specific measures that it considers necessary and appropriate to prevent, mitigate or offset adverse environmental effects to acceptable environmental outcomes, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development.
- Recommendations as to any feasible modifications to the project (e.g. extent, design, alternative configurations, or environmental management) that would enable more appropriate environmental outcomes.
- Recommendations for any appropriate conditions that may be lawfully imposed on any approval for the project, including with respect to the content of the draft work plan or conditions that might appropriately be attached to approval of a work plan if issued under the MRSD Act.
- Recommendation on changes, including to the structure and content, that should be made to the Amendment in order to ensure the environmental effects of the project are

acceptable having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development.

- 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.
- Recommendations with respect to the WAA (Development Licence), including recommendations about conditions that might appropriately be attached to a works approval if issued.
- Specific findings and recommendations about the predicted impacts and residual risks for matters of national environmental significance and their acceptability, including appropriate controls and environmental management.

The IAC makes a number of recommendations in the executive summary and recommendations for specific actions in the event the Project is granted approvals.

The IAC has not made specific recommendations for changes to the Project itself. The issues the IAC has identified leading to its recommendation in chief is the location is unsuitable for a major mining project given its proximity to a large-scale high value horticultural area with no effective buffer zone, and which has a significant number of households living nearby.

Given the recommendation in chief, the IAC has not turned its mind in detail to a revised draft work plan. If the Project were to be taken forward for approval then there is significant and substantial additional base line work and investigation and development and management action validation in this environment that would be required prior to the approval of a Work Plan.

The IAC considers the Amendment is an appropriate mechanism to control use and development in the Infrastructure Area if the Project were to proceed. There are many outstanding issues including the changing area of the Mining Licence and SCO area which would need to be resolved prior to the Amendment being approved. The IAC has made some recommendations for changes and additions to the Amendment and Incorporated Document in Chapter 20.

The IAC has not made specific recommendations on the structure and content of the EMF given its recommendation in chief and the uncertainty underlying many of the proposed management measures and their lack of validation in this site context. The marked-up version of Project documentation at the close of Hearing are referenced in Chapter 21, and if Project approvals are to be considered these would be an important input. That being said the IAC consider the structure of the EMF in principle is acceptable.

The Development Licence for the DAF Plant will need to be considered by the EPA in future as part of Project approvals if the Project proceeds. The EPA was active in the Hearing and provided considerable assistance to the IAC in understanding the new environment regime in Victoria under the EP Act.

The IAC is aware there is still a significant outstanding information request with the Proponent around the DLA. The IAC has not made any specific recommendations in relation to the DLA.

Conclusions around MNES are provided in Chapter 23. Given the uncertainty in a number of areas the IAC is unable to conclude at this point the residual risks to MNES can be managed to an acceptable level.

23 Matters of National Environmental Significance

23.1 Introduction

The Project was referred to the Commonwealth Department of Environment and Energy (now the Department of Agriculture, Water and Environment (DAWE)) under the EPBC Act in April 2017 (Referral 2017/7919).¹¹⁹⁶

On 6 July 2017, the delegate for the Minister for the Environment and Energy determined¹¹⁹⁷ the Project is a ‘controlled action’ as it is likely to have a *significant impact* on:

- Ramsar wetlands (specifically the Gippsland Lakes Ramsar site) (sections 16 and 17B)
- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A)
- nuclear actions (section 21 and 22A).

The Commonwealth’s Significant Impact Guidelines state:

A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.¹¹⁹⁸

The Proponent made two variation requests to the Department for changes to the Project, both of which were accepted by the Department on 14 June 2019,¹¹⁹⁹ and later changed the proponent of the Project from Kalbar Ltd to Kalbar Operations Pty Ltd, which was accepted by the Department on 7 April 2020.¹²⁰⁰ A further variation request for changes to the Project for the introduction of centrifuges was made on 24 March, which was accepted on 21 April 2021.¹²⁰¹

The EES for the Project was undertaken in accordance with the Bilateral Agreement¹²⁰² and there is no separate assessment by the Commonwealth. The EES process is accredited to assess impacts¹²⁰³ on MNES under the EPBC Act through the Bilateral (Assessment) Agreement between the Commonwealth and the State of Victoria (Schedule 1 (part 5) of the Bilateral Agreement).

The Commonwealth Environment Minister (or delegate) will receive the Minister for Planning’s Assessment under the EE Act at the conclusion of the EES process and use it to inform the

¹¹⁹⁶ <http://epbcnotices.environment.gov.au/referralslist/>

¹¹⁹⁷ <http://epbcnotices.environment.gov.au/entity/annotation/b43b80c4-de62-e711-8780-005056ba00a8/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1620974768107>

¹¹⁹⁸ Commonwealth Significant Impact Guidelines 1.1: https://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/neg-guidelines_1.pdf.

¹¹⁹⁹ <http://epbcnotices.environment.gov.au/entity/annotation/77fd5425-c590-e911-8f1d-00505684324c/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1623209111957>

¹²⁰⁰ <http://epbcnotices.environment.gov.au/entity/annotation/7b5f8bcf-6580-ea11-a236-005056842ad1/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1623209266360>

¹²⁰¹ <http://epbcnotices.environment.gov.au/entity/annotation/872d674f-fba2-eb11-80c6-00505684c563/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1623209463664>

¹²⁰² Bilateral Agreement made under section 45 of the *Environment Protection and Biodiversity Act 1999* (Cth) relating to environmental assessment, Commonwealth of Australia and the State of Victoria, 27 October 2014.

¹²⁰³ What are generally termed ‘effects’ in the EES process correspond to ‘impacts’ under the EPBC Act.

approvals decision under the EPBC Act, including any conditions the Commonwealth Minister may deem appropriate.

The IAC's Terms of Reference require the IAC to “*specifically identify its advice relevant to matters of national environmental significance that may be affected*” by the Project.¹²⁰⁴

MNES are discussed in EES Chapter 10 and Technical Reports included in Appendix A005, A006 and A011.

The approach of EES to assessing the potential impacts of the Project on MNES, was:

- Desktop assessments and field surveys to identify existing biodiversity values, including MNES, in and around the Project and Infrastructure Areas.
- A likelihood of occurrence assessment to determine the potential for MNES to occur.
- The outcomes of this assessment then informed the impact assessment for MNES with biodiversity values, namely listed threatened species and communities, listed migratory species, and Ramsar wetlands (the Gippsland Lakes).¹²⁰⁵

Relevant databases, online-resources and literature were used to identify the likelihood of MNES presence within the Project and Infrastructure Areas and surrounds.

Field assessments and targeted surveys were undertaken as described in Chapter 4. The assessment of potential impacts on nationally significant biodiversity values was undertaken consistent with the framework set out in EES Chapter 7: Impact assessment framework.

23.2 Key issues

The issues are:

- impacts on the Gippsland Lakes Ramsar site
- impacts on listed threatened species and communities
- impacts on listed migratory species
- impacts of stockpiling and storage of HMC
- the level of uncertainty as to impacts on MNES.

23.3 Impacts on the Gippsland Lakes Ramsar site

23.3.1 Background

The Gippsland Lakes are located approximately 25 kilometres southeast of the Project Area. If the Bairnsdale rail option is used, the Gippsland Lakes would be located within 5 kilometres of the Project.¹²⁰⁶

The Gippsland Lakes wetland covers an area of about 60,000 ha and encompasses 13 waterbodies including Sale Common, Lake Reeve, Lake Wellington, Lake Victoria, Lake King, Lake Bunga, Lake Tyers and Macleod Morass. The lakes are predominantly estuarine environments separated from the sea by a sand dune barrier system and receive freshwater inflow from seven major river systems including the Mitchell River (which runs about 350 m northeast of the Project Area at its closest point) and the Perry River (approximately 2 kilometres southwest of the Project Area at its closest point). The Gippsland Lakes system also provides important habitat for other MNES

¹²⁰⁴ IAC Terms of Reference, item 14.

¹²⁰⁵ EES Chapter 10, section 10.5.

¹²⁰⁶ Document 70, page 10.

including waterbirds, migratory shorebirds, fish and threatened species such as the nationally vulnerable growling grass frog.¹²⁰⁷

The Gippsland Lakes system was listed in 1982 as a wetland of international importance under the Ramsar Convention having been identified as meeting six of the nine Ramsar site criteria.¹²⁰⁸ It is therefore a MNES under the EPBC Act.

The EES assessed the potential impacts of Project activities to the Gippsland Lakes Ramsar site by assessing the impacts to upstream surface water bodies (the Mitchell and Perry rivers) and to the local groundwater system.¹²⁰⁹

The key issues and potential impacts identified included:

- altered groundwater levels and quality
- altered surface water flows and quality in the Mitchell and Perry Rivers.

The EES concluded that any altered groundwater and surface water quantity and quality from the Project were not expected to have a measurable impact on the critical components, processes, or services and benefits of the ecological character of the Gippsland Lakes Ramsar site. Therefore, overall, the Project would not lead to a significant impact on the Gippsland Lakes Ramsar site:¹²¹⁰

The project will not result in direct or indirect impacts to the critical components, processes or services/benefits that make up the ecological character of the Gippsland Lakes Ramsar site, or any other Ramsar site. The project is not expected to have impacts on marine sub-tidal aquatic beds, coastal brackish or saline lagoons, fringing wetlands, threatened fauna species (such as Australian grayling), threatened wetland flora, waterbird breeding and fisheries resource values.¹²¹¹

23.3.2 Evidence and submissions

Evidence and submissions relating to the impacts of the Project on groundwater and surface water are discussed in Chapters 6 and 7, respectively.

In summary, the key issues for submitters were:

- adverse effects on nearby and downstream water environments of the Mitchell and Perry Rivers which flow into the Gippsland Lakes, due to changes to water quality for example from the DAF outputs, chemical spills, dust (which could include radioactive material) and groundwater quality impacts, flow regimes and general waterway conditions
- impact on the Gippsland Lakes (and its silt jetties) of a catastrophic dam failure, particularly given the impact of a catastrophic dam failure was not modelled in the EES and therefore the impact on the Gippsland Lakes cannot be properly understood
- that any impact from the Project would further stress the Gippsland Lakes which are already experiencing degradation in water quality.

The Proponent submitted:

No plausible mechanism has been identified by which the Project would materially impact on the Gippsland Lakes. Again, any contribution made by the Project to water flows in the Mitchell River is very small in the context of the broader catchment. However, it is

¹²⁰⁷ EES Chapter 10, page 10-48.

¹²⁰⁸ EES Chapter 10, page 10-51.

¹²⁰⁹ EES Chapter 10.

¹²¹⁰ EES Chapter 10, section 10.7.3.

¹²¹¹ EES Chapter 10, page 10-137.

appropriate for the flows from the Project Area to the River to be monitored and managed. This will assist in protecting the Lakes downstream.¹²¹²

In response to submitter concerns regarding the loss of aquatic habitat through loss of containment (including flocculant and other chemicals toxic to aquatic environments), Mr Lane gave evidence for the Council that while the EES discussed mitigation measures for reducing the risk of a fuel spill, risks relating to other chemical spills and waste had not been addressed. His evidence was that more detail would be required to inform a decision around the risk of adverse effects on water quality from the Project.¹²¹³

In its closing submissions, EPA submitted (emphasis added):

The EPA as the regulator of the proposed discharge is still unclear as to the operational arrangement and circumstances for the active management of Water Management Dams and the Freshwater Dam, it requires explanation for changes in the water balance, needs further details as to where, how and when discharges will occur and the quality and quantity of such discharges. Accordingly the EPA is currently unable to determine the potential effects the proposed surface water discharges to the Mitchell River may have and its consequential impact upon the specific environmental values of the ERS [Environmental Reference Standard]. Further detailed information has been requested and will be required before the development licence can be determined.¹²¹⁴

Along similar lines, MFG submitted in closing there is remaining uncertainty about:

- nutrient and metal contaminant discharges into the Mitchell River
- impacts of catastrophic dam failure because no modelling has been provided by the Proponent, including for the Perry Gully which is to be backfilled with caked tailings prior to placement of cake in the mining void
- impact on groundwater quality because the quantity of flocculant had not been determined.¹²¹⁵

23.3.3 Discussion

Chapters 6 and 7 provide further discussion of the issues relating to groundwater and surface water impacts. Chapter 19 provides a discussion around dam stability.

The IAC's findings on these issues relevant to potential impacts on the Gippsland Lakes are:

- **Groundwater**
 - Further assessment and understanding of the groundwater site specific conditions is required to predict potential impacts from the Project.
 - The impact of seepage quality and quantity to groundwater is uncertain and dependant on full scale trials of the centrifugation process to confirm flocculant quantities, seepage and recovery rates.
 - There is no basis for concluding that groundwater mounding would have unacceptable impacts on water quality in the Mitchell and Perry Rivers.
- **Surface water**

¹²¹² Document 698, page 41.

¹²¹³ Document 189, page 3

¹²¹⁴ Document 743, page 2.

¹²¹⁵ Document 749, pages 4-5. The Proponent advised that preliminary 2-D modelling was undertaken for the water storage dam as part of an analysis of the consequences of the failure of the Tailings Storage Facility (TSF), but that modelling of other water dams across the site has otherwise not been undertaken. Moreover, "dam break analysis has not been undertaken for the catchment storage dams": TN31, Document 500, page 3.

- Further work is required to model the performance of the DAF plant using site-based rainfall data and to model flooding using data collected during an east coast low.
- There is an unacceptable risk of untreated mine contact water entering natural watercourses when the DAF plant is offline.
- Management measures are required to manage water quality prior to discharge into the Mitchell River in times of low river flow or drought.
- Surface water take and use limits managed by SRW will restrict water use during periods of low flow to protect the Mitchell River flows.
- **Dam stability**
 - Dams should be able to be constructed and maintained to an appropriate standard to manage the risk of catastrophic failure, including using the ANCOLD guidelines for all dams.

Based on these findings, the IAC considers there is insufficient evidence before it to conclude the Project would not have a significant impact on the Gippsland Lakes because there is insufficient evidence on the groundwater and surface water quality impacts of the Project generally.

In the IAC's view, the key risk for the Gippsland Lakes would be a catastrophic failure of an onsite water management dam which could result in large sediment loads and contaminated water being discharged into the Mitchell or Perry Rivers, and thereby discharging into the Gippsland Lakes. While this would appear to be a low risk because onsite dams would be constructed in accordance with ANCOLD standards, given the location of the Project Area upstream from the Gippsland Lakes via both the Mitchell and Perry Rivers, the potential impact on this Ramsar wetland is high. There is also a risk of untreated mine contact water entering the Mitchell River during high rainfall events when the DAF plant is offline and there is a risk of water management dams overtopping.

The IAC considers the potential water quantity impacts are less of a concern because:

- there is no basis for concluding that groundwater mounding would have unacceptable impacts on water quality in the Mitchell River
- the flows in the Mitchell River will be protected by the winterfill extraction conditions that would be attached to any s51 take and use licence under the Water Act the Proponent obtains
- any use of groundwater by the Project would be obtained by a transfer of an existing groundwater licence.

23.3.4 Findings

The IAC finds:

- There is insufficient certainty regarding the potential impacts of the Project on groundwater and surface water quality and the resulting impacts on the Mitchell and Perry Rivers, and in turn the Gippsland Lakes, to reach a conclusion on the significance of the potential impacts of the Project on the Gippsland Lakes Ramsar site.
- The key risk for the Gippsland Lakes Ramsar site is likely to be from a catastrophic failure of an onsite dam.

23.4 Impacts on listed threatened species and communities and migratory species

23.4.1 Background

The EES (Chapter 10) identified the following listed threatened species and communities and migratory species under the EPBC Act potentially impacted by the Project:

- 14.06 hectares of the nationally significant (EPBC Act-listed) Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland ecological community.
- The potential occurrence of three nationally significant flora species (noting that none were detected during surveys):
 - Swamp Everlasting *Xerochrysum palustre*
 - Dwarf Kerrawang *Commersonia prostrata*
 - Gaping Leek-orchid *Prasophyllum correctum*
- The known occurrence of two nationally significant fauna species:
 - Grey-headed Flying-fox *Pteropus poliocephalus* (recorded during surveys)
 - Australian Grayling *Prototroctes maraena* (recorded during surveys)
- The potential use of the Project Area by four fauna species of national significance:
 - Swift Parrot *Lathamus discolor* (rare visitor)
 - Painted Honeyeater *Grantiella picta* (vagrant visitor)
 - Giant Burrowing Frog *Heleioporus australiacus* (low likelihood)
 - Dwarf Galaxias *Galaxiella pusilla* (low likelihood).

As discussed in Chapter 4, the figures for clearance of native vegetation were updated during the Hearing with the total area of native vegetation proposed to be removed agreed between the experts to be 223.58 hectares comprising:

- 110.47 hectares (49% of the total area to be removed) of Plains Grassy Forest EVC, of which 1.74 hectares is the EPBC Act listed threatened Grassy Woodland and Associated Native Grassland community
- 373 large trees in patches and 461 scattered trees
- 74.88 hectares (33% of the total area to be removed) of Valley Grassy Forest EVC
- Areas of Plains Grassy Woodland, Aquatic Herbland, Plains Grassy Wetland, Box Ironbark Forest and Lowland Forest making up the balance (18%) of the cleared area.¹²¹⁶

The EES's significant impact assessment concluded as follows:

Table 25 EPBC Act significant impact assessments

Critically Endangered and Endangered ecological communities and conservation status	Significant impact?
Grassy Woodland and Associated Native Grassland (Critically Endangered)	Yes, but clearance will be offset ¹²¹⁷
Swift parrot (Critically Endangered)	No ¹²¹⁸

¹²¹⁶ Document 537, page 9

¹²¹⁷ Chapter 10, Table 10.20.

¹²¹⁸ Chapter 10, Table 10.21.

Critically Endangered and Endangered ecological communities and conservation status	Significant impact?
Dwarf kerrawang (Endangered)	Unlikely ¹²¹⁹
Gaping leek-orchid (Endangered)	Unlikely ¹²²⁰
Australian grayling (Vulnerable)	No ¹²²¹
Grey-headed Flying-fox (Vulnerable)	No ¹²²²
Giant burrowing frog (Vulnerable)	No ¹²²³
Swamp everlasting (Vulnerable)	No ¹²²⁴

The EES noted that several EPBC Act-listed migratory species had previously been recorded within a 10-kilometre radius of the Project Area.¹²²⁵ It stated:

Suitable habitat within the project area for EPBC Act migratory is limited to the very small low-lying areas (drainage lines and creeks) that would be inundated periodically, and the primary species that would use these habitats include Latham's Snipe, while the main areas of suitable habitat for migratory species are several kilometres to the south east of the project area (i.e. in intertidal areas along the coast and throughout the Gippsland Lakes Ramsar site) ...¹²²⁶

Only one species of bird recognised under the migratory provisions of the EPBC Act, the Rufous Fantail *Rhipidura rufifrons*, was recorded in the project area during field surveys.

The EES concluded that while migratory bird species may periodically utilise the Project Area and Project locality for foraging purposes, it does not constitute 'important habitat' as defined under relevant policies and standards.¹²²⁷ The Report confirmed that this conclusion applied for migratory species specifically outlined in the EES Scoping Requirements, including Little Tern *Sterna albifrons*, Red-necked Stint *Calidris ruficollis* and Sharp-tailed Sandpiper *Calidris acuminata*. It reached the same conclusion (applying different criteria) for Latham's Snipe commenting:

It is unlikely the project area will support more than 18 individuals at any given time [the relevant criterion] and therefore the project area is not likely to contain an ecological important population of this species as defined under the EPBC Act (DoEE 2017).¹²²⁸

The EES concluded the Project would not have a significant impact on migratory species.¹²²⁹

23.4.2 Evidence and submissions

Evidence and submissions relating to the impacts on biodiversity are discussed in Chapter 4.

¹²¹⁹ Chapter 10, Table 10.21.

¹²²⁰ Chapter 10, Table 10.21.

¹²²¹ Chapter 10, Table 10.22.

¹²²² Chapter 10, Table 10.22.

¹²²³ Chapter 10, Table 10.22.

¹²²⁴ Chapter 10, Table 10.22.

¹²²⁵ Detailed Ecological Investigation Report by Ecology & Heritage Partners (EHP Report) Appendix A005, page 75. The study notes: "An additional 18 EPBC Act-listed migratory and/or marine species have been recorded within 10 kilometres of the project area, with an additional two species not recorded from the project area although are predicted as having potential to occur (i.e. under the PMST)".

¹²²⁶ Appendix A005, page 75.

¹²²⁷ Appendix A005, pages 75-76.

¹²²⁸ Appendix A005, page 76.

¹²²⁹ EES Chapter 10, page 10-16.

In summary, the key issues of concern as they relate to EPBC Act-listed threatened species and communities were:

- the extent of vegetation loss including the removal of 1.74 ha of the nationally significant Grassy Woodland and Associated Native Grassland ecological community, given its critically endangered status, its decline (now less than five per cent of its original extent remains with most known remnants being small and comprising isolated fragments surrounded by a mostly cleared, agricultural landscape) and that it faces continued threatening processes, making what is left even more valuable
- the nationally threatened species that may be found in or near the Gippsland Red Gum Grassy Woodland ecological community (i.e. Regent Honeyeater, Spot-tailed Quoll and Southern-brown Bandicoot)
- the loss of a predicted 373 large trees in patches and 461 scattered trees, with an estimated 110 large trees to be impacted across the 2705 Dargo-Bairnsdale Road site which had not yet been surveyed, in particular the loss of hollows¹²³⁰
- the adequacy of the mitigation measures proposed for the loss of hollow-bearing trees, in particular the effectiveness of nesting boxes
- the assessment of the Swift Parrot critical habitat in the Project Area by the Proponent's ecologists
- whether the Giant Burrowing Frog is present within the Project Area and potential impacts
- the fact the property at 2705 Bairnsdale-Dargo Road, Glenaladale has not been surveyed
- the adequacy and availability of the offsets proposed by the Proponent, including whether it was acceptable for offsets to be staged.

Mr Kern gave evidence for MFG that, overall, *“the proposed clearing is too high of an impact in a region already significantly cleared and degraded”* and as a result, the loss of critically endangered vegetation classes would be significant.¹²³¹ Mr Gibson-Roy for the Proponent acknowledged during the Hearing the Project would remove 12 per cent of the Gippsland Red Gum Grassy Woodland left.¹²³²

23.4.3 Discussion

In Chapter 4, the IAC found that, generally, the Project has not taken sufficient measures to avoid and minimise ecological impacts and removal of native vegetation. It also expressed concern about the number of hollow-bearing trees that would be lost, given their ecological importance and if nest boxes are not effectively managed their success as mitigation may be limited. Further, given the length of time it would take to replace hollow-bearing trees, their loss cannot be mitigated by revegetation in the medium to long term as tree hollows take decades to form.

The IAC found that due to the significant amount of native vegetation proposed to be removed within the Project Area, native terrestrial fauna species which utilise the vegetation as habitat are likely to be impacted by removal and there are several nationally significant species known to occur or have the potential to occur within the Project Area.

On specific issues, the IAC found:

¹²³⁰ Document 299, page 14.

¹²³¹ Document 92, page 5.

¹²³² Day 3, 5 May 2021.

- there is no evidence to suggest the Swift Parrot is present in the Project Area or will be impacted by the Project
- because there was no independently corroborated evidence before the IAC the Giant Burrowing Frog is present in the Project Area despite submissions that independent surveys had found the Giant Burrowing Frog in the Project Area, a management plan for the Giant Burrowing Frog should be implemented in the event the species is found within the Project or Infrastructure Areas.

In relation to offsets, the IAC found the Proponent's Offset Strategy has demonstrated to an acceptable level the offsets that would be required for the Project are capable of being provided and that a staged approach to securing offsets over the life of the Project does not present a risk to securing offsets prior to clearing.

Further, the property at 2705 Bairnsdale - Dargo Road, Glenaladale and the mining licence extension area would need to be surveyed before any clearance takes place. The IAC notes the ecological experts for Council and MFG both considered the surveying of these properties for additional listed species should be undertaken before any decision is made on the Project.¹²³³

23.4.4 Findings

The IAC finds:

- The property at 2705 Bairnsdale - Dargo Road, Glenaladale and the mining licence extension area must be surveyed and final figures of vegetation loss updated before any decision is made under the EPBC Act to ensure the Commonwealth Minister has accurate information before him or her.
- On current projections, the Project would remove at least 1.74 hectares of the critically endangered, EPBC Act-listed Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland ecological community, but this impact is able to be offset in accordance with relevant requirements.
- The impacts, if any, on other EPBC Act-listed species and communities and migratory would be acceptable.

23.5 Impacts of stockpiling and storage of HMC

23.5.1 Background

Nuclear actions require approval under the EPBC Act if they will have, or are likely to have, significant impact on the environment. The EES states:

The basis for the classification of the project as a nuclear action was that it involves stockpiling and storage of naturally-occurring radioactive materials within the produced HMC in exceedance of the levels set out in the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations).¹²³⁴

Radiation impacts are discussed in Chapter 10 of this report.

The EES explains:

'A loading facility will be constructed adjacent to the WCP [wet concentrator plant] to stockpile the concentrates awaiting transport to a port via road and rail. The volume of concentrate stockpiles will vary from 5,000 to 50,000 t and will be continuously depleted and

¹²³³ Expert Meeting Statement, Document 238, page 2.

¹²³⁴ EES Chapter 10, page 10-141.

replenished as concentrate is removed for transport and new material is added from the WCP. The stockpiled concentrates are dewatered to less than 5% moisture to allow for safe and effective management and handling during transportation and shipping.¹²³⁵

The EES concluded that with standard mitigation measures implemented, the Project would not lead to any radiation impacts to environmental, social or cultural values.¹²³⁶ In particular, mine personnel and members of the public would not experience adverse health impacts and:

Elevated levels of radionuclides in groundwater or surface water from transport in surface water runoff of stockpiled HMC or overburden will not impact these water resource values. No aquatic (freshwater and marine) or terrestrial ecosystems will be impacted from radionuclides as a result of project operations.¹²³⁷

23.5.2 Evidence and submissions

Evidence and submissions relating to potential radiation impacts are discussed Chapter 10 of this report.

In summary:

- All experts agreed the highest radiation risk of the Project was the storage and handling of HMC and that every effort should be made to minimise:
 - handling of the HMC and activities that would generate dust from the HMC (for example, loading HMC onto and off trucks, and onto ships from wharves)
 - open storage of HMC (whether that be at the mine, on wharves or anywhere else).¹²³⁸
- The Proponent advised that although the EES had indicated that HMC would be stockpiled, HMC is now intended to be captured directly in sealed silos and loaded from the silos into containers on the back of the B-doubles ready for transport off site.¹²³⁹
- HMC would be kept damp to control dust.
- Submitters expressed concerns about:
 - how the HMC stockpiles would be managed to control dust, erosion from wind and rain, and how big they would be
 - potential impacts of radioactive dust on human health and the environment, including the Lindenow Valley horticultural area, the Gippsland Lakes and grazing animals on nearby farms.

23.5.3 Discussion

As discussed in Chapter 10, the IAC notes the following:

- The material before the IAC does not confirm the scale of the HMC storage silos, the volume of material to be stored or their management and in some documentation use of stockpiles is still referred to leading to uncertainty about the Proponent's proposal.
- The IAC considers that all stages of the HMC processing, storage, loading for freight and transport to ship should be via a closed system to control dust and leachate.
- Most of the detail around the management of HMC has been left until a later date and no draft radiation management plans or associated emergency management plans have been provided as part of this EES process.

¹²³⁵ EES Chapter 3, page 3-21.

¹²³⁶ EES Chapter 10, page 10-155.

¹²³⁷ EES Chapter 10, page 10-155.

¹²³⁸ Document 234 Radiation and Human Health Expert Meeting Statement.

¹²³⁹ Document 243, para 41.

- Subject to the adoption of best practice and use of a sealed system approach throughout the HMC process and export, radiation risks to the environment and the public associated with the movement of HMC should be able to be managed effectively.
- Potential radioactive contamination more broadly via movement of dust represents an unresolved risk to people and the environment.

23.5.4 Findings

The IAC finds:

- Further clarity around the size, location and management of HMC stockpiles, including the use of silos, is required before an assessment of their impacts on the environment can be made.
- Subject to the adoption of best practice and use of a sealed system approach throughout the HMC process and export, radiation risks to the environment and the public associated with the movement of HMC should be able to be managed effectively.
- Potential radioactive contamination more broadly via movement of dust represents an unresolved risk to people and the environment.

23.6 Overall conclusions on MNES

The IAC concludes:

- There is insufficient certainty regarding the potential impacts of the Project on groundwater and surface water quality, the resulting impacts on the Mitchell and Perry Rivers, and in turn the Gippsland Lakes, to reach a conclusion on the significance of the potential impacts of the Project on the Gippsland Lakes Ramsar site.
- The key risk for the Gippsland Lakes Ramsar site is likely to be from a catastrophic failure of an onsite dam which although having a low likelihood, has the potential to have a significant impact on the water quality of the Mitchell and Perry Rivers, and in turn the Gippsland Lakes Ramsar site.
- It is critical the property at 2705 Bairnsdale-Dargo Road, Glenaladale is surveyed, together with any additional area of the mining licence area not already surveyed, and ecological impact assessments updated accordingly, *before* any decision is made under the EPBC Act to ensure the Commonwealth Minister has accurate information before them.
- The Project would have a significant impact on the critically endangered Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland ecological community. The destruction of 1.784 hectares of the ecological community is likely to be able to be offset in accordance with relevant requirements.
- Further clarity around the size, location, and management of HMC stockpiles and use of silos is required before an assessment of their impacts on the environment can be made. However, if best practice and use of a sealed system approach throughout the HMC process and export is implemented, radiation risks to the environment and the public associated with the movement of HMC should be able to be managed effectively.
- The potential for radioactive contamination and impacts more generally from Project-derived dust is unresolved.