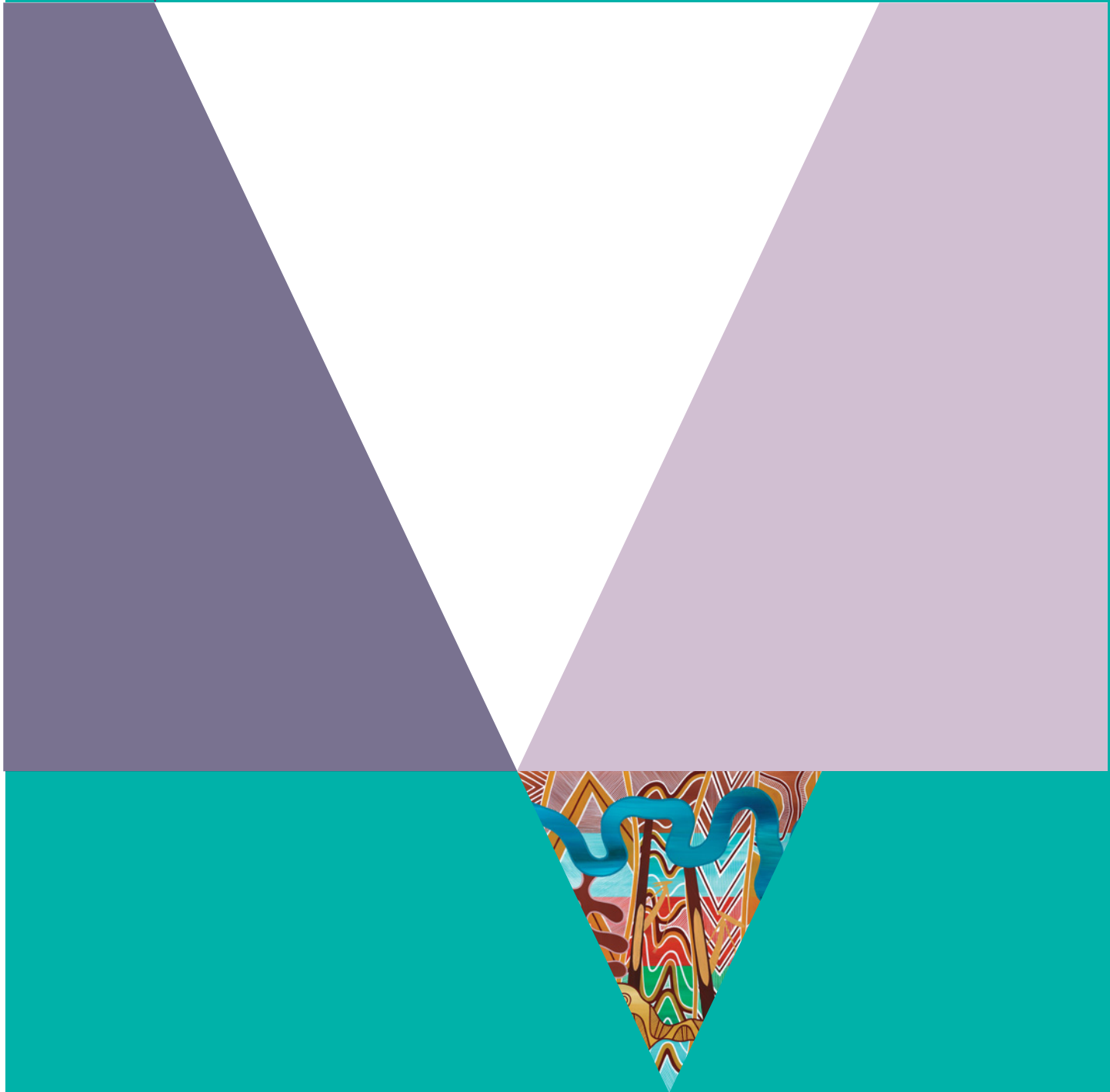


# Fingerboards Mineral Sands Project

Minister's Assessment under  
Environment Effects Act 1978



Minister for Planning  
November 2021



Environment,  
Land, Water  
and Planning

OFFICIAL



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We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.



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# Glossary

ANCOLD	Australian National Committee on Large Dams
CHMP	Cultural heritage management plan
DAF	Dissolved air flotation
DELWP	Department of Environment, Land, Water and Planning
EE Act	<i>Environment Effects Act 1978</i>
EES	Environment effects statement
EMF	Environmental management framework
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERS	Environment reference standard
EVC	Ecological vegetation class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
GDE	Groundwater dependent ecosystem
GED	General environmental duty
GL	Gigalitres
GLaWAC	Gunaikurnai Lands and Waters Aboriginal Corporation
Ha	Hectares
HMC	Heavy mineral concentrate
IAC	Inquiry and advisory committee
kg	Kilogram
km	Kilometres
MFG	Mine Free Glenaladale
ML	Megalitres
MNES	Matters of national environmental significance
μGy/h	Microgray per hour
μm	Micrometres
mSv	Millisievert
MRSD Act	<i>Mineral Resources (Sustainable Development Act) 1990</i>
Mt	Megatonnes
PEM	Protocol for environmental management: Mining and Extractive Industries
PM <sub>10</sub>	Particulate matter 10 micrometres or less in diameter
PM <sub>2.5</sub>	Particulate matter 2.5 micrometres or less in diameter
PSA	Planning scheme amendment
RAP	Registered Aboriginal party
SCO	Specific control overlay
SEPP	State environment protection policy

SEPP (AAQ) SEPP (Ambient Air Quality)  
SRW Southern Rural Water  
TRG Technical reference group  
TSF Tailings storage facility  
WGCMA West Gippsland Catchment Management Authority

## Executive summary

On 18 December 2016, following receipt of a referral from Kalbar Resources Ltd under the *Environment Effects Act 1978* (EE Act), I decided that an environment effects statement (EES) was required for the Fingerboards Mineral Sands Project. Kalbar Operations Pty Ltd (Kalbar) prepared an EES which I authorised for public exhibition and comment. The EES was exhibited for public comment from 3 September 2020 to 29 October 2020.

On 30 August 2020, I appointed an inquiry and advisory committee (IAC) to consider the project's EES, a draft planning scheme amendment and a works approval application (now a development licence application). Planning Panels Victoria received 910 submissions in respect of the exhibited EES, and an additional 47 supplementary submissions on proposed project changes introduced after the exhibition of the EES. The later changes related to the use of centrifuges to dewater fine tailings material. The IAC held a public hearing over 10 weeks, from 3 May 2021 to 22 July 2021. The IAC provided its report to me on 30 September 2021.

I am satisfied that the EES documentation, together with the material provided to the IAC and the IAC's report, provides me with sufficient information to allow me to assess the environmental effects of the project, notwithstanding that some aspects of the project remain uncertain.

It is my assessment that the project would have unacceptable environmental effects. Moreover, I am not satisfied that the *overall* environmental outcomes of the project would be sufficiently improved even if those aspects of the project which remain uncertain are resolved in a manner that resulted in different and reduced environmental impacts. The unacceptable effects relate primarily to effects on native vegetation, biodiversity, air quality, agriculture and horticulture, and social values within the project area and its surrounds. The project also poses an unacceptable risk to surface water values downstream of the site.

The project would clear a very significant amount of native vegetation and large old trees. Having regard to the extent and conservation status of the ecological vegetation classes represented in the vegetation proposed to be cleared, the clearing would result in an unacceptable impact to biodiversity values. The project's potential adverse effects to several listed threatened species and communities have also contributed to my conclusion that the project's effects on biodiversity would not be acceptable.

The proximity of the project to many sensitive receptors and an important horticultural district, without an effective buffer, and with a reliance on adaptive management to only just comply with airborne dust criteria, will likely result in effects to air quality and risks to agriculture and horticulture that are not acceptable. The flow on effects to the local community's sense of place, cohesion and wellbeing, in circumstances where it has already experienced significant disruption through the initial mining exploration phase and statutory assessment processes, are also unacceptable.

My assessment is provided to relevant statutory decision-makers responsible for the approvals necessary under Victorian law for the project to proceed. In accordance with section 8C of the EE Act, those decision-makers must consider this assessment before deciding whether and subject to what conditions those approvals should be given. I expect decision-makers to write to me to advise how my assessment was considered and applied.

I note that those aspects of the project which remain uncertain would require significant further examination in the event that, despite my assessment, a decision-maker is minded to consider granting



approval for the project to proceed. In those circumstances, I encourage the decision-maker to consult with me and my department on those matters prior to proceeding with an approval decision.

The project is a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential impacts on matters of national environmental significance. The Victorian EES process serves as the accredited assessment process for EPBC Act purposes, pursuant to the bilateral agreement between the Australian and Victorian governments. I will provide my assessment to the Commonwealth Minister for the Environment to inform her decision about whether and under what conditions to approve the project under the EPBC Act.

# 1. Introduction

On 15 November 2016, Kalbar Resources Ltd (Kalbar) referred the Fingerboards Mineral Sands Project (the project) to me under the *Environment Effects Act 1978* (EE Act).

On 18 December 2016, I decided that an environment effects statement (EES) was required under the EE Act. In my decision, I included my procedures and requirements for the EES, in accordance with section 8B(5) of the EE Act and the Ministerial Guidelines. In particular, I specified that the EES must investigate and report on effects on/of:

- biodiversity and ecological values within and near the site;
- surface water environments, downstream wetlands and groundwater resources;
- land uses and landscape values of the site and surrounding areas;
- land stability, erosion and soil productivity;
- Aboriginal and historical cultural heritage values;
- air quality and noise;
- positive and adverse socio-economic effects; and
- solid and liquid waste.

## 1.1 Purpose of my assessment

This document constitutes my assessment of the environmental effects of the project. It represents the final step in the EES process and provides findings on the likely environmental effects of the project, their acceptability, and authoritative, statutory advice and recommendations to decision-makers on how those impacts might be addressed in relevant statutory decisions. My assessment is informed by the report of the inquiry and advisory committee (IAC) that I appointed, as well as by the EES, submissions and documents tabled at the IAC hearing.

My assessment will inform decisions required under Victorian law for the project to proceed, as well as a decision by the Commonwealth Minister for the Environment whether to approve the project as a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

## 1.2 Structure of the assessment

In my assessment:

- Section 2 provides a brief description of the project;
- Section 3 outlines both the EES process and statutory approvals required for the project;
- Section 4 outlines my overarching assessment of the environmental effects of the project;
- Section 5 assesses the environmental effects of the project, providing findings based on the applicable legislative and policy framework;
- Section 6 contains my conclusions, including responses to the recommendations of the IAC; and
- Appendix A contains a consolidated assessment of impacts on matters of national environmental significance (MNES).

## 2. Project description

The EES described the project as the mining of the Fingerboards resource, which is located within the more extensive Glenaladale mineral sands deposit. Kalbar proposes to produce 8Mt of heavy mineral concentrate (HMC) from 170Mt of ore over the mine's life of up to 20 years. HMC would be exported for secondary processing in Asia. Mining would be a 24 hour, 365 days a year operation. The mine life includes approximately two years for construction and commissioning, 15 years of production at full capacity followed by closure activities. Final closure is anticipated to require an additional five years. The project area, as exhibited in the EES, is approximately 1,675ha.

The project includes:

- the development of a mineral sands mine;
- two mining unit plants;
- wet concentrator plant (comprising mineral separation processing and tailings thickening and disposal plant);
- water supply infrastructure;
- power supply infrastructure;
- temporary tailings storage facility (TSF);
- additional site facilities, such as a site office, warehouse, workshop, loading facilities and fuel storage; and
- new rail siding, roads, diversions, intersections.

The project area is in East Gippsland, approximately 20km west of Bairnsdale (Figure 1 and Figure 2), on a plateau, adjacent to the Mitchell River floodplains. The western section of the project area drains towards the Perry River and Providence Ponds while the eastern section drains to the Mitchell River. The Perry and Mitchell Rivers flow into the Gippsland Lakes. The land within the project area is largely used for agriculture, forestry and rural residential living. The Lindenow Valley Horticulture District is located adjacent to north-eastern boundary of the project area on the floodplains of the Mitchell River.

### 2.1 Proposed changes since EES exhibition

Kalbar proposed a number of key project changes after the exhibition of the EES:

- the abandonment of the temporary TSF in favour of using centrifuges to dewater fine tailings material;
- changes to road layouts;
- the abandonment of the option for using the existing pump station on the Mitchell River for obtaining surface water;
- expansion of the area of the mining licence area;
- potential relocation of the groundwater borefield outside of the mine infrastructure area; and
- using the Port of Geelong for export of HMC.

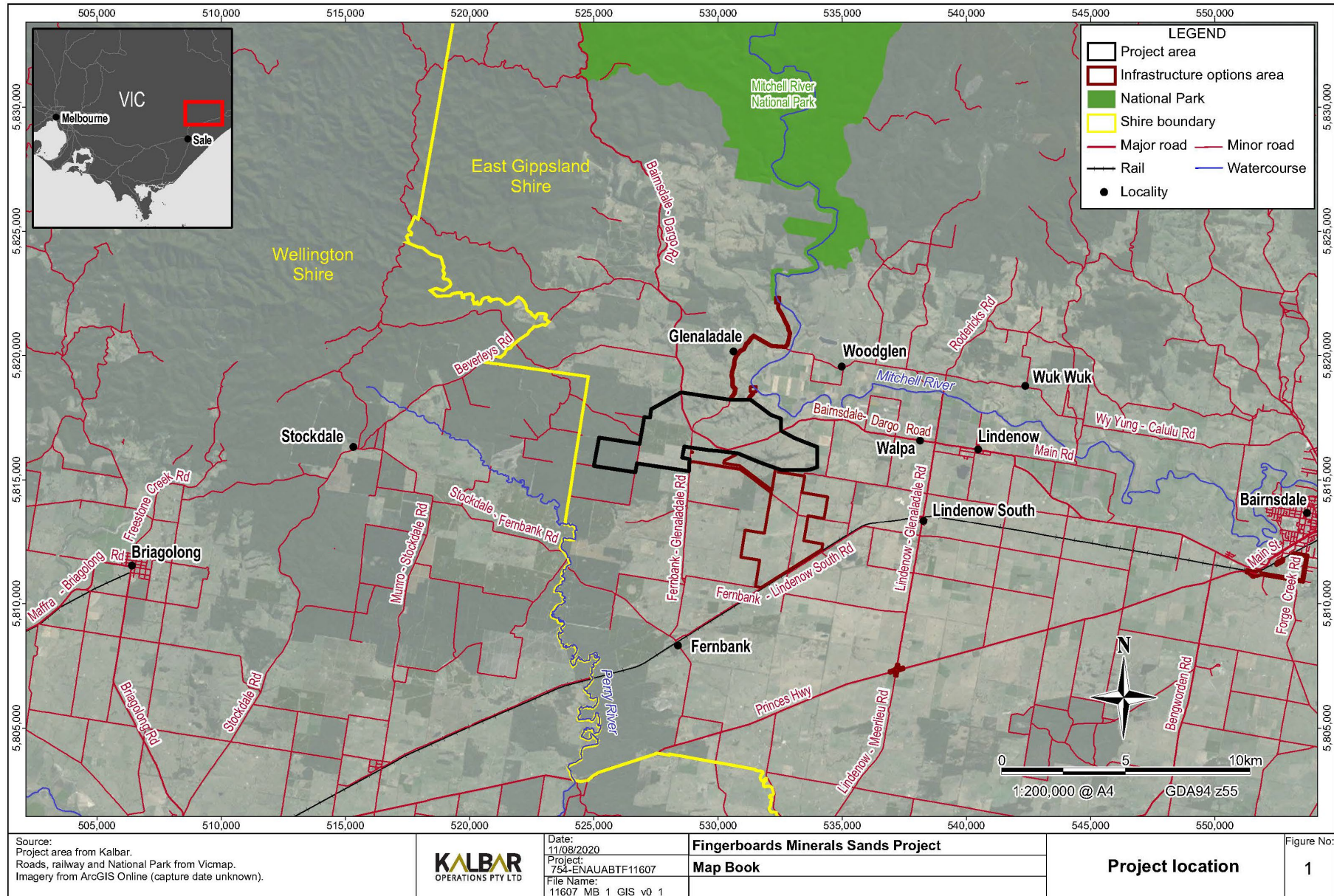


Figure 1: Project location (Source: EES Map book).

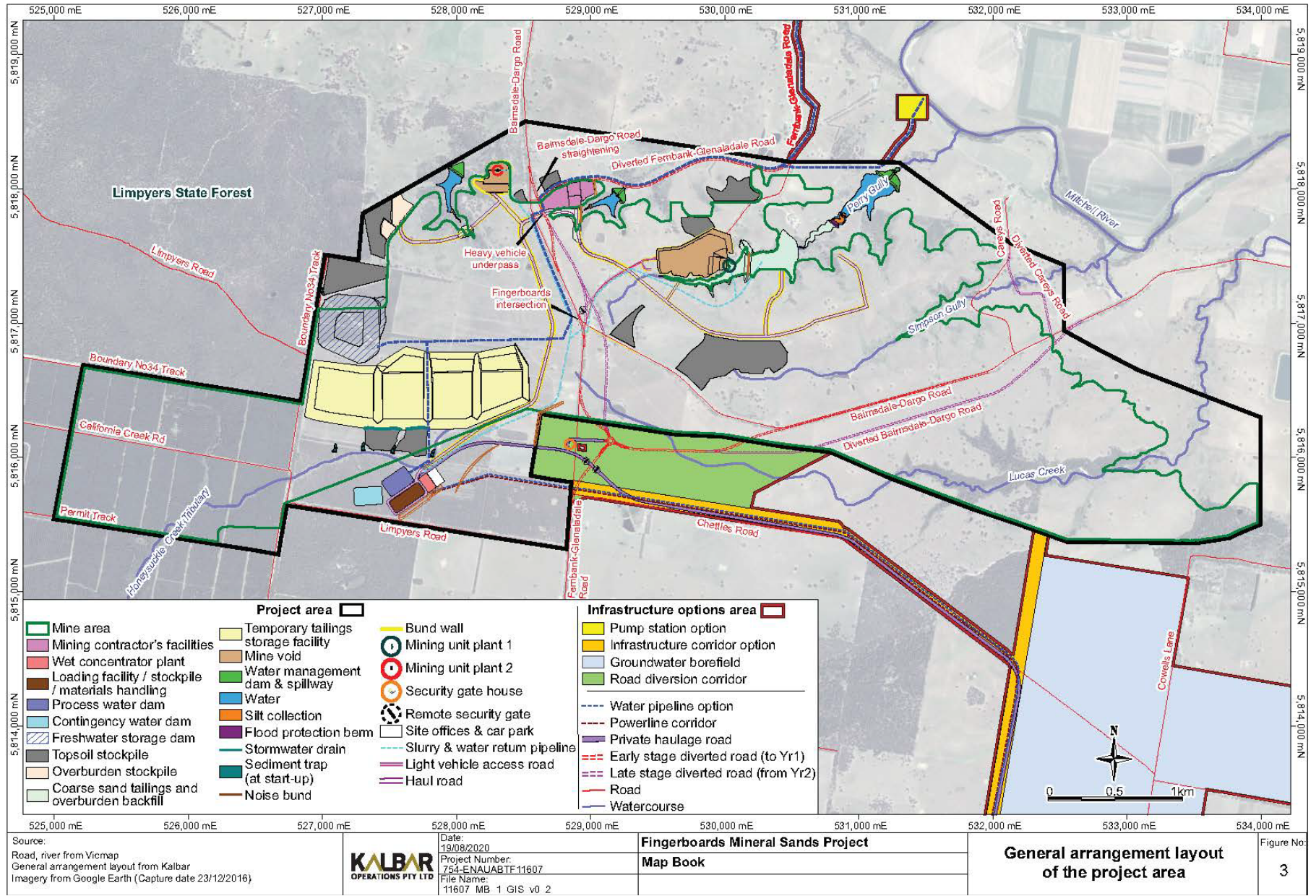


Figure 2: Project layout (Source: EES Map book).

## 3. Statutory processes

To proceed with the project, Kalbar requires a variety of statutory approvals under Victorian and Commonwealth law. My assessment will inform approval decisions under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act), the *Planning and Environment Act 1987*, the *Environment Protection Act 2017*, the *Aboriginal Heritage Act 2006*, as well as a range of other permits, licences and consents. In addition, the project is a controlled action requiring approval under the EPBC Act.

### 3.1 Environment Effects Act 1978

I issued scoping requirements to specify the matters to be addressed by Kalbar in its EES for the project in late October 2017, following the exhibition of an earlier draft for public comment over the course of September and October 2017. The Department of Environment, Land, Water and Planning (DELWP) convened a technical reference group,<sup>1</sup> in accordance with normal EES practice, to provide advice to Kalbar (and DELWP) on the preparation of the EES. The EES was placed on public exhibition from 3 September 2020 to 29 October 2020. A draft planning scheme amendment (Amendment C156egip) to the East Gippsland Planning Scheme and an Environment Protection Authority (EPA) works approval application were also exhibited with the EES.

On 30 August 2020, with the consent of the Governor in Council, I appointed an inquiry under the section 9(1) of the EE Act to review submissions and inquire into the environmental effects of the project in accordance with its terms of reference, which I approved on 19 July 2020. The inquiry members were also appointed as an advisory committee under section 151 of the *Planning and Environment Act 1987* to consider the draft planning scheme amendment. Planning Panels Victoria received 910 submissions on the EES, the draft amendment and the EPA works approval application; nine submissions were from state agencies or local government.

The IAC held three directions hearings on 14 December 2020, 15 February 2021 and 31 March 2021, followed by 10 weeks of public hearings, from 3 May 2021 until 22 July 2021. The second and third directions hearings responded to the introduction of significant changes to the project by Kalbar after the EES exhibition and public comment period had closed. The key changes included the use of centrifuges to dewater fine tailings material, in place of a temporary tailings storage facility, and changes to proposed road layouts. The IAC allowed submitters on the EES the opportunity to lodge supplementary submissions on the proposal to use centrifuges. An additional 47 supplementary submissions were received by the IAC in response to that invitation.

The IAC provided its report to me on 30 September 2021. The IAC report, along with the EES documentation, submissions and documents tabled at the IAC hearing, has informed the preparation of this assessment of the environmental effects of the project under the EE Act.

The EE Act requires me to provide my assessment of the environmental effects of the project to Victorian statutory decision-makers. The decision-makers must then consider my assessment before deciding whether and how the project should proceed.

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1.The technical reference group comprised representatives of departments and authorities with statutory interests or specialised expertise relevant to the project, including DELWP (Planning and Environment portfolios), Department of Jobs, Regions and Precincts (Earth Resources Regulation), Department of Health, First Peoples State Relations, Heritage Victoria, EPA Victoria, Parks Victoria, East Gippsland Water, Southern Rural Water, West Gippsland Catchment Management Authority, East Gippsland Catchment Management Authority, Department of Transport, East Gippsland Shire Council, Wellington Shire Council. The proponent and relevant members of its consultant team also attended meetings.

### **3.2 Mineral Resources (Sustainable Development) Act 1990**

An approved work plan and mining licence is required under the MRSD Act before commencing works associated with the project. A draft work plan was exhibited as Attachment B to the EES.

Kalbar applied for a mining licence for the project during the IAC hearing, which was accepted for assessment by Earth Resources Regulation on 8 July 2021. I note that the mining licence application covers a larger area than was described in the exhibited EES. Consideration of the environmental effects of the project in the EES, IAC report and my assessment was undertaken on the basis of the mining area as exhibited. I have not considered any additional environmental effects of the project associated with the additional mining licence area described in Kalbar's mining licence application.

### **3.3 Planning and Environment Act 1987**

The *Planning and Environment Act 1987* sets out processes for the amendment of Victorian planning schemes. An amendment to the East Gippsland Planning Scheme is required to facilitate the project and to provide comprehensive statutory planning controls; in particular to allow for infrastructure proposed to be located outside the mining licence area. In the absence of planning scheme amendment, the project would be subject to multiple permit requirements under various provisions of the planning scheme. The draft amendment included in the exhibited EES is discussed in Section 5.10 of this assessment.

### **3.4 Environment Protection Act 2017**

I note that on 1 July 2021, the *Environment Protection Act 1970* was repealed; the *Environment Protection Act 2017* and *Environment Protection Regulations 2021* now apply. As a result, state environment protection policies have been largely replaced by environmental reference standards.

A works approval (which has now transitioned to a development licence) is required before commencing works associated with the project. An application for a works approval has been received by the EPA and was advertised jointly with the EES (Attachment D to the EES), in accordance with section 20AA of the *Environment Protection Act 1970*. The application related to the treatment and discharge of mine water from the dissolved air flotation plant.

I note that EPA issued a notice under section 22 of the *Environment Protection Act 1970* requesting further information (Tabled Document 20) and that during the IAC's public hearing the proponent and EPA agreed under section 67A of the *Environment Protection Act 1970* that EPA would delay its decision on the development licence application until 31 December 2021 (Tabled Document 142).

Matters relevant to the assessment of the development licence application are addressed in Sections 5 and 6 of this assessment.

### **3.5 Aboriginal Heritage Act 2006**

The *Aboriginal Heritage Act 2006* stipulates, amongst other things, that an approved cultural heritage management plan (CHMP) must be prepared for works for which an EES is required. Matters relevant to the assessment of the CHMP are addressed in Section 5.12 of this assessment. The project is located on land for which the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is the registered Aboriginal party (RAP) under the Aboriginal Heritage Act. Due to administrative issues when the notice of intent to prepare a CHMP was submitted, Aboriginal Victoria (now known as First Peoples State Relations)

took on the evaluation and approval role for the CHMP. GLaWAC have since been re-instated as the RAP for the land on which the project is proposed. First Peoples State Relations has retained the evaluation and approval role for the CHMP, which will be considered in consultation with GLaWAC.

### 3.6 Other Victorian statutory approvals

The project requires other Victorian statutory approvals including:

- licences to take and use surface water and extract groundwater under the *Water Act 1989*;
- licences to construct water management dams under the *Water Act 1989*;
- licence(s) under the *Radiation Act 2005* and approval of a number of radiation management plans;
- a permit to remove listed flora and/or fauna from public land under the *Flora and Fauna Guarantee Act 1988*;
- if needed, a permit to take wildlife under the *Wildlife Act 1975*; and
- consent to close, divert or upgrade roads under the *Road Management Act 2004*.

### 3.7 Commonwealth statutory approval

In May 2017, Kalbar referred the project to the Commonwealth (Referral 2017/7919) for a determination on whether the project is a controlled action requiring approval under the EPBC Act.

On 6 July 2017, the delegate for the Minister determined the project to be a controlled action requiring assessment and approval under the EPBC Act because of its potential for significant impacts on MNES. The controlled action decision specified the controlling provisions of part 3 of the EPBC Act to be sections 16 and 17B (in relation to the Ramsar-listed Gippsland Lakes), sections 18 and 18A (in relation to listed threatened species and communities), sections 20 and 20A (in relation to listed migratory species) and sections 21 and 22A (in relation to nuclear actions).

The project's EES process has been undertaken as an accredited assessment, in accordance with the bilateral agreement between the Australian and Victorian Governments. My assessment will inform the Commonwealth Minister for the Environment's decision about whether and under what conditions to approve the project, fulfilling the assessment requirements for MNES under the EPBC Act. My assessment of the potential impacts of the project on MNES is addressed in Appendix A.

As the nuclear action controlling provision is triggered, a whole of environment assessment is applied to the entire action, so the impacts of all potential project activities on the whole of the environment will be considered. The Commonwealth Minister will need to consider all impacts in Section 5 of my assessment, not just impacts occurring from radiation.



## 4. Environmental assessment

My assessment is informed by the IAC's report, as well as by the EES documentation, submissions and documents tabled at the IAC hearing. Legislation, policy, strategies and guidelines, summarised in Chapter 5 of the EES, as well as the objectives and principles of ecologically sustainable development, also contextualise my assessment.

### 4.1 Acceptability of environmental effects

Following careful consideration of all available information, particularly the IAC's findings, it is my assessment that the project would result in unacceptable environmental effects.

The unacceptable effects relate primarily to project's effects on native vegetation, biodiversity, air quality, agriculture and horticulture, and social values of the project area and surrounds. I have also concluded that the project poses an unacceptable risk to surface water values downstream of the site.

The project would clear a very significant amount of native vegetation and large old trees. Having regard to the extent and conservation status of the ecological vegetation classes (EVCs) represented in the vegetation proposed to be cleared, the clearing would result in an unacceptable impact to biodiversity values. The project's potential adverse effects on several listed threatened species and communities have also contributed to my conclusion that the project's effects on biodiversity would not be acceptable.

The proximity of the project to many sensitive receptors and an important horticultural district, without an effective buffer, and with a reliance on adaptive management to only just comply with airborne dust criteria, will likely result in effects to air quality and risks to agriculture and horticulture that are not acceptable. The flow on effects to the local community's sense of place, cohesion and wellbeing, in circumstances where it has already experienced significant disruption through the initial mining exploration phase and statutory assessment processes, are also unacceptable.

The IAC did note there was uncertainty about the final configuration of the project and some potential environmental effects. Notwithstanding this, the IAC concluded that the project would have significant unacceptable environmental effects and should not proceed. Moreover, the IAC formed the view there was sufficient information available through the EES process to support its conclusion without recourse to supplementary information. I agree with the IAC's primary conclusion of unacceptability and the sufficiency of information to support that conclusion and my overall assessment of the project. While the information at hand prevents definitive examination of every aspect of the project, I am satisfied that further examination of those aspects of the project which remain uncertain would not change my overall conclusion, as set out in this assessment, that the environmental effects of the project are unacceptable.

In the event a decision-maker does entertain an approval for the project, I generally support the IAC's recommendations for further work as outlined in Sections 5 and 6.1 of this assessment. However, the decision-maker should consult with me and my department before any further work is conducted or indeed prior to any decision-making on an approval.

### 4.2 Consideration of project alternatives

As set out in the scoping requirements and the EES procedures and requirements that I issued under the EE Act, the EES was required to describe and assess effects of relevant alternatives. Kalbar set out the

rationale for the project in Chapter 2 of its EES. Chapter 4 of the EES sets out Kalbar's examination of alternatives for the project. As outlined in Section 2.1 of my assessment, significant project changes were also introduced through the IAC hearings after EES exhibition. My assessment is made on the basis of Kalbar's EES and subsequent documentation tendered to the IAC, which together represent Kalbar's preferred form of the project and the alternatives it considered or presented in the EES and the IAC hearing.

### **4.3 Introduction of material post EES exhibition**

The IAC reported on the considerable difficulties caused by the introduction of significant new elements of the project, particularly the introduction of centrifuges, after the exhibition of the EES. The IAC also reported on the uncertainty of elements of the project and proposed mitigation measures presented for assessment. The IAC noted that a significant portion of submitters' time and money was spent reviewing the EES, preparing submissions and preparing for participation in the public hearings. The significant changes to the project post-exhibition required the unexpected further investment of those parties, which was inefficient and inconvenient.

During an EES process, it is my expectation that proponents will change and adapt their project to achieve better environmental outcomes. While the form and specific elements of a project does not need to be inappropriately constrained or locked in at the stage of EES exhibition, I do expect that a proponent will present a project form and mitigation measures that allow for confidence in their assessment of environmental effects, ready for public review.

The IAC also noted that Kalbar's piecemeal approach to bringing forward new information and significant changes to the project, resulted in them tabling substantial technical notes and other documents containing important information. This presented challenges to the IAC and other parties during the hearing. My view is that while new or further information via technical notes and other forms of evidence may be required to be tabled by a proponent during the hearing—to respond to requests from the IAC, expert evidence, or submissions—the exhibited EES should be the primary source of information on the project and its likely environmental effects.

### **4.4 Environmental management**

As part of the EES, Kalbar prepared an environmental management framework (EMF) and mitigation measures (Attachment H of the EES) which includes Kalbar's proposed approach to managing the project's environmental effects. Given the IAC's conclusion and recommendations in chief on the project, it did not undertake a line-by-line reconciliation of the suggested changes to the mitigation measures, as would normally be conducted to inform the report of an IAC. I have also not provided line-by-line recommendations on the proposed mitigation measures as part of my assessment as I have found that the project's effects would be unacceptable.

I have generally adopted the recommendations of the IAC for significant further assessment work, that would be necessary ahead of any potential consideration of approvals, in the event a decision-maker entertains approving the project despite my primary recommendation. I agree with the IAC that this in turn would require a significant re-write of the mitigation measures.

There was considerable discussion in the public hearings about adaptive management. The IAC considered that there was a strong sense in the EMF of dealing with what arises, as it arises, instead of providing a

sufficiently detailed, evidence-based assessment of the current environment and what might be expected during mining, based on a well-developed and resolved mining approach. The IAC considered that leaving this level of consideration to later is neither accepted nor best practice. The IAC recommended that the EMF and mitigation measures be reviewed and revised based on the last versions with comments tabled in the IAC hearings, in light of and incorporating the additional assessments and investigations recommended in their report. I accept the recommendation of the IAC.

## 5. Assessment of environmental effects

This section sets out my examination of the project's potential effects on each aspect of the environment and includes the relevant evaluation objectives which are set out in the scoping requirements for this EES; context for the assessment of each environmental aspect; a brief discussion of the project's effects on each environmental aspect; and my assessment of the project's effects on each environmental aspect.

While I find the project's environmental effects are unacceptable, in particular for biodiversity, air quality, agriculture and horticulture and social; other decision-makers remain responsible for determining whether respective approvals should be granted for the project. However, the EE Act requires decision-makers to consider my assessment.

In the event a decision-maker does not adopt my overall conclusion and considers project approvals, my assessment makes recommendations on matters related to further work that should be completed prior to an approval decision. I encourage the decision-maker to consult with me and my department on those matters.

The IAC made several findings and recommendations in respect of the project. My assessment generally supports these findings and recommendations. Along with my assessment of the environmental effects of the project, my response to the IAC's key findings and recommendations, which I generally support, are detailed in this Section 5. Section 6.1 summarises my key recommendations in these respects.

### 5.1 Biodiversity

#### 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.*

#### Assessment context

Biodiversity impacts are addressed in Chapter 9.1 and Appendix A005 of the EES and in Chapter 4 of the IAC Report. EES Attachment E constitutes the proposed biodiversity offset management strategy for the project. During the IAC hearing, the proponent tabled five technical notes dealing with project changes or new information related to biodiversity impacts. EES Attachment H included 51 mitigation measures specifically addressing potential effects on biodiversity values. IAC Document 777, tabled during the hearing, comprises the updated mitigation register also with biodiversity mitigation measures.

The proponent's EES and the IAC examined the range of biodiversity impacts predicted to result from the project. The project would clear native vegetation, including large old (potentially hollow-bearing) trees and impact on listed species and ecological communities. The project will likely change local and regional watertable levels that may impact groundwater dependent ecosystems. Further afield, the downstream biodiversity values associated with, and intrinsic to, the Gippsland Lakes Ramsar Site may also be affected.

#### Discussion

##### *Removal of native vegetation*

The IAC has noted that the project presented for its consideration would require removal of a minimum of 223.58ha of native vegetation. That extent would increase with the addition of as yet unquantified native

vegetation clearance at 2705 Bairnsdale-Dargo Road, the expanded mining licence area and the relocated groundwater borefield.

I note that, of the proposed extent of native vegetation removal that has been quantified to date, almost half comprises EVCs classified as endangered. Most of the remainder comprises EVCs classified as vulnerable. These EVCs are therefore already threatened in a bioregional context and represent important native vegetation that remains within the region. Further extensive clearing of those EVCs is likely to have serious implications for the region's ecological values and represents a very significant environment effect which has been understated in the EES.

I note that the property at 2705 Bairnsdale-Dargo Road is likely to support a variety of biodiversity values, including some areas of relatively intact native vegetation, some areas of modified vegetation, a number of large and probably hollow-bearing trees and some relatively treeless native grassland.

The proponent has had sufficient opportunities, in its preparation of the EES, to explore and embrace practicable avoidance and minimisation of impacts on native vegetation and ecological values. However, the IAC concluded the proponent has not taken sufficient measures to avoid clearing native vegetation and minimising ecological impacts (IAC Report, v. 1, s. 4.3.3). I support this view. My findings on this matter are based on the position adopted by the proponent with respect to the proposed extent of clearing for the project (subject to this assessment), which encompassed evidence about avoidance and minimisation set out within the proponent's EES and documents tabled at the IAC. I do not accept the proponent's views on the residual effects of the project on native vegetation and ecological values and conclude they are very significant and unacceptable.

#### *Large old trees, scattered trees and hollow-bearing trees*

The IAC heard that the ecological experts' conclave agreed large old trees serve an important ecological function and provide habitat for a variety of animals (IAC Report, p. 54).

The proponent's expert witness advised the IAC that the project would remove 373 large trees in patches and 461 scattered trees, plus an estimated 110 large trees in patches and 44 scattered trees on the 2705 Dargo-Bairnsdale road property (Tabled Document 299, p. 14). The IAC noted with concern the number of large old trees that would be removed if the project were to proceed. The loss of a cohort of over 700 large trees across an area the size of the project footprint in the space of only decades would create a habitat vacuum for those species that could take centuries to fill or not be overcome at all.

The IAC heard that large old trees contribute to scenic and landscape values as well as biodiversity, and that several species found to be present through surveys for the EES rely on hollows for roosting. I accept the IAC's conclusion that considering those trees to be hollow-bearing and assessing their ecological values in that context is an adequate approach. While only large trees can form large hollows suitable for use by large species such as owls and goannas, many animals rely on smaller hollows which can form in smaller, younger trees. Any mitigation measures for the loss of natural hollows would need to address the diverse habitat needs of large threatened species as well as smaller species such as pardalotes, treecreepers, small marsupials and microbats.

Nest boxes or other forms of artificial hollows may go some way to mitigating the effects of loss of hollow-bearing trees in the landscape. However, not all species are known to adapt to using nest boxes in the absence of natural hollows. Non-target species including introduced birds and feral bees are known to take advantage of nest boxes, making them unavailable for the threatened species they are intended to benefit.

The IAC heard that nest boxes, which can deteriorate in condition quite quickly, require regular inspection, repair and cleaning to remain effective even for those native species which use them. The proponent acknowledged that nest boxes would require a monitoring, management and maintenance regime. That program would need to be securely resourced and implemented over many decades beyond the contemplated life of the project, to enable it to fill the gap effectively before natural hollows of adequate size and quantity can form.

Large trees can also be important for their relatively significant contribution to resources such as nectar and pollen for wildlife. A landscape-scale mosaic of different ages of trees enhances habitat complexity and contributes to the vigour and resilience of the biodiversity sustained within the area.

The loss of a very significant number of large and hollow-bearing trees required for the project to proceed is a contributing factor to my conclusion that the project's effects on biodiversity values would be unacceptable.

### *Threatened species*

The scoping requirements for the EES list thirteen species listed as threatened under the EPBC Act which the project could affect, which have been examined through this accredited EES process.

In addition to the species mentioned in the scoping requirements, three other species listed under the EPBC Act and identified in the EES or in submissions are also addressed here.

### **Long-nosed Potoroo (EPBC Act: vulnerable; FFG Act: vulnerable)**

Long-nosed Potoroo (*Potorous tridactylus tridactylus*) is a small marsupial that occurs patchily in southern Victoria. The EES did not identify records closer to the project site than the Gippsland Lakes and surveys undertaken for the EES failed to detect the species in the vicinity of the project site. The project area offers limited potential habitat for the Long-nosed Potoroo and the project is unlikely to adversely affect the species.

### **New Holland Mouse (EPBC Act: vulnerable; FFG Act: endangered)**

The EES notes that one of three known Victorian populations of New Holland Mouse (*Pseudomys novaehollandiae*) occurs at Providence Ponds, about 8km from the project site. Within the project area potential habitat is marginal and there is little likelihood of the species occurring on the site.

If the project proceeded and led to adverse impacts on a groundwater dependent ecosystem (GDE) at Providence Ponds, there could be consequential impacts on the New Holland Mouse population there. However, there seems little likelihood that the species might be adversely affected. If despite my primary conclusion on the project's effects, the project is considered for approval, the conditions of any GDE at Providence Ponds Flora and Fauna Reserve should be monitored. Contingency plans should be agreed with the relevant authorities for maintenance of any affected GDEs before works which could affect local aquifers are initiated.

### **Grey-headed Flying-fox (EPBC Act: vulnerable; FFG Act: vulnerable)**

Grey-headed Flying-fox (*Pteropus poliocephalus*) is a partly migratory fruit-bat that roosts in permanent or temporary camps from which individuals disperse nightly to forage. The EES notes that a camp exists at Bairnsdale and reports an observation of an individual on the project site. Grey-headed Flying-foxes are known to travel much further than the distance between Bairnsdale and the project site to forage, so it is to be expected that the site would attract bats when resources such as flowering eucalypts are available.

Most of the proposed vegetation clearance for the project comprises forest or woodland EVCs in which Eucalypt species are prominent. Eucalypt blossom is an important component of Grey-headed Flying-fox diet and therefore the loss of the extent of potential foraging habitat across the project site could represent an appreciable reduction in the local resources available to the species. Accordingly, this possible adverse effect of the project on the habitat is considered significant and is one factor contributing to my conclusion that the project's overall effects on biodiversity values are likely to be unacceptable.

#### Regent Honeyeater (EPBC Act: critically endangered; FFG Act: critically endangered)

The EES notes a nearby record of Regent Honeyeater (*Anthochaera phrygia*) in 2001. Although most recent Victorian records are centred on Chiltern in north-eastern Victoria, occasional records do occur in Gippsland, including localities such as Glenmaggie, Briagolong and Paynesville. However, historical data indicate that even when the species was more plentiful, Gippsland does not seem to have supported an important proportion of the population. Given the limited records in the vicinity of the project and lack of identified habitat for the species on the site, there is only a remote possibility that the species could be adversely affected by this project.

#### Australian Painted Snipe (EPBC Act: endangered; FFG Act: critically endangered)

Australian Painted Snipe (*Rostratula australis*) is a cryptic wetland bird occurring in southern Australia, with its distribution centred on the lower part of the Murray-Darling Basin. It also occurs in coastal Victoria and New South Wales and has occasionally been recorded in the Gippsland Lakes. Its secretive habits and largely inaccessible habitat mean that it is difficult to detect.

I note that the project area does not feature substantial tracts of densely vegetated freshwater wetlands of the types favoured elsewhere by Australian Painted Snipe. There are few records of the species in Gippsland, although I acknowledge that this may be as much an artifact of the difficulty of detecting the species as of its objective scarcity in the region. However, while there is some potential for impacts on Australian Painted Snipe arising from the project, these appear to be limited and therefore not significant.

#### Australasian Bittern EPBC Act: (endangered; FFG Act: critically endangered)

Australasian Bittern (*Botaurus poiciloptilus*) is a cryptic wetland bird favouring extensive reedbed habitats. The EES notes that regional records are concentrated around the Gippsland Lakes. However, the EES fails to acknowledge the mobility of the species, which has been found to undertake movements of hundreds of kilometres elsewhere in Victoria.

I note that the project site does not feature substantial tracts of densely vegetated freshwater wetlands of the types favoured elsewhere by Australasian Bittern. There are relatively few records of the species in Gippsland. Potential impacts on Australasian Bittern arising from the project appear to be limited and therefore not significant.

#### Swift Parrot (EPBC Act: critically endangered; FFG Act: critically endangered)

Swift Parrots (*Lathamus discolor*) are migratory, breeding in Tasmania and dispersing across the south-eastern mainland during the non-breeding season. Their mainland distribution varies from year to year according to seasonal availability of foraging resources. East Gippsland is not generally regarded as within the core Victorian range of the species, but records do exist.

I am not persuaded that Swift Parrots are absent from the broader area within which the project is proposed. I note that Swift Parrot has been reclassified as Critically Endangered, reflecting a serious recent decline in its numbers. Therefore, a lack of recent records may not mean that the species would not

occupy presently unused habitat if a recovery plan is successful in rebuilding numbers. However, I accept that the vicinity of the project does not represent an important part of their mainland (non-breeding) range and that preferred foraging habitat EVCs for Swift Parrot are generally rare if present at all in the area. Accordingly, the possibility that the species might be adversely affected is not considered to be significant.

#### Painted Honeyeater (EPBC Act: vulnerable; FFG Act: vulnerable)

Painted Honeyeater (*Grantiella picta*) is distributed throughout much of eastern mainland Australia, occurring generally at low densities where mistletoe, its dietary staple, is found. It is migratory, moving south in spring and is largely absent from Victoria during the cooler months. Most Victorian records are from inland of the Great Dividing Range, with some records from Gippsland, in the vicinity of the Gippsland Lakes. The EES notes that mistletoe (*Amyema* sp) was recorded on the project site. Although Painted Honeyeater was not recorded, it is possible that individuals might occasionally pass through the site or visit to forage. However, the possibility that the species might be adversely affected is not considered to be significant.

#### Giant Burrowing Frog (EPBC Act: vulnerable; FFG Act: critically endangered)

The EES reported that field surveys conforming to guidelines failed to detect the Giant Burrowing Frog (*Heleioporus australiacus*). The IAC heard a submission which reported recording the species calling on the project site, a record which has subsequently been lodged with the Atlas of Living Australia (Tabled Document 387). I understand that DELWP is satisfied the observer is reliable and that the report is credible.

Giant Burrowing Frog is a rare, cryptic species for which the vicinity of the project is close to the south-western limit of its known distribution. The observation of the species on the site might relate to a wandering individual but could indicate that a population of the species occurs on or near the project site, despite the generally modified nature of the available habitat. I note that many threatened species are known to make use of degraded or modified habitats, even if undisturbed habitat might be preferable. Given the status of the species under the FFG Act, the possibility that a population of the species might occur within the mine site is one contributing factor to my overall conclusions on the significance and unacceptability of the project's effects on biodiversity values. However, if the project is considered for approval by a statutory decision-maker, appropriate contingency plans will be required to ensure individuals found within the project area are protected. Such contingency plans may present challenges considering available information about handling and habitat needs for the species, and therefore should be agreed with the relevant authorities before any works that could affect the species are initiated.

#### Growling Grass Frog (EPBC Act: vulnerable; FFG Act: vulnerable)

Growling Grass Frog (*Litoria raniformis*) is a widespread Victorian species which has undergone a substantial reduction in population and fragmentation for reasons which remain unclear. The EES notes that the species has been recorded in Gippsland but not recently within 35km of the project site. Targeted surveys for the EES failed to detect the species on the site.

While it is unlikely that an important population of the species occurs on or near the project area, it is possible that the species might occur. I note that the species commonly occurs in modified or artificial habitats, including constructed dams, provided that necessary structural features are present, and that the species can be difficult to detect if not calling.

The possibility that the species might occur is not considered significant or a factor in my overall conclusions regarding the project's effects on biodiversity values. However, should the project proceed,



appropriate contingency plans to ensure that any individuals found within the project area are protected will be required. Such contingency plans should be agreed with the relevant authorities before works which could affect the species are initiated.

#### Green and Golden Bell Frog (EPBC Act: vulnerable)

Closely related to the Growling Grass Frog, the Green and Golden Bell Frog (*Litoria aurea*) occurs in eastern New South Wales and extends into eastern Victoria at the southern end of its range. The EES notes that it has been recorded in Macleod Morass, near Bairnsdale, not far from the project site. However, targeted surveys for the EES failed to detect the species on the project site, despite apparently suitable habitat being present.

While it is unlikely that an important population of the species occurs on or near the site, it is possible that the species might occur. If the project is considered for approval by a statutory decision-maker, appropriate contingency plans to ensure that any individuals found within the project area are protected will be required. Such contingency plans should be agreed with the relevant authorities before works which could affect the species are initiated.

#### Dwarf Galaxias (EPBC Act: vulnerable; FFG Act: endangered)

Dwarf Galaxias (*Galaxiella pusilla*) is a small native freshwater fish occurring in eastern Victoria and Tasmania. Populations in western Victoria and South Australia have recently been reclassified as Little Galaxias, *G. toourtkoourt*<sup>2</sup>. The Mitchell River basin is at or near the eastern limit of the Dwarf Galaxias' mainland distribution. Targeted surveys for the EES failed to detect Dwarf Galaxias either in the Mitchell River or in wetland habitats on the project site.

I note that DELWP Gippsland Region did not include Dwarf Galaxias among the species for which species habitat units would contribute to the overall offset calculation if the project were to proceed (Tabled Document 521). Given the low likelihood that the species occurs in or close to the project site, I do not consider there is potential for any associated significant impact.

#### Australian Grayling (EPBC Act: vulnerable; FFG Act: endangered)

Australian Grayling (*Prototroctes maraena*) is a medium-small native fish which is diadromous, spending the larval and juvenile phase of its lifecycle in estuaries or the sea and its adult phase in freshwater. Adult populations occur in streams in southern New South Wales, Victoria and Tasmania, including the Mitchell River system and other rivers that flow into the Gippsland Lakes.

The EES notes that targeted surveys were undertaken for Australian Grayling at three sites in the Mitchell River and that two individuals were found at Site 2, downstream of the Perry Gully confluence. The EES acknowledges that the Mitchell River population of the Australian Grayling constitutes an "important population" under the EPBC Act (EES Appendix 005, Table A5.3, p. 314).

I note that DELWP Gippsland Region included Australian Grayling among the species for which species habitat units (SHUs) would contribute to the overall offset calculation if the project were to proceed (Tabled Document 521). DELWP Gippsland Region submitted a higher offset requirement for Australian Grayling than the figure proposed in the EES (34.264 SHUs compared to 29.975 SHUs in the EES).

The EES concludes that the project is unlikely to have a significant impact on the Mitchell River population of the Australian Grayling, noting that the population has survived despite the impacts of agriculture and other forms of development in the catchment. I note that the project would entail a scale of mining activity close to the river quite different from any existing land uses in the catchment and could present a range of risks to water quality immediately downstream, to which the river and its aquatic fauna might not presently

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<sup>2</sup> See [Dwarf Galaxias \(swifft.net.au\)](http://DwarfGalaxias(swifft.net.au))

be exposed. I also note the potential for some degree of change to water extraction from the river if the proponent were successful in bidding for a winter-fill licence.

I agree that the Australian Grayling population in the Mitchell River is likely to be important because the river is free from the barriers that exist in many other Victorian streams; barriers to fish passage are problematic for the species because of its life cycle<sup>3</sup>. As Australian Grayling migrate downstream to spawn close to the estuary, it is likely that a significant proportion of the population in the river passes through the reach adjacent to the project site. Therefore, the population's exposure to any adverse impacts on the river arising from the project could be significant for that important population.

It is not possible to be definitive about the extent of impact on Australian Grayling, because the effects to which it might be susceptible are likely to result from risk events rather than ongoing/persistent impacts. However, I am satisfied that such risk exists and note the significance of the consequences, which are in addition to the impacts that might affect the species resulting from existing economic activities in the catchment. The possibility that the species could be significantly affected is therefore a factor contributing to my conclusion that the project's effects on biodiversity values are likely to be unacceptable.

#### Dwarf Kerrawang (EPBC Act: endangered; FFG Act: critically endangered)

Dwarf Kerrawang (*Commersonia prostrata*) is a prostrate shrub found in eastern New South Wales and Victoria, usually on sandy or peaty soils associated with wetlands. The EES notes that it has been recorded in the vicinity of the project site. It is also one of several threatened species that contribute to the ecological character of the Gippsland Lakes Ramsar Site.

Targeted surveys for the EES failed to detect the species. The EES suggests that limited potential habitat for the species occurs on the project site or in areas that could be affected by the project. I note that DELWP Gippsland Region did not include Dwarf Kerrawang among the species for which species habitat units would contribute to the overall offset calculation if the project were to proceed (Tabled Document 521).

Given the limited extent of potential habitat for the species that could be affected by the project, there is low possibility that the species will be adversely affected and is therefore not considered to be a significant impact. However, if the project is considered for approval by a statutory decision-maker, further targeted surveys for the species should be conducted to the satisfaction of DELWP Gippsland Region in any areas of potential habitat for Dwarf Kerrawang. This would need to occur prior to earthworks or other disturbance. Contingency plans should be agreed with the relevant authorities for management of any plants that might be found before works which could affect areas of potential habitat are initiated.

#### Gaping Leek-orchid (EPBC Act: endangered; FFG Act: endangered)

Gaping Leek-orchid (*Prasophyllum correctum*) is extremely rare and restricted in its range to the general vicinity of the Lindenow Valley. The EES notes that a population of Gaping Leek-orchid is known to occur (and to have been observed as recently as 2017) in the Gippsland Rail Reserve south-west of Cowells Lane, close to the project area. While the EES refers to the lack of high-quality habitat that would be affected by the project, some populations of significant orchids survive in highly modified habitat, and lack of high-quality habitat should not be assumed to imply the absence of the species. Targeted surveys for the EES failed to detect the species within the area that would be affected by project works, although plants are known to occur nearby.

Gaping Leek-orchid is an endemic Victorian species with a distribution and population reduced since European settlement. Although the species was not detected by the proponent's targeted surveys, the consequences for the species of further impacts resulting from the project would be serious even if the likelihood of such consequences occurring would be low. I note that DELWP Gippsland Region included

<sup>3</sup> See for example FFG Act Action Statement No. 257, Australian Grayling, p. 5.

Gaping Leek-orchid among the species for which species habitat units would contribute to the overall offset calculation if the project were to proceed (Tabled Document 521). The potential for the project to affect the surviving population of Gaping Leek-orchid cannot be ruled out and if impact did occur it would likely be significant.

#### Swamp Everlasting (EPBC Act: Vulnerable; FFG Act: critically endangered)

Swamp Everlasting (*Xerochrysum palustre*) is a wetland plant occurring in south-eastern New South Wales and in Victoria. It has been recorded in the vicinity of the project area, including at Saplings Morass Flora and Fauna Reserve. Targeted surveys for the EES failed to detect the species within the area that would be affected by project works.

I note that DELWP Gippsland Region did not include Swamp Everlasting among the species for which species habitat units would contribute to the overall offset calculation if the project were to proceed (Tabled Document 521). Given the limited extent of potential habitat for the species that could be affected by the project, there is not considered to be adverse effects of significance for this species.

#### Other FFG Act-listed species

In addition to species listed under both the EPBC Act and the FFG Act, discussed above, the EES identified at least a dozen FFG Act-listed species which would require offsets. It also identified removal of almost 15 ha of FFG Act-listed Forest Red Gum Grassy woodland. This extent of impact on threatened ecological values is perhaps not surprising given the conservation status of most of the EVCs which would be affected by the project, but it reinforces the significance of the project's adverse effects on important biodiversity values.

#### Threatened ecological communities

The scoping requirements for the EES identified two EPBC-listed threatened ecological communities which could be affected by the project.

#### Gippsland Red Gum grassy woodland and associated native grassland (EPBC Act: critically endangered)

The ecological community as defined for the EPBC Act listing corresponds to two listed threatened communities under the FFG Act. Forest Red Gum Grassy Woodland Community corresponds to the grassy woodland component of the EPBC Act-listed ecological community and Central Gippsland Plains Grassland Community corresponds to the associated native grassland component.

The EES identified the occurrence of 1.74ha of the EPBC Act listed threatened ecological community within the works footprint for the project, which would therefore be removed if the project were to proceed. The EES also identified other occurrences of the ecological community totalling in excess of 12ha within or adjacent to the infrastructure options area, which would not be proposed for removal.

The ecology conclave report to the IAC noted the possible occurrence of the ecological community on the property at 2705 Bairnsdale-Dargo Road. However, it acknowledged the view of one of the experts that the dominant eucalypt species across the property were not Red Gums and therefore the likelihood that the ecological community is present was reduced (Tabled Document 238, p. 4). The ecology conclave report also noted the views of experts that some vegetation may have incorrectly been classified as Plains Grassy Forest instead of Plains Grassy Woodland, and therefore overlooked as possibly meeting the definition of the threatened ecological community.

While the overall loss may be relatively small in the context of the overall native vegetations losses that would result if the project proceeded, incremental losses of critically endangered values would remain of concern. I note the proponent's view that offsets consistent with commonwealth requirements for the ecological community could be provided, but I note also that the actual extent of removal may need to be recalculated to account for corrected classifications of patches which would be removed and possibly for additional occurrences of the community in parts of the works area for which the EES and tabled documents at the IAC hearings did not provide definitive information.

Potential impacts on Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) grassy woodland and associated native grassland are at least significant. This also contributes to my conclusion that the effects of the project on biodiversity values would be unacceptable, given the extent is likely to be greater than that characterised in the EES.

#### Seasonal herbaceous wetlands (freshwater) of the temperate lowland plains (EPBC Act: critically endangered)

The EES reported that this threatened ecological community had not been identified within the project site and predicted a low likelihood that it might be found to occur in unsurveyed parts of the site. The IAC accepted that view and did not reach any further conclusions relating to potential impacts on the ecological community. I am satisfied that there is relatively low likelihood of the ecological community's occurrence in the vicinity of project and that potential effects on the ecological community are not likely to be significant.

#### Gippsland Lakes Ramsar Site

The EES scoping requirements include references to several wetland species such as terns and sandpipers, the relevance of which is their contribution to the ecological character for the Gippsland Lakes Ramsar Site. Adverse effects on the health or condition of the Ramsar site could lead to adverse impacts on those species due to reduced habitat quality. Direct effects other than through that pathway on biodiversity values reliant on the Ramsar site and contributing to its ecological significance are not anticipated in the EES or by the IAC.

The IAC did recognise that adverse effects resulting from the project, due for example to a dam failure or uncontrolled release of mine contact water, could lead to an appreciable adverse effect on the Ramsar site, caused by pollution reaching the Ramsar site via the Mitchell River. I accept that the sorts of "risk" events of concern to the IAC would not be part of normal operations. However, they represent foreseeable events and require contingency, which has not been adequately addressed within the EES or tabled documents. I have assessed their potential likelihood and consequence in the context of what the proponent presented to the IAC, including some management and mitigation approaches.

Notwithstanding its distance from the Gippsland Lakes Ramsar Site, the project would be close enough and large enough to potentially adversely affect the Ramsar site via the Mitchell River. As noted above, the river also provides habitat for Australian Grayling, a threatened fish species which contributes to the ecological character of the Ramsar site and would be at risk of direct effects on water quality. Some mitigation of this risk is possible through design and other management measures, however given the site is directly upstream from two rivers that feed into the Gippsland Lakes, the consequences of such impacts on water quality on the downstream Ramsar site is high.

I accept the IAC's conclusion that significant adverse effects from the project could occur on the Gippsland Lakes Ramsar Site.

### *Groundwater dependent ecosystems*

I note that the IAC has been unable to reach conclusions about potential effects on GDEs. It would have been preferable for the proponent's EES to have provided more definitive information about the project's potential impacts on GDEs. However, even without that information I am satisfied that I have sufficient information to arrive at a conclusion about the project's overall effects on biodiversity and ecological values.

The potential for adverse effects on GDEs — either on the project site or nearby, such as at Providence Ponds or Saplings Morass — is real, even if inadequately quantified for the purposes of conclusive assessment. If more definitive information had been provided by the proponent, it may be that adverse effects on GDEs would have reinforced my assessment that the project's environmental effects on biodiversity are unacceptable. However, that conclusion is not dependent on the possible contribution of the effects on GDEs.

### **Assessment**

It is my assessment that the project's overall effects on native vegetation, as well as biodiversity and ecological values, would be unacceptable, particularly given:

- the very significant extent of the project's effects on native vegetation, as quantified by the proponent, and having regard to the conservation status of the EVCs that would be cleared;
- the project's effects on a very large number of large, old and presumed hollow-bearing trees, which would be very significant in ecological terms for the region and impracticable to mitigate;
- the project's potential for significant adverse effects on threatened species, in particular the Grey-headed Flying-fox, Giant Burrowing Frog, Australian Grayling and Gaping Leek-orchid;
- the project's potential for significant effects on the EPBC Act-listed critically endangered Gippsland Red Gum grassy woodland and associated native grassland ecological community; and
- the project's potential for adverse effects on the Gippsland Lakes Ramsar Site.

## **5.2 Air quality and greenhouse gases**

### **Evaluation objectives**

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

*To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.*

### **Assessment context**

Air quality and greenhouse gas effects are addressed in the EES within Chapter 9.4, the technical report Appendix A009 and the independent peer review of the air quality assessment and Kalbar's response in Attachment J of the EES, as well as in Chapter 8 of the IAC's report. EES Attachment H and Tabled Document 779, comprising the updated mitigation register which the proponent tabled towards the end of the IAC hearing, both include mitigation measures specifically addressing potential effects related to air quality and greenhouse gas emissions.

A number of potential effects of the project for air quality and greenhouse gas emissions were examined through the EES and IAC process, in particular the:

- air quality impacts associated with dust (airborne and deposited) emissions and their management;

- air quality impacts associated with other emissions (e.g. generator or vehicle/mining equipment exhaust); and
- greenhouse gas emissions from the project.

## Discussion

### *Effects associated with airborne dust*

Dust is typically generated at mineral sand mines through disturbance of rock or soils by mining equipment (e.g. bulldozers, excavators, etc.) and vehicle movements on unsealed roads. Wind erosion of stockpiles and bare or disturbed ground can also contribute to dust emissions. Coarser particulate matter tends to settle relatively quickly while finer particles can remain in the atmosphere for days and travel hundreds of kilometres. Fine particulate matter is associated with health impacts and is typically considered in two fractions: PM<sub>10</sub> (particulate matter with a diameter less than 10µm) and PM<sub>2.5</sub> (particulate matter with a diameter less than 2.5µm). Heavy metals and radionuclides can be associated with the dust originating from mineral sands mines.

Kalbar produced Technical Note 4 (Tabled Document 145) in response to a request by the IAC after submitters identified Kalbar had missed a number of nearby sensitive receptors in its EES. The technical note identified 71 sensitive receptors within 2km of the project (which encompasses the haul road, rail siding or Mitchell River pump), 40 of which are within 2km of the project area excluding those components. Within 2 to 5km of the project area (including the haul road, rail siding or Mitchell River pump), a further 284 sensitive receptors were identified. It is my view that this is a considerable number of sensitive receptors, which are almost entirely made up of residences, given the rural setting of the project. Additional modelling was conducted to account for all the sensitive receptors, although it was noted that the newly modelled receptors were located further away than other receptors with predicted impacts less than those already described within the EES (Tabled Document 145).

Modelling of dust emissions was also re-run by Kalbar post-EES exhibition (Tabled Documents 84, 139), to account for the project changes Kalbar introduced prior to the hearing (i.e. primarily the introduction of centrifuges to dewater the tailings material, instead of the previously assessed temporary TSF). The modelling shows that while compliance with the 24-hour average and annual average PM<sub>2.5</sub> criteria in the State Environment Protection Policy (Ambient Air Quality (SEPP AAQ) is predicted, PM<sub>10</sub> criteria would be exceeded for some receptors with the implementation of the proposed standard mitigation measures. For example, 20 receptors are predicted to be subject to dust impacts that exceed the 24-hour average PM<sub>10</sub> criteria (Protocol for Environment Management: Mining and Extractive Industries (PEM) objective) on up to three occasions in the modelled year 12 of operations with only standard mitigation measures applied (Tabled Document 139). Kalbar's EES and subsequent evidence states that additional mitigation measures, comprising changed operational scenarios (to respond to likely exceedances), are required to achieve compliance with the PEM objectives and the criteria in SEPP AAQ for 24-hour average PM<sub>10</sub> concentrations. The modelling presented by Kalbar demonstrates that compliance can be achieved at all receptors when all these measures are implemented successfully. While compliance can technically be achieved, the IAC noted (with reference to Tabled Document 139), for all receptors the air quality criteria for 24-hour average PM<sub>10</sub> concentrations of 60µg/m<sup>3</sup> is only just met (all were 57.4µg/m<sup>3</sup> or above).

The IAC noted that the independent peer review of the air quality impact assessment (Attachment J of the EES) found that the contributions of the project to airborne dust (PM<sub>10</sub> and PM<sub>2.5</sub>) at sensitive receptors is significant, for example up to 88% of the PM<sub>10</sub> criterion in Year 5 at one location (R15) and up to 92% in Year 12 at another (R44), and that with additional controls implemented to reduce dust levels, the criteria were only just met. The independent peer reviewer noted the approach of managing/mitigating emissions

to just meet criteria is not consistent with the intent of EPA's PEM or SEPP Air Quality Management to "minimise emissions and potential risk to health of the surrounding community". The IAC agreed and noted that the approach is also not consistent with the general environmental duty (GED) under the new Environment Protection Act, where it is not acceptable to simply meet the applicable standards.

Standard mitigation measures proposed in the EES and in evidence tendered for Kalbar include dust suppression via two water trucks, use of chemical dust suppressants and sealing of the haul road. A number of additional scenarios and adaptive management approaches have been proposed by Kalbar to enable compliance with air quality criteria to be achieved, including more stringent air quality criteria from SEPP AAQ objectives in response to EPA's submission (Submission 514). The included scenarios considered measures such as changing mining methods (e.g. truck and shovel rather than scrapers) or temporarily ceasing or moving operations as reactive controls to be implemented in the event of elevated dust. While the adaptive management measures are modelled to be effective in achieving compliance with standards if implemented successfully, they would be reliant on monitoring equipment functioning reliably; accurate forecasting; and prompt operational changes to avoid exceedances. I note that the site's meteorology station lost about 22% of data during the preparation of the EES to several equipment faults (Tabled Document 84). The proposed adaptive management is also reliant on the standard mitigation measures (i.e. water trucks, chemical suppressants) being as effective as described during hot and/or windy conditions.

The IAC considered it was unlikely that proposed standard mitigation measures would be completely effective all the time. The IAC found submissions (Tabled Document 473) persuasive that it is not feasible that water trucks could effectively dampen all the disturbed landform with sufficient frequency to mitigate dust risk. I note that the EES describes two open pits, with progressive rehabilitation limiting disturbed areas to 360ha (or 270ha without the abandoned TSF) at any one time. However, in practice this assumes that revegetation of rehabilitated areas will be successful, which may not always immediately be the case and there may be larger areas in varying states of rehabilitation that could contribute to dust generation in windy conditions if not managed effectively. I also note the need for the project to scale back operations should adequate water not be available for mine water supply and that this could also have implications for the effectiveness of progressive rehabilitation and dust management.

Submissions were received that raised concerns the modelling had not accounted for the effects of climate change, notably a drier climate with more severe storms. The IAC found that while the modelling had not considered these scenarios, increases in wind and storm events are likely to increase offsite dust impacts beyond those presented in the EES. I agree with the findings of the IAC.

It is my view that the project's effects on local air quality from airborne dust emissions would be unlikely to be managed to comply consistently with air quality standards. I agree with the IAC's findings that the project will result in significant and unacceptable offsite dust impacts on nearby sensitive receptors. The EES and proponent's evidence has demonstrated compliance is only just possible for nearby sensitive receptors. The proponent's proposed mitigation measures are unlikely to be completely effective and there are too many points of potential failure (unreliability) in the adaptive management approach, all of which increase the likelihood of air quality criteria being exceeded and impacting on sensitive receptors.

I note that the IAC made recommendations for further assessment should a decision maker consider proceeding with project approval decisions for the project. These recommendations relate primarily to characterising gaps in the EES air quality impact assessment (e.g. storage of tailings in the Perry Gully, heavy mineral concentrate stockpiles). The work relates to characterising the impacts in further detail

rather than understanding the significance of the impacts on which I have based my assessment. I accept the IAC's recommendations for further work, should a decision maker wish to issue approvals for the project against the primary conclusion and recommendation of my assessment.

### *Effects associated with dust deposition*

Coarser dust particles tend to settle out of the atmosphere quickly and relatively close to their point of emission. Coarser dust, in a regulatory sense, is typically viewed as an amenity or aesthetic issue and the criteria outlined in the PEM and now the environment reference standard (ERS) has been set for the protection of amenity from nuisance dust. The EES provided examples of amenity impacts from dust including short-term visibility, soiling of laundry or build-up on surfaces within homes or on roofs, which may wash into rainwater tanks.

As discussed in the previous section, the IAC was not convinced that proposed mitigation measures would be completely effective all the time and requested further modelling be undertaken for maximum deposited dust levels to understand the deposition rates that could be expected if dust mitigation strategies were not working to the maximum extent achievable (Tabled Document 16). Technical Note 7 prepared by the proponent modelled dust deposition rates for the nearby receptors (Tabled Document 146). The results for dust deposition rates show up to 162.7kg/ha/year as the maximum predicted annual cumulative dust deposition rate, with all sensitive receptors within 2km of the project modelled to receive over 100kg/ha/year cumulative deposition rates. I note that some of the sensitive receptors predicted to experience the largest increases in deposited dust rates are located within the Lindenow Valley Horticultural District.

I have addressed above the IAC's and my concerns with the proponent's approach to adaptively mitigating potential effects related to dust emissions. These apply equally to control of depositional dust. While I note that dust deposition criteria are achieved more comfortably than the criteria for PM<sub>10</sub>, these criteria are for protection of aesthetic values or nuisance criteria. These criteria have not considered the protection of horticulture or agriculture. What is clear from the EES and the proponent's subsequent additional modelling is that there is potential for significant cumulative deposited dust to impact receptors within the Lindenow Valley Horticultural District. The proponent has been aware of the concerns from neighbouring stakeholders as evidenced in their EES stakeholder and consultation Chapter 6 and numerous submissions on the exhibited EES. However, the proponent's response during the EES and IAC hearings has been focused on only just achieving compliance with quantitative air quality criteria. While submissions about the quality assurance requirements for the producers in the Lindenow Valley are discussed further in Section 5.3 of my assessment, it is clear a significant amount of dust will be generated from the mine site. With no effective buffer between the site and the horticulture district, deposited dust could result in unacceptable impacts to this important horticultural district.

### *Effects associated with greenhouse gas emissions*

The project could contribute to greenhouse gas emissions from mining equipment, electricity use and land clearing. The IAC considered that the greenhouse gas assessment is acceptable and had appropriate mitigation measures. The IAC found that, should the project proceed, the commitments to further greenhouse gas emissions reductions as proposed by Kalbar would need to be given effect in project approval documentation and that emissions as a result of the transport of heavy mineral concentrate from the Port of Geelong should be assessed. I agree with the IAC on these matters; should a decision maker consider an approval for the project, I recommend that those findings are adopted.



## Assessment

It is my assessment that the project's effects on air quality and sensitive receptors related to airborne dust emissions is unacceptable. Given the modelled airborne dust has only just been demonstrated to comply with air quality standards for many nearby sensitive receptors, it is unlikely proposed mitigation measures, in combination with the adaptive management approach, will offer effective and reliable management over the life of the project.

While depositional dust is modelled to be within aesthetic criteria, Kalbar's modelling shows that significant increases in depositional dust are expected to occur for some receptors including areas of the adjacent Lindenow Valley Horticultural District. It is my assessment that the aesthetic criteria for depositional dust do not consider the implications for horticulture (discussed in Section 5.3). That, combined with the lack of an effective buffer, means depositional dust will pose an unacceptable risk to the important Lindenow Valley Horticultural District.

It is my assessment that other air quality emissions and greenhouse gas emissions related to the project could be managed to an acceptable level should the project proceed.

## 5.3 Agriculture and horticulture

### Evaluation objective

*To minimise potential adverse social and land use effects, including on agriculture, dairy, irrigated horticulture, tourism industries and transport infrastructure.*

### Assessment context

Agriculture and horticulture impacts are primarily addressed in Chapter 9.11 and technical report Appendices A015 (Agriculture) and A016 (Horticulture) of the EES and Chapter 14 of the IAC Report. Several other components of the EES and sections of the IAC report address topics relevant to agriculture, including water, air quality and economics. EES Attachment H and IAC Document 777, comprising the updated mitigation register which the proponent tabled towards the end of the IAC hearing, both include mitigation measures specifically addressing potential effects on agriculture and horticulture.

Much of the land comprising the project site and its environs can be characterised as agricultural land in a broad sense. A substantial area directly to the east of the project site on the Mitchell River flats (the Lindenow Valley) is used for horticulture, with a range of crops, primarily vegetables, grown intensively under irrigation.

The potential impacts of the project on agriculture and horticulture arise from:

- temporary loss of agricultural production as mining progresses across the project site until rehabilitation is complete;
- dust impacts within and outside the project areas;
- water impacts – quality, quantity and access; and
- market issues and economic impacts.

Many submitters, including locally based farmers and farming businesses, raised concerns about the potential impacts of the project on their respective operations if the project proceeds. Although EES investigations for agriculture and horticulture included engagement with stakeholders, the data collected in the course of those studies are not presented in the EES.

Economic effects are considered in Section 5.13 of my assessment. Effects on land-uses are covered in Section 5.10.

## **Discussion**

### *Loss of agricultural land*

The EES describes the land within the project area as used predominantly for dryland agriculture, with some forestry, farm and rural living dwellings, forestry and public roads<sup>4</sup>.

The project would involve land being progressively mined and rehabilitated, with about 360-450ha being worked or unavailable for agricultural use at any one time. Mined land will be unavailable for agriculture until rehabilitation has been completed. The IAC noted the EES' prediction of an effective loss of dryland agricultural production in the vicinity of \$87,250-\$125,250, due to the temporary unavailability of farmland. The scale of lost productivity seems insignificant and, in any case, if the project were to proceed, the proponent would be liable for paying adequate compensation to affected landowners, reflecting both economic losses and other specified impacts (e.g. amenity). Section 85 of the MRSD Act sets obligations on a mining licensee for compensation to owners or occupiers of affected private land for losses or damage.

### *Dust impacts*

In terms of farming, the most significant impact arises from dust, which is likely to be experienced by the intensive horticultural operations to the east of the project site, outside of the project footprint.

I note that the project lies to the west of the Lindenow Valley Horticultural District. The project and the Lindenow Valley Horticultural District are both in the Mitchell River Valley, which rises to the north of the project area and bends eastward near Glenaladale.

As described within the EES, the project would entail a substantial area of bare ground (>360ha, or 270ha without the abandoned TSF) at any one time, throughout the life of the mine, until rehabilitation is successfully completed after mining operations conclude. While greater levels of dust generation are likely to result from earth-moving activities and vehicle movement, unvegetated surfaces can also contribute to dust generation, especially under dry or windy conditions.

Airborne dust comprises particulate matter of varying origins, chemical composition and physical properties. In particular, dust particles vary significantly in size. As noted in Section 5.2, environmental health standards recognise smaller size ranges, especially PM<sub>10</sub> and PM<sub>2.5</sub> as a concern for human health because of the depth to which they can penetrate the respiratory system. Visible dust, which can have aesthetic or amenity impacts, includes coarser fractions but may also include a proportion of finer particles.

While the local meteorological data collected for the EES at the project site were incomplete, the wind data presented in the EES show strong dominance of westerly and northerly winds. Under prevailing wind conditions, the horticultural district is downwind of the project site and therefore in the path of windblown dust originating from the project. Deposition of dust in significant quantities could threaten the quality of produce, the maintenance of market-imposed standards and costly accreditations and ultimately the viability of the horticultural area itself. The IAC concluded that there is no effective buffer between the project site and the horticultural district to protect it from project-derived dust, and that dust deposits in the horticultural district would pose a significant risk to horticultural production. Products such as head vegetables (e.g. cauliflower, broccoli) and leaf vegetables (e.g. lettuce, kale, spinach) are particularly sensitive to increased dust deposition<sup>5</sup>. I accept that conclusion of the IAC.

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<sup>4</sup> EES Main Report, Section 8.9.2.1, p. 8-148

<sup>5</sup> See for example EES section 9.11.3.1

The IAC noted the rigorous quality assurance regimes applying to agricultural and horticultural operators to ensure their produce meets market standards. It found that both horticultural and agricultural producers could bear a significant new regulatory compliance burden to ensure and demonstrate that their produce is safe for market and to maintain standards for access to markets. Increased dust would create a significant risk of product rejection and reputational risk. I consider that it would be unacceptable for offsite effects resulting from a new operation to cause such a burden for pre-existing, often highly capitalised businesses, closely dependent on the natural and built attributes of their existing location.

I note that air quality standards set under the *Environment Protection Act 2017*, and previously under the *Environment Protection Act 1970*, generally set out to protect values such as human health, health of other life-forms and aesthetic and amenity values. In general terms, airborne particulates coarser in size than PM<sub>10</sub> are regarded as relevant to aesthetic or amenity values rather than to health values<sup>6</sup>. The market quality of crops is not recognised explicitly as a value to be protected under the environmental reference standard, but an appropriately broad application of the standards leads to a conclusion that deposition of dust may be regarded as pollution.

### *Water resource impacts*

Potential environmental effects on groundwater and surface water are addressed in Sections 5.6 and 5.5 of this assessment. Here, I consider the impacts of the project's water requirements relative to available resources and demand for those resources from agriculture and horticulture. I also consider potential impacts on local resources such as farm dams resulting from the project, due for example to drawdown of aquifers as a consequence of excavation or dewatering and changed run-off patterns into dams due to changes to surface topography.

The project would require approximately 2.8-3GL per annum. Water would be sourced from some combination of a winter-fill licence allowing extraction of up to 2GL from the Mitchell River when flowing above a specified threshold (which might not occur every year) and groundwater extraction under licence. A winter-fill licence would be an option only if offered for auction by SRW and if the proponent is then a successful bidder. I understand that the relevant groundwater aquifer is already over-allocated, so groundwater would be available only if the proponent is able to purchase existing entitlements on the market.

Regulation of water entitlements provides a measure of protection to existing users and entitlement holders. However, the introduction of a new and substantial purchaser into the local market may have the effect of driving up water prices to the detriment of present users. I understand that access to high quality, reliable and affordable water is one of the key advantages that have contributed to the development of vigorous and diverse horticultural operations in the Lindenow Valley.

If the groundwater resource of the Latrobe Group aquifer has historically been overallocated, the introduction of a new high-volume user could be expected to run counter to measures to align entitlements more accurately with the available resource. Continued extraction at unsustainable levels could ultimately lead to adverse impacts on the aquifer and dependent users, including GDEs as well as extractive users.

While mining operations are not expected to penetrate to the regional water table (EES, p. 3-18), the IAC heard submissions that nearby farm dams may rely at least to a degree on shallow perched aquifers which the project could damage. It found that agricultural businesses supported by such dams should be compensated in such an event. Data to characterise the pre-mining condition and performance of such dams would be needed to enable claims to be evaluated adequately.

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<sup>6</sup> See Environmental Reference Standard, *Victorian Government Gazette* No. S245, 26 May 2021, Table 2.2

### *Water quality impacts*

Potential water quality risks are addressed in Sections 5.5 and 5.6 of this assessment. Here I note the IAC's conclusions that horticultural and agricultural operations depend upon access to clean and reliable water and that the project has the potential to impact the water quality of the Mitchell River and other water users.

As the Lindenow Valley Horticultural District is located downstream from the project, it would be at risk of exposure to project-derived waterborne contaminants flowing into the Mitchell River. Project impacts on water quality could result from causes such as run-off from overtopping or failures of onsite dams or failure of onsite water quality treatment systems as discussed in Section 5.6 of my assessment.

While such events should be rare, as I have concluded in Section 5.6 the possibility would remain. Although rare, the consequences could be severe for the horticultural businesses in the Lindenow Valley and the region's agricultural industry. Accordingly, this is a factor in my conclusion that the project has the potential to have unacceptable effects on horticulture and agriculture.

### *Market issues and economic impacts*

The IAC report identifies different estimates for the value of horticultural production from the Lindenow Valley. The EES estimates the annual value at \$62 million based on 2016 data (EES Section 8.13.3.5 and Table 8.69, p. 8-199). However, the IAC concluded that horticultural production (and potential losses) in the Lindenow Valley was significantly undervalued in the EES. The IAC also found that the proponent failed to demonstrate an adequate understanding of business and production practices in the Lindenow Valley and therefore was unable to assess adequately the impacts or the likely efficacy of proposed mitigation measures. The IAC adopted an estimate of \$100 - 120 million per annum, reflecting the range of information provided by the proponent and submitters, although it could be possibly higher.

I note that tension and distrust between local agricultural and horticultural operators on the one hand and the proponent on the other may have constrained the proponent's ability to gather and analyse data about production. However, I am satisfied that the IAC had sufficient information available to it to arrive at robust conclusions about the values and risks associated with the existing horticultural industry in the vicinity of the project.

While losses associated with non-horticultural agricultural production would be at lesser levels, the IAC found that impacts could still be significant for individual operators, and that operators' investments in producing higher value products, including through certification, should be taken into account in assessing impacts. It concluded that market confidence in the quality of Lindenow Valley and local agricultural produce is paramount to the long-term sustainable viability of those existing industries. It also concluded that reductions in production from the Lindenow Valley Horticultural District could have significant impacts on businesses processing that produce, noting that the EES failed to identify alternative supply options in the event impacts manifested due to the project.

The IAC found that horticultural operations in the area represent 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. I accept the IAC's finding that even a modest impact on the horticultural district could result in significant losses to the region in terms of income and employment. The nature of horticultural operations in the vicinity of the project means that they are vulnerable to impacts from excessive dust or contamination, which if they occurred could be expected to have a

significant negative economic impact. This would be exacerbated by other potential impacts on these businesses associated with reduced water quality or access to a reliable water supply.

I also conclude that damage to the reputation of the Lindenow Valley as a source of high-quality produce would constitute an environmental effect for the purposes of this assessment, and that such damage is likely to be significant. I am satisfied that it would be difficult, costly and potentially impracticable to mitigate or reverse reputational damage and consequent implications for the value and marketability of produce from the region.

I accept the IAC's finding that impacts threatening certifications and quality assurances for horticultural and agricultural businesses could be significant. Those potential impacts are also reflected in the IAC's finding that the area's reputation and image could be adversely affected.

The IAC concluded that the economic case for the project, compared to potential impacts to existing horticultural and agricultural industries that may be threatened, is marginal. The IAC has found that "the project presents an unacceptable risk to this high value horticultural (and agricultural) resource." This finding is based on several separate but inter-related adverse significant effects. The combination of significant impacts on valuable horticulture and the agricultural sector that would stem from the potential effects of this project is a core element of my overall assessment that the project is likely to have unacceptable environmental effects.

## Assessment

Given the potential for impacts examined above, I conclude that the project could have significant and unacceptable effects on existing horticultural and agricultural operations. Further, adverse impacts on production of horticultural products may result in significant effects on downstream processing businesses which may be unable to obtain produce from alternative sources. My assessment has particular regard to:

- the project's potential air quality impacts affecting the produce from the nearby Lindenow Valley Horticultural District to a significant degree (re its quality and marketability);
- the project's potential effects on water availability and water quality could be significant and could also contribute to the degree of overall impact on horticulture and agriculture;
- the project is likely to adversely and significantly detract from the region's reputation as a source of high quality sustainable horticultural and agricultural produce; and
- the project's adverse effects on horticultural productivity would lead to potentially significant adverse effects on the economic performance of downstream processing industries, including in terms of local and broader employment.

## 5.4 Social

### Evaluation objective

*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.*

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

*To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.*

## Assessment context

Social effects are addressed in Chapter 9.13 and the technical report appendix A018 of the EES, as well as in Chapter 16 of the IAC's report. A number of mitigation measures deal with socioeconomic matters as outlined in Attachment H of the EES which were then revised during the IAC hearing and presented in Tabled Document 777.

A number of potential effects of the project to social and issues were examined through the EES and IAC process, in particular:

- effects on the community's connection to and sense of place;
- effects on community cohesion and well-being;
- efficacy of and engagement through the social and economic impact assessment; and
- whether the project has a social licence to operate.

Economic effects are considered in Section 5.13 of my assessment. Effects on agriculture and horticulture are covered in Section 5.3 of my assessment.

## Discussion

The EES describes the potential for both positive and adverse socio-economic effects. Positive effects associated with the project are generally associated with the economic and employment benefits the project would bring to the local and regional community. These are discussed in further in Section 5.13 of my assessment.

It is acknowledged in the EES that the social impacts of the project would be linked to the other environmental effects of the project which would influence community views on the project.

The IAC's consideration of potential social effects focused on two main areas including a loss of connection with the land and sense of place and adverse effects to community well-being and cohesion.

### *Effects on the community's connection to and sense of place*

The EES described the community's strong connection to the land and their concerns about how the project's effects would influence this connection. The EES predicts residual risks that are moderate to low associated with these impacts, citing as the basis for that ranking progressive rehabilitation of the mining areas along with proposed mitigation measures, including stakeholder and landholder engagement, establishment of a community reference group, and maintaining access to the Fingerboards information board and re-establishment of a similar meeting point.

The IAC heard and reported on the many submissions it received about the importance of different community member's sense of place and the strong inter-generational ties of families to their land, including the project area. Submissions were also received on the community's ties to and the history of the Fingerboards and its importance historically and still today as a meeting place for the surrounding communities.

Mine Free Glenaladale submitted that the Fingerboards intersection is at the crossroads of four adjoining communities, and that it was used extensively as a social meeting place for families gathering there in horse drawn wagons to travel together to Bairnsdale. They submitted that the Fingerboards intersection had historical and cultural significance for the older residents. Mine Free Glenaladale noted that it is still used as a meeting place, as a rest stop for visitors to the area and a staging area for the Country Fire Authority and that the Fingerboards is the gateway to the Mitchell River National Park (Submission 813).

The IAC concluded that the local community have a deep sense of place with respect to the project area and the Fingerboards meeting place and that the project would have a significant adverse impact on this sense of place resulting in a loss of connection with this land. The IAC was assisted in reaching their conclusion by their site visits and listening to submissions from the local community during the hearings. The IAC acknowledged that the proponent has suggested mitigation measures, such as moving the Fingerboards meeting place and notice board so that locals could continue to have a meeting place, however the IAC considered this would be unlikely to be successful and would be another reminder to the community of what had been lost.

I accept the findings of the IAC and note that given the unacceptable and other significant effects of the project including as described in Sections 5.1, 5.2, 5.11 and 5.3 of my assessment, these effects would inevitably contribute to the loss of connection with the land and significantly impact the community's sense of place. This finding has contributed to my assessment that the social effects of the project are very significant.

#### *Effects on community cohesion and well-being*

The EES identified the project's potential to have a significant impact on community cohesion and well-being, identifying potential sources of division between those who stood to gain from the project and those who did not. The EES acknowledged that the division would influence how residents interact and engage with their community. The EES noted some community members had already reported the project had resulted in division. The EES assigned high and moderate residual risk ratings for community division for residents adjacent to the project area and those within 10 km of the project area respectively.

Potential effects associated with access and connectivity of the community relating to changed road conditions or physical disturbance from mining effects to local access to and connectivity with social networks or places of employment and recreation were considered to be low after the implementation of mitigation measures. Mitigation measures proposed in the EES were generally related to traffic management focused on safety and ensuring alternative routes would be provided.

The EES considered the potential effects of how an influx of workers from outside the project area would affect the cohesion of the local community, for example through engaging in unwanted behaviour in the local community. The EES proposed mitigation measures such as employment procedures, police checks for potential employees and a community complaints procedures. The residual impacts were considered to be low. The EES also considered how community services and infrastructure would be impacted by increased demand from the project workforce. The EES found the residual impacts would be low with the implementation of proposed mitigation measures including local employment and procurement guidelines, pre-employment medical, engagement with local health service providers and the local government areas.

The IAC heard submissions from the community about the divisions that had already occurred within the community as a result of the project and their concern about the effects should the project proceed. East Gippsland Shire Council submitted that the risk of harm to the wellbeing of the community is one of the key adverse impacts of the project (Tabled Document 407) and that the proposed mitigation measures would not be effective.

Kalbar submitted, in closing, that social rifts are likely to heal and that they, as proponent, would have a role to play in this process. Kalbar further submitted that the social effects could be managed through the proposed mitigation measures.

The IAC found that the local community is active with strong social ties and a well-developed sense of community identity. The IAC heard submissions, as the EES had acknowledged, that community cohesion and well-being in and around the project area has already been adversely impacted and found that should the project proceed it would continue to be impacted. The IAC considered that many of the proposed mitigation measures would do little to address the concerns of the community, noting that submissions about the community grants program had already contributed to some division within community clubs and groups, for example members withdrawing from meetings or clubs. The IAC was also concerned about the impact on key community institutions such as emergency services, in the event project staff are paid to participate in volunteer activities such as the Country Fire Authority, when these groups play an important role in community cohesion and well-being.

I accept the findings of the IAC and note that given the very significant and in some cases unacceptable effects of the project, including as described in Sections 5.1, 5.2, 5.11 and 5.3 of my assessment, I consider it unlikely that the proposed mitigation measures would be effective enough to prevent the impacts on community cohesion and community well-being from being very significant.

#### *Efficacy of and engagement through social and economic impact assessment*

Submissions were made in regard to the limited primary data collected for a project of this size to support the social impact assessment and the proponent's reliance on other studies and stakeholder engagement activities. The IAC found that stakeholder engagement activities undertaken to support the project and EES process should have been supplemented with comprehensive empirical research to inform the development of the social impact assessment. As the IAC reported, I have commented in previous assessments on the importance of not confusing stakeholder engagement for the project with engagement required to inform the social impact assessment.

I note that there have been difficulties in the proponent gaining access to some properties to gather information for the preparation of its EES. I am unable to determine to what extent this has influenced the proponent's ability to engage with a wider group of landholders within and near the project area to support the development of the social impact assessment.

The IAC considered that it had sufficient information about social impacts to carry out its role. I agree that there was sufficient information for the IAC and for me to inform an assessment of social effects.

#### *Social licence*

The EES did not refer to social licence, however it was raised in submissions on the EES and reported on by the IAC in their report. The IAC found that there is no requirement for Kalbar to demonstrate the project has a social licence.

I note that there has been commentary during the public hearing process on the volume of opposition to the project, as measured for example by the number of submissions made against the project, I would like to note that my assessment is focused on the potential effects of the project rather than on the number of submissions for and against the project. While it can be tempting to consider these numbers as indicative of the community's feelings in the project, I note that there are people within the community who have not participated in the EES and public hearing process but that does not necessarily mean that they do not have an opinion on the project. I am also very conscious that in a scenario where there is strong vocal opposition to a project, some members of the community may not feel comfortable voicing their support for the project. The IAC reported on the divisions that have already occurred within the community during the assessment phase of this project. I agree with the IAC's finding that there is no requirement for the



project to demonstrate that it has a social licence and that the focus of the EES and my assessment needs to be on the significance and acceptability of potential effects.

### **Assessment**

It is my assessment that the project would have very significant effects on the social values of the local and possibly the regional community, including on their sense of place and community cohesion and wellbeing. In combination these potential effects of the project on the community and social values are likely to be unacceptable. I note that IAC has reported on submissions which show this to have already occurred to a significant degree, in the context of the EES process for the project. It is also my view that, should the project proceed, the likely very significant and unacceptable effects, including as described in sections 5.1, 5.2, 5.11 and 5.3 of my assessment, would result in impacts the local community would not be able to overcome even with the implementation of the proposed mitigation measures.

## **5.5 Groundwater**

### **Evaluation objective**

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

### **Assessment context**

Groundwater effects are addressed in Chapter 9.2 and the technical reports Appendices A006, A007 and A008 of the EES, as well as in Chapter 6 of the IAC's report. A number of mitigation measures deal with groundwater as outlined in Attachment H of the EES which were then revised during the IAC hearing and presented in Tabled Document 777.

A number of potential effects of the project for groundwater values were examined through the EES and IAC process, in particular the:

- impacts associated with groundwater availability for mine water supply;
- impacts associated with using groundwater to supply mine water requirements;
- impacts of seepage quality and quantity on groundwater beneficial uses;
- impacts of groundwater mounding on the Mitchell and Perry rivers;
- impacts of groundwater on the Woodglen active storage and recovery;
- impacts and management of groundwater mounding; and
- impacts of the project on water supply to spring-fed dams.

The potential effects to groundwater dependent ecosystems are dealt with in Section 5.1 of my assessment. Potential effects related to surface water values are dealt with in Section 5.6 of my assessment.

### **Discussion**

#### *Groundwater availability*

The project requires about 3GL of water per year for ore processing, dust suppression, rehabilitation, wash down and onsite drinking water. Water is proposed to be supplied by a licenced winterfill abstraction from the Mitchell River. In years, when there is insufficient water available from the Mitchell River, mine water would be supplied through the licensed abstraction of groundwater from the Latrobe Group Aquifer. If sufficient water is not available operations at the site would need to be scaled back.

In response to a request for information from the IAC, Kalbar presented the impacts of climate change on its project's water balance (Tabled Document 535). The work showed that it is likely that a drought would occur at least once during the proposed 15 year mine life and peak groundwater use could be up to 2.8GL/year, which is equivalent to the total site water demand.

Several submissions were received that expressed concerns about the availability of groundwater to supply the project. Southern Rural Water (SRW, Tabled Document 38) and the community group Mine Free Glenaladale's expert witness on groundwater (Tabled Document 88) submitted that the Latrobe Group aquifer system is fully allocated and under significant pressure with the groundwater levels in the aquifer declining at a rate of about 1m/year in areas to the south and west of the project since monitoring was established in 1970s. The proponent has understood that access to the groundwater resources of the Latrobe Group aquifer is capped and can only be obtained from willing sellers (EES, Chapter 3).

The proponent has not identified any groundwater licensees that would be willing to transfer their licence to Kalbar, so I have no information before me relating to the feasibility of whether groundwater would be able to be obtained to supply mine water or on the effects that might stem from trading that volume of water from one or more licensees. If a feasible trade was to be identified and pursued, I note that any application to trade groundwater licences would be subject to assessment by SRW under section 40 of the *Water Act 1989*, which would assess and protect the rights of existing users, the environment and sustainability of the resource.

The IAC found that Kalbar's contingency plan to scale back operations in the event groundwater does not become available is not a reasonable or acceptable approach. Under this approach, limitations to water access may result in an unpredictable extension to the mine life and further consequences for other environmental values that may result from prolonging mining. These have not been considered or indeed assessed by Kalbar to demonstrate whether this could be acceptable. I agree with the IAC's finding and note that a planned potential extension of the mine life due to uncertain water supply is not an acceptable contingency plan and could contribute further to some significant and unacceptable effects, such as dust, which have been assessed and are discussed further in Section 5.2 of my assessment. I accept that in planning to scale back operations, potential effects may be reduced during the years where operations have been limited. However, I agree with the IAC that the more likely outcome is that the project life and period over which the community is exposed to some significant and unacceptable effects would be drawn out.

#### *Effects associated with groundwater as supply for mine water requirements*

Groundwater modelling was prepared during the development of the EES as the basis for assessing potential impacts from the project to the groundwater system in the event a trading partner is found. This modelling assessed the potential drawdown of groundwater levels during groundwater abstraction for project water supply. A conceptual model of the local and regional groundwater system was developed which was supported by an initial drilling program and a 4-day pumping test program. Submissions were received on the adequacy of the modelling and baseline data collection to support it.

The EES found that extraction of 3GL/year of groundwater during operations resulted in a drawdown of groundwater levels by up to 35km south of the borefield of a minimum of 1m. Maximum groundwater drawdown, from continued extraction for mining operations, was predicted to be up to approximately 14m in the immediate vicinity of the borefield.

The groundwater expert's conclave agreed the pumping test was sub-optimal and a longer duration test, where high-quality late test period data can be derived, would be needed to better understand the aquifer's behaviour in response to pumping (Tabled Document 255). The conclave also agreed that the pumping test data could indicate potential boundary effects and the groundwater assessment had not considered the risk of a potential boundary effect and that predicted groundwater drawdown associated with pumping from the Latrobe Group aquifer may be inaccurate.

Southern Rural Water (SRW) submitted that further testing and assessment would be needed to support any licence application for extraction of groundwater in accordance with the groundwater licence application guidelines (Submission 291). SRW also stated that the potential connection between the three aquifers at the project site is a significant issue for consideration and that the proponent would need to demonstrate impacts from its pumping will not adversely impact existing users, the environment and the sustainability of the resource (Tabled Document 38).

The IAC considered the groundwater modelling generally acceptable for the purposes of informing the EES. However, the IAC found that there is ongoing uncertainty within this region regarding the response of the Latrobe Group aquifer, and other aquifers at the project site, to pumping. It concluded that further work would be required to understand the groundwater site specific conditions to allow for assessment of the project's effects on groundwater. The IAC considered 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.

I generally support the findings of the IAC that there is not sufficient information before me to make a definitive assessment on whether the adverse impacts of the project in relation to groundwater drawdown can be acceptably managed. I also accept the recommendation of the IAC for further work on this aspect, should a decision maker wish to proceed with consideration of the project's approval and consider that it should include assessment of cumulative effects within and around the project area.

#### *Effects of seepage quality and quantity on groundwater beneficial uses*

Seepage of process water within coarse and fine tailings material back-filled into the mine void (fine tailings within containment cells) would potentially percolate through to the regional groundwater table. The EES asserted that tailings seepage water would have comparable quality to the existing Coongulmerang Formation groundwater and would therefore not have an adverse impact to the health of surrounding GDEs. A number of submissions were received raising concerns about impacts from seepage quality and quantity.

The proponent submitted that residual water within the fine tailings cake after centrifugation would not be free draining (Tabled Document 43), while Mine Free Glenaladale's (MFG's) expert witness on groundwater submitted that it was unlikely that residual water entrained within the fine tailings water would remain there and that it was likely that this water would mix with re-charging groundwater moving through the mine voids before reaching the regional water table (Tabled Document 186).

All experts at the groundwater expert's conclave agreed that further leaching tests of tailings material should be conducted with Latrobe Group Aquifer water in order to determine potential effects of the use of this water on leachability of elements of the tailings material, in addition to further baseline monitoring and assessment on other aspects of process water quality (Tabled Document 255). I support the conclave's recommendations for further work and recommend this work be undertaken to inform consideration of any future approvals. MFG's expert witness on tailings, also identified the need for further work to identify

breakdown products of the nominated flocculants to be used in tailings processing and centrifugation, including potential fate and transport modelling for contaminants of concern and consideration of potential added nutrient load for the Gippsland Lakes Ramsar Site. The need for further work was not disputed by other expert witnesses at the conclave.

West Gippsland Catchment Management Authority (WGCMA) also supported the need for further work on breakdown products of polyacrylamide flocculants particularly relating to the flux of nitrogen species from tailings deposited in the mine void (Supplementary Submission 358).

The IAC noted in its report that the EPA and Kalbar did not reach agreement during the hearings on whether the discharge of water seeping from tailings to groundwater would require a development licence under the *Environment Protection Act 2017*.

Kalbar propose a range of drainage infrastructure to manage seepage including toe drains, wet wells and a sub-surface drainage network. The groundwater expert conclave (Tabled Document 255) agreed on the need for monitoring of the escarpment for lateral seepage and installation of a nested bore network across multiple depths to monitor for potential seepage.

The IAC considered that, in the absence of real-world examples of the application of centrifuges being used to dewater mineral sand mine tailings or a larger field scale demonstration, considerable field scale trials of centrifugation are required to have confidence in expected seepage rates and the rate of application of flocculants that is required to dewater the tailings material. The IAC noted there was evidence before it that the potential effects of flocculants on groundwater discharges were significant and unacceptable and recommended further work to demonstrate that flocculant can be recovered to avoid seepage to groundwater or that the level of flocculant required does not pose an unacceptable risk.

I generally agree with the IAC's findings and recommendations on this matter.

#### *Effects of groundwater mounding on groundwater beneficial uses*

Entrained water within the tailings material to be back-filled within the mine voids has the potential to create a mounding of groundwater in and around the mine void. The EES predicted that groundwater mounding would be largely confined to the project area, with the 0.5m groundwater mounding contour extending approximately 4km from tailings seepage locations by year 15. The EES asserted that insignificant changes were predicted for sensitive receptors including the Gippsland Lakes, Providence Ponds, Perry River and Woodglen active storage and recovery site as well as groundwater users in the Coongulmerang Formation and Balook/Latrobe Valley Group groundwater resource.

The EES undertook particle tracking modelling to show groundwater movement from different points beneath the project site as the groundwater mound developed and throughout stages of the project's life. The modelling undertaken to support the EES indicated the groundwater beneath the site is likely to be predominantly transported vertically to the underlying Balook Formation Aquifer, where it migrates to the south and east, away from the Woodglen active storage and recovery.

Mine Free Glenaladale submitted on the potential for groundwater mounding to create a new pathway for mobilisation of existing contaminants within the regional groundwater to beneficial uses on the floodplains below, including surface water systems.

All experts agreed that modelling of groundwater mounding predictions in the EES are conservative as it does not account for the expected water recovery efficiencies through the proposed use of centrifuges to

dewater the fine tailings material (Tabled Document 255). The proponent's expert witness, Mr Sweeney, submitted that conservative modelling showed the increase of groundwater discharge to the Mitchell River would be 1-2% of Mitchell River flow during low flow conditions (Tabled Document 81). Mr Sweeney submitted that groundwater mounding in the Coongulmerang Formation Aquifer was not predicted to extend to the Gippsland Lakes, Providence Ponds, the Perry River or the Woodglen active storage and recovery site.

The proponent submitted that it would be appropriate to require water quality monitoring, including interception bores, between the project and Mitchell River to allow for corrective action to be taken if significant departures from predictions are identified (Tabled Document 698).

The IAC accepted the modelling in the EES is sufficient to demonstrate that the capacity of mobilisation of metals and nutrients in the existing groundwater to impact the Mitchell River is limited. The IAC also accepted that there is already a connection between the regional groundwater table and the Mitchell River. I accept the findings of the IAC on this aspect and note its recommendations for further trials on centrifugation of fine tailings, flocculant dose rates and recovery.

Submissions, including from East Gippsland Water Corporation (Submission 692), were received in relation to potential effects associated with seepage from the project on groundwater quality and quantity at the Woodglen active storage and recovery. East Gippsland Water Corporation submitted on the importance of ensuring the risks are adequately managed and monitoring programs are established in consultation with the water corporation.

The IAC accepted the evidence of Kalbar's experts on the potential for effects on the Woodglen active storage and recovery, finding that the risk of impact on the Woodglen active storage and recovery from groundwater mounding was acceptable and could be monitored over the life of the project. I agree with the findings of the IAC. Should a decision-maker proceed with considering approval, it is my recommendation that a proposed monitoring program be established in consultation with East Gippsland Water Corporation.

### *Effects of the project on water supply to spring-fed dams*

Submitters raised concerns that there are farm dams within and around the project area that would be disrupted if the project were to proceed. Submissions raised that some of these farm dams maintain water levels in the absence of surface water run-off and are supported by local groundwater aquifers. Displacement of the materials within the mine void would potentially remove the aquifers or pathways for water supply for these dams within and surrounding the project site.

All experts agreed farm dams within the project area are unlikely to be supported by groundwater from the regional water table but are most likely to be dependent on isolated perched water (Tabled Document 255). The IAC noted there was no persuasive evidence before it to prove the existence of spring-fed dams in the area. While I accept it is a landholder's right not to allow property access, I note that when the landowners of 2705 Bairnsdale-Dargo Road prevented access to their property, the EES was potentially deprived of evidence of spring-fed dams occurring in the project area.

East Gippsland Shire Council's expert witness statement (Tabled Document 190) noted it is likely that at least some of the perched groundwater within the project area lies within the porous and permeable dune sand and that springs can emerge at the boundary between the dune sand and the less permeable Haunted Hills Formation. The council's witness submitted that spring-fed dams and potentially the perennial

sections of Moulin/Stoney Creek could lie along this boundary. The proponent recognised owners of dams which are shown to be impacted due to loss of water would be entitled to a compensation agreement (Tabled Document 698).

The IAC found that it is not practicable to protect dams within the mining area if the project were to proceed and that the project could restrict surrounding properties' access to the perched water table system through the removal of the dune sands. The IAC made recommendations for further assessment to determine the potential for spring-fed dams to occur within and near the project area, should the project proceed, and for compensation arrangements to be made between Kalbar and owners of dams shown to be impacted by the project. I generally support those findings and recommendations of the IAC.

### **Assessment**

It is my assessment that a contingency plan to scale back operations in the face of insufficient water availability would lead to the extension of significant and unacceptable effects on nearby sensitive receptors. I note that the proponent has had enough time through the EES process to identify licensee(s) willing to trade their groundwater licence(s) and opportunities to further develop contingency measures including alternative water supplies but has instead presented this form of the project for my assessment. Although I accept that in scaling back operations, potential effects may be reduced during the years where operations have been scaled back, I agree with the IAC that the more likely outcome is that the project life and period over which the community is exposed to significant and unacceptable effects would be drawn out further.

There is insufficient site-specific groundwater baseline information underpinning the development of the groundwater model to conclusively assess the potential effects associated with groundwater extraction for mine water supply. I generally support the recommendations of the IAC for further investigations should a decision-maker wish to grant approvals for the project.

There is insufficient information to inform my assessment of the potential effects related to seepage quality and quantity from the fine tailings material. I generally support the recommendations of the IAC for further investigations should a decision-maker wish to grant approvals for the project.

It is my assessment that the effects of groundwater mounding on mobilising existing contaminants within the regional groundwater table to beneficial uses including the Mitchell and Perry Rivers and the Woodglen active storage and recovery are likely to be acceptable subject to the implementation of monitoring of groundwater levels and quality and contingency measures if to reduce impacts of mounding if detected. I recommend that the monitoring program for the Woodglen active storage and recovery be developed in consultation with the East Gippsland Water Corporation.

It is my assessment that with further mapping to identify the potential for dune sands to support perched groundwater supply to farm dams outside of the project area and with the implementation of make-good arrangements between Kalbar and potentially impacted dam owners, potential effects to spring-fed dams could be adequately managed.

The IAC has made a number of recommendations for further work to inform the assessment of some of the project's effects associated with groundwater. I generally support the IAC's recommendations with some minor changes as outlined in Section 6.1 of my assessment.

## 5.6 Surface water

### Evaluation objective

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

### Assessment context

Surface water effects are discussed in the EES, within Chapter 9.3 and Technical Reports included in Appendix A006, A007 and A008, as well as in Chapter 7 of the IAC's report. In addition, four surface water technical notes were provided by the proponent at the IAC hearing (Technical Notes 2, 13, 29, 37). A number of mitigation measures deal with surface water matters as outlined in Attachment H of the EES which were then revised during the IAC hearing and presented in Tabled Document 777.

A number of issues and potential effects on surface water values were examined through the proponent's EES and by the IAC, in particular the:

- the project's access to surface water (from the Mitchell River winter-fill);
- potential adverse effects on values and licensed uses of surface water resources due to water extraction/use required by the project;
- approach to modelling project water balance (and climate data used), to inform water/dam management in times of high rainfall events;
- potential erosion, sedimentation and landform stability effects during construction, operations, rehabilitation;
- potential adverse effects on receiving waters due to discharges from operational areas, changes to water and/or interception/diversion of runoff, particularly for the Mitchell and Perry Rivers; and
- potential adverse effects on water environments further downstream with conservation significance, such as Lake King and Lake Wellington, and Gippsland Lakes Ramsar Site.

The effects on specific values of the Ramsar site protected under sections 16 and 17B of the EPBC Act are dealt with in Appendix A of my assessment. The effects for receiving/downstream water environments from possible groundwater impacts are discussed in section 5.5.

### Discussion

#### *Water supply (access to water from the Mitchell River winter-fill)*

The EES concluded that potential effects associated with Kalbar extracting water from the Mitchell River (winter-fill) would not impact water availability for other (licensed) users or the public, or water dependent ecosystems, and would be restricted to days between July and October when flows exceed 1,400ML/day. The EES assessed the residual environmental risk of this surface water extraction as low, as it would only be permitted when flows were well beyond both environment flow targets and those required for other yearly licensed users.

As set out by both the proponent and SRW through the IAC process, Kalbar would need to apply and participate in a competitive process, in order to access the winter-fill water supply. Two gigalitres has been reserved for allocation by SRW (in late 2021) via an auction process for those eligible to be considered for a licence at that time. The application process for such a large volume of extraction would need to examine the potential effects and ensure any licence for extraction issued was conditioned to ensure risks were indeed low and have a negligible effect on other users and the environment. SRW clarified that this entails detailed impact assessment under section 40 of the *Water Act 1989*, including an assessment of all impacts on the local and downstream environments, other users, and the waterway itself.

Concerns were raised by several submissions regarding the proponent's extraction of surface water from the Mitchell River, in particular that it may reduce the availability of water supply to other users and the environmental flows in the Mitchell River and environments further downstream.

The submitters raised concerns about the competition with agricultural uses and potential for allocation of surface water supplies to Kalbar adversely affecting the expansion of existing agricultural businesses that rely heavily on water to operate. As stated by SRW, there is limited water to allocate from the Mitchell River, which may or may not be allocated to Kalbar. It is highly likely that SRW would allocate water to existing licence holders in the area if Kalbar was not successful in securing it.

The IAC agreed with the significant value of water in the region for the agricultural and horticultural sectors, as well as for potable /domestic use, in addition to its important role as environmental flows for downstream environments such as the Gippsland Lakes. It concluded that introducing another significant water user, this project could have an adverse impact on an already competitive, constrained water market in the region. I support the IAC findings on this matter.

As noted by the IAC, the project does not have existing rights to Mitchell River water or to the 2GL of winter-fill that will become available in late 2021, and it is not the IAC's role to determine how winter-fill water is allocated or how that may need to occur to minimise environmental risk or indeed enable equitable or 'best' allocation. I concur this is beyond the scope of the IAC and agree this matter of water allocation is one for SRW to consider, should the project proceed.

As discussed in Section 5.5 of this assessment, the IAC and submitters raised concerns about the proponent's contingency plan to address unavailability of sufficient surface and groundwater to meet the project needs (i.e. to scale back the project). This could have implications and effects for different aspects of the environment.

#### *Effects on receiving waters (hydrology, water quality) due to diversions, site water management and discharges*

Land disturbance from the project would change the topography of the site and reduce runoff leaving the site, thus reducing the frequency of more regular, low flows within gullies drain the project area into the Mitchell and Perry Rivers. The EES predicts that reduced runoff from these changes to topography and use of infrastructure to divert runoff will not generate significant impact on water availability for users of the Mitchell and Perry Rivers, given the size of the two catchments. The project is not predicted to impact the hydrology and environmental values of these surface waters directly downstream. The EES reached these conclusions noting that the drainage lines/gullies to be intersected/ diverted by the project are ephemeral and typically dry. The modelled year 8 mining scenario results in a reduction of only 0.02% of annual flows in the Mitchell River and increase of 1% in the Perry River.

The updated proposal tendered to the IAC included use of centrifuges, to improve extraction of water from tailings and to remove the need for a temporary tailings storage facility (TSF). The removal of the TSF from the proposal reduces the risk to downstream water environment's associated with the potential failure of the TSF. However, as noted by the proponent's expert, there is still risk of a failure of the centrifuge. However, careful design could mitigate the risks.

As described in the EES, the proposed site water management will collect mine contact water in dams, which will then be treated in the dissolved air flotation (DAF) plant (rate of up to 24ML /day). The DAF



plant will generate treated water to be pumped into the freshwater storage dam, for reuse and/or release downstream waterways.

The IAC examined some critical aspects (highlighted by submitters) of the proponent's approach to water balance and site management and the associated modelling of the water management system. Concerns were raised about the climate data used, the impact of east coast lows on water management risks, the complexity of the proposed management system and reliability of the DAF plant's performance and ability to control discharges to receiving waters. These matters are discussed below.

### Flood modelling - climate data and east coast lows

Several submitters raised issues with the proponent's limited consideration of climate change and uncertainty associated with east coast lows, asserting they increase environmental risk due to a very high intensity of rainfall combined with the area's soil type. Such storms are considered very likely to bring water management challenges and potential for uncontrolled discharges of floodwaters from the site with significant sediment load into the Perry and Mitchell Rivers. Submitters cited anecdotal evidence of water pooling in the project location for many weeks following storms. Local landowners referred to their experience with east coast lows generating random and significant flooding, not believing the proponent has adequately examined these events and associated risks. Submitters questioned whether the proposed site water management system was able to manage the risks to acceptable levels.

The proponent's flood modelling did assume dam storages are full, to represent conservative conditions, including using weather predictions to plan for floods and move water to create storage capacity for runoff and mitigate dams overtopping. The proponent's expert's view was that the dams were sufficiently sized to cater for storms like east coast lows. However, concern was raised by submitters and the IAC regarding the uncertainties and need for further flooding and run-off data from the project area (during an east coast low), which would help determine the reliability of using historical meteorological data to model runoff and the potential for a microclimate to exist. I support the need for this to occur in the event the project is considered for approval.

The EPA did seek further information on the proposed storage structures, including how water would be moved between storages and how the design and management measures could prevent spills, although Kalbar was unable to address them, citing the need for project design matters to be more resolved first. EPA considered the "spill risk from dams to be unacceptable given the water quality of untreated mine contact water" (Tabled Document 486). In its submission, the EPA highlighted the importance of upgrading the design of water management dams to have sufficient capacity to contain contaminated runoff and prevent discharges to under 1% (for both the Mitchell and the Perry Rivers). I agree this would be necessary if a decision-maker considers approving the project despite my primary recommendation.

The water experts assembled at the conclave agreed flood modelling needed to consider climate change sensitivities and extreme weather events further, using a 5% increase in rainfall intensity and worst-case flooding conditions onsite. The IAC also considered the EES' modelling and examination of east coast lows and climate change to be inadequate, and the risks of impacts on downstream environments not sufficiently explored. I support this view.

The EES assessed the risk of spill from mine water contact dams to be about 3.4%. Further work produced by the proponent (Technical Note 37) to respond to the IAC's concerns about climate change scenarios, predicts the risk reducing to 1%, with mostly reduced rainfall predictions. However, this work also highlights that climate change scenarios could give rise to intense storms becoming more intense increasing

the peak runoff. The IAC concluded that east coast lows were very likely to result in large volumes of rainfall and runoff in short periods of time, with widespread flooding of the site, which increases risks for downstream water environments. It was the IAC's view this presented very significant challenges for how water is managed on the mine site and could give rise to some significant impacts associated with contaminated runoff entering the Perry and Mitchell Rivers at times, possibly reaching further downstream (as far as the Gippsland Lakes). I support this conclusion and consider the consequences of these risks to be significant and not reduced to an acceptable level.

### Water management system - DAF plant and discharges to receiving waters

The proponent's modelling in the EES uses historical rainfall data to estimate the discharges from the water management system to receiving waters (in the Mitchell and Perry Rivers). The experts at the water conclave agreed the model provided reliable estimates of the likely frequency and volume of discharge events from the water management dams. The revised documents provided to the IAC by the proponent take account of the centrifuges and more water being present on site, with the risk of storages overflowing and discharging to waterways increased from 2.5% to 3.4%, with the use of a DAF plant.

However, the EPA remained concerned that the proponent's assessment did not sufficiently characterise the DAF plant's discharges, including volumes or the times of the year it would deliver water back into the Mitchell River. In particular, the EPA was concerned about the discharge of treated water into the Mitchell River during periods of low flow (summer/autumn) impacting on the river's water quality. Other submitters raised the influence of potential droughts on flows and dilution/dispersion of DAF plant discharges into the Mitchell River.

The IAC agreed with the EPA and remained concerned about the potential impact on water quality in the Mitchell River during times of low flows with reduced dilution of discharges, with the risk of also impacting on water quality in downstream environment such as the Gippsland Lakes. However, the IAC also concluded that management measures could be developed to manage water quality of discharges into the Mitchell River (i.e. to reduce the need for dilution via mixing).

SRW and WGCMA raised concerns about complexity and uncertainties associated with the operation of the proposed water management system. The submission of WGCMA raised concerns about the reliance on the DAF plant to treat water, given it could fail or be unusable at times when the freshwater storage is full (e.g. during the winter-fill period). In WGCMA's opinion the proposed water management system is too reliant on a temporary mechanical facility (DAF plant) that is at risk of failure and without any redundancy or contingency.

The proponent's expert witness agreed there is a limitation when the DAF plant is unable to operate at times and that it increases the probability of dams spilling. Environmental risk stems from this, particularly when the freshwater storage is at or near capacity; there is an increased likelihood that contaminated mine contact water may be unable to be treated before discharging into the Mitchell River or Perry River. The IAC agreed with the proponent's expert witness and WGCMA's submission. I concur with these views and conclude there are indeed limitations associated with the water management system relying on the DAF plant.

Due to the proposed use of centrifuges, it is expected that more water will be present on site for use and less water would be taken from the freshwater dam. More water is then expected to be held within the freshwater dam at any one time, which adds to the risk of the DAF plant not being able to discharge to the freshwater dam at times it is necessary to do so.

The IAC also accepted there could be management of this by prioritising the dewatering of the more sensitive Perry River catchment dams, as proposed by Kalbar. However, it was not clear how (or whether) this was practical and whether the timing and rate of dewatering would result in impacts on the environment, or sufficiently reduce the risk of spill to the Mitchell River.

The overarching concern of the IAC and that of key submitters is the system's dependence on the DAF plant and the absence of a real contingency plan to cover its failure or inability to operate at times when it is essential to mitigate risks to downstream water quality. This creates a significant risk for downstream environments. The IAC concluded that the information presented by the proponent was not able to demonstrate reliable performance of the DAF plant and that this presents a significant and unacceptable risk of contaminated mine contact water entering downstream environments at times it is off-line, including potentially the Gippsland Lakes. I support the IAC's conclusion regarding the unacceptability of this risk.

#### *Potential effects on sensitive downstream waterbodies (Gippsland Lakes Ramsar Site)*

The Gippsland Lakes receive water from seven major river systems including the Mitchell and Perry Rivers. The EES assessed the potential impacts to the Gippsland Lakes by assessing the impacts to surface waters directly downstream, of the project site (the Mitchell and Perry Rivers), and to the local groundwater system.

The EES predicts that water dependent ecosystems (including the Gippsland Lakes) will not be adversely impacted by the project, including through its proposed extraction of winter-fill water from the Mitchell River. It states that extraction will not alter the salinity profile within the downstream environments of Jones Bay or Lake King of the Gippsland Lakes, or the ecosystem health and other beneficial uses/values of these wetlands. The EES also asserts that the site's water management system (including the DAF plant) will minimise risk to downstream environments in relation to both hydrology and water quality.

As discussed above the IAC's view is that there is risk for sensitive downstream water environments, including the Gippsland Lakes, due to the potential for failure of the site's water management system (i.e. spills from dams, unreliability of the DAF plant, significant rainfall events leading to uncontrolled discharges), which could produce higher sediment loads and contaminated water entering the Perry and/or Mitchell Rivers. I support the IAC's view that this risk is higher than that articulated in the EES and that without mitigation, these risk events are likely to generate unacceptable impacts for the receiving waters of the Ramsar site.

Some mitigation of this risk may be possible through design (e.g. meeting ANCOLD standards) and other management measures. However, given the location of the project directly upstream from two rivers that feed into the Gippsland Lakes, the consequences of such impacts on water quality on the downstream Ramsar site is high, and the project as proposed by Kalbar has limited scope to sufficiently mitigate this risk effectively.

#### **Assessment**

It is my assessment that the project's proposed use of winter-fill from the Mitchell River would introduce another significant user, impacting on an already constrained and competitive water market in the region, and potentially limiting the expansion of existing agricultural businesses already heavily reliant on water to operate. However, I support the IAC's findings that it is not its role (or mine) to determine how winter-fill water is allocated under the *Water Act 1989* or how that can/may need to occur to minimise environmental

risk or enable 'best' allocation. This is beyond the scope of my assessment and remains a matter for SRW, should decision-makers consider proceeding with approval of the project.

It is my assessment that the proponent's consideration of east coast lows and climate change was inadequate, thus understating the risks of impact on downstream environments. Some east coast lows are very likely to result in large volumes of rainfall and runoff over short periods, leading to flooding and increased risk of contaminated discharges into downstream surface water environments of the Mitchell and Perry Rivers. I conclude that combined with the unreliability of the DAF plant as a core element of the water management system (and without any redundancy or contingency), this presents very significant challenges for how water can be effectively managed on the mine site. As currently configured the system could fail and could give rise to significant impacts on water quality of runoff leaving the site. I conclude there is a significant risk of untreated mine contact water entering the Mitchell and Perry Rivers at times the DAF plant is unable to operate. My assessment supports the conclusion of the IAC that the project has limited scope to sufficiently mitigate this risk to an acceptable level.

I also consider the project's potential for higher sediment loads and contaminated water entering the Perry and Mitchell Rivers to increase the risk for the downstream waters of the Gippsland Lakes Ramsar Site. It is my assessment that without mitigation, it presents an unacceptable risk of significant impact on the water quality of this sensitive Ramsar wetland system. Indeed, the proponent has not demonstrated it has taken all reasonably practicable measures to reduce risk of harm to downstream environments such as the Gippsland Lakes.

## 5.7 Noise and vibration

### Evaluation objective

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

### Assessment context

Noise and vibration impacts are addressed in chapter 9.6 and technical report Appendix A10 of the EES and in Chapter 9 of the IAC Report. The IAC identified 27 mitigation measures in the EES and nine technical notes tabled during the IAC's hearing that deal with noise and vibration matters.

### Discussion

#### Noise

The IAC generally accepted the proponent's evidence that the project would be able to meet relevant criteria in the ERS, although it recognised that some aspects of the revised project such as the expanded mining licence area had not been assessed. It acknowledged that exporting concentrate via the Fernbank rail siding as proposed would be superior in noise terms compared to road freight using B-double trucks to Bairnsdale.

The IAC however noted the additional obligations arising from the GED under the *Environment Protection Act 2017*. Effectively the proponent would have to achieve all practicable mitigation of impacts such as noise on sensitive receptors, not merely demonstrate that it could meet quantitative thresholds specified in the ERS.

The IAC also noted the real difference between existing ambient noise conditions and the noise environment if the project proceeds, even with all practicable measures to mitigate noise operating as best

they can. Neither the ERS nor the GED could be applied to require that no perceptible change to the noise environment results from a development. There would be a perceptible change for the neighbouring community, and submissions to the IAC were clear that such a change would be unwelcome to the majority of local submitters.

The mining operation is proposed to run non-stop 24 hours per day, every day, in a relatively quiet rural location (albeit not pristine). I would expect that appropriate observance of the GED would at least include making every practicable effort, even at the expense of some business efficiency, to minimise exceedances of ambient noise levels during the night period (10pm until 7am). This would particularly apply to the construction phase of the project when noise from work at night should be restricted to genuinely “unavoidable” night-time activity. In considering potential impacts on receptors, the proponent would need to have due regard for all sensitive receptors as presently defined by EPA.

The IAC concluded that if the project were to proceed, noise effects could be managed within established criteria although adverse effects in neighbourhood amenity would still probably result. It noted that the application of the GED would need further consideration, in the context that mere compliance with quantitative thresholds under the environmental reference standard would not represent an adequate approach to achieve compliance with the GED.

### *Vibration*

The IAC noted that existing conditions are characterised by low vibration levels, and the form of the project presented in the EES would not generate a significant increase in vibration as it would not entail activities such as blasting or piling. The proponent provided no evidence about the potential vibration impacts associated with the alternative centrifuge-based approach to dewatering mining residues which replaced the temporary tailings storage facility described in the EES. Some submitters raised concerns about vibration including the potential for liquefaction of soils underlying the foundations of the centrifuges.

It is appropriate for a proponent to review and modify the form of a project in response to matters raised in submissions. However, such changes should not be left to the post-exhibition phase of the EES process if the proponent should have identified the relevant issues through adequate stakeholder engagement while the EES was being prepared. Further, sufficient information about the possible environmental impacts of alternatives adopted by the proponent should be provided to stakeholders and to the IAC to enable a properly informed assessment. It is disappointing that the proponent in this case has failed to do so with reference to potential vibration impacts arising from the centrifuges.

The IAC also noted the potential for vibration effects on dwellings close to affected roads if a road transport option were pursued in preference to the haul road and use of the railway siding at Fernbank, proposed as the preferred option in the EES.

The IAC’s conclusions about the need for further work on assessment of vibration effects would be well-founded if a decision maker were to consider proceeding with approval of the project.

### **Assessment**

On the information available to the IAC and to me, I cannot conclude that the project would have unacceptable effects with respect to noise or vibration. However, I also could not conclude with a reasonable level of confidence that all the project’s noise and vibration effects would be manageable within acceptable limits.

If, contrary to my overarching conclusion and assessment with respect to the project's unacceptable effects on biodiversity, air quality and agriculture and horticulture and social values, decision-makers were minded to consider approvals, further information should be sought from the proponent on uncertainties that the IAC has highlighted with respect to noise and vibration.

The proponent has failed in its EES and in further information presented to the IAC to demonstrate that it has given due regard to how it would adequately observe the GED. If the project were to proceed, the proponent should be required to provide detailed commitments to decision-makers that demonstrate its understanding of its GED obligations, including with respect to noise and vibration and satisfy decision-makers that those commitments would be met effectively.

## 5.8 Radiation

### Evaluation objectives

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

*To minimise potential adverse social and land use effects, including on, agriculture (such as dairy, irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.*

*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.*

### Assessment context

Radiation effects are addressed within Chapter 9.7 and the technical report Appendix A011 of the EES, as well as in Chapter 10 of the IAC's report. EES Attachment H and IAC Document 777, comprising the updated mitigation register which the proponent tabled towards the end of the IAC hearing, both include mitigation measures specifically addressing potential effects of radiation.

A number of potential effects of the project from potential radiation exposure were examined through the EES and IAC process, in particular these can be summarised as:

- adverse impacts to public, workers and the environment related to potential inhalation or ingestion of dust or exposure to Radon or Thoron gas; and
- adverse impacts to public, workers and the environment related to elevated levels of radionuclides in surface water and groundwater.

The potential effects to air quality and human health are dealt with in sections 5.2 and 5.14 of my assessment.

### Discussion

Mineral sands contain naturally occurring radioactive materials, including in particular the mineral monazite, which contains Thorium and Uranium. Monazite, present in the ore, would be concentrated through the on-site processing of mineral sands into magnetic and non-magnetic heavy mineral concentrate (HMC) products. The key pathways for potential radiation exposure include dust (ore and HMC), water, processing, handling and transport of the HMC products.

Radiation in Victoria is managed under a comprehensive regulatory framework set out in the *Radiation Act 2005* and the *Radiation Regulations 2017*, which are administered by the Department of Health. Kalbar would require a management licence prior to commencing operations as well as the approval of a radiation management plan, radioactive waste management plan and radiation environment plan by the Department of Health (Tabled Document 41).

The IAC heard evidence that the risks posed by radiation are greatest when the mineral sands are exposed and in all stages of HMC processing, handling and transport. In the context of the project the IAC found that as the radioactive elements of the material are largely removed from the project area within the HMC, tailings and other materials to be returned to the mine voids would not pose a significant radioactivity risk. The IAC were concerned mainly about the control of dust from the mineral sands and HMC as well as the storage, handling and transport of the HMC.

Kalbar, as part of its EES, undertook an assessment of radiation doses to environmental biota using the ERICA software tool which uses a tiered approach to assessment. The assessment considered the scenario of dust deposition, including from HMC stockpiles, over the 20 year life of the mine for lichen and bryophytes, as the default organism chosen by the software. Kalbar's EES concluded that as the results of the model showed the dose rate values were less than the screening value of 10µGy/h that tier 2 and 3 assessments were not required. The EES concluded that potential effects to EPBC listed species as a result of radiation from the project are insignificant. The Department of Health (Tabled Document 41) noted that the assessment of impacts to flora and fauna species would be required as part of Kalbar's radiation environment plan.

The radiation experts at the expert conclave all agreed further work characterising the radiation baseline levels was required to meet the requirements for a management licence under the Radiation Act and to inform the approval of the different radiation management plans. However, there was disagreement between the experts on the timing for this work and whether it needed to be conducted to inform the EES (Tabled Document 234). It is worth noting the Department of Health, in their response to questions from the IAC, concluded that the methods used by Kalbar are well established and appropriate and that the conclusions drawn in the radiation assessment are valid (Tabled Document 41).

I have given reasonable weight to the responses of the Department of Health, as the regulator of radiation in Victoria, to the questions put to them by the IAC, and their responses have assisted me in reaching the conclusion on the project's effects.

The prescribed radiation dose limit in Victoria is 1mSv in any 12 month-period for a member of the public. The EES looked at a number of pathways for radiation effects to the public including: airborne dust inhalation; exposure to Radon/Thoron gas, which was predicted to be acceptably low due to dilution and dispersion; incremental exposure through ingestion of vegetables or soil; incremental ingestion of ore as a result of airborne deposition; incremental exposure via drinking water and through exposure via a number of scenarios related to the transport of HMC. The EES predicted dose levels would be considerably below the prescribed dose limit. The Department of Health (Tabled Document 41) submitted that methods used in the assessment were appropriate and that the conclusions of the assessment were valid.

The IAC's expert adviser on radiation (Tabled Document 9) identified the need to assess the potential public exposure risk for dairy and beef/lamb production from grazing animals near the project as an exposure pathway that had not been assessed during the EES. Mine Free Glenaladale's radiation expert noted in the expert conclave that the radionuclide content in crops had only been modelled and not sampled (Tabled

Document 234). All experts agreed that this work would need to be completed, while the Department of Health noted that it would be required to support Kalbar's management licence application (Tabled Document 41). The IAC recommended that Kalbar should undertake additional detailed radiation assessment studies and agricultural and horticultural data collection that would 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. I support the recommendation of the IAC, should a decision maker wish to issue and approval for the project.

The EES assessed various scenarios of potential public exposure to radiation through the transport of HMC including a passenger vehicle following a truck loaded with HMC; a passenger vehicle waiting at a rail crossing while a freight train loaded with HMC passes, a resident living on a HMC trucking route; and an accidental spill of HMC during transport. The EES concluded that the public would not experience adverse health impacts from external exposure to gamma radiation. The IAC reported that Kalbar, late in the public hearings, changed the port through which HMC would be exported from the Port of Melbourne to the Port of Geelong (Tabled Document 537). The IAC found that the transport of HMC on freight trains through Melbourne had not been considered and that the export of HMC from Port of Geelong had not been assessed at all through the EES process. The IAC was concerned that the proponent deferred these matters to management plans that are yet to be developed, without having addressed the feasibility, appropriateness and impacts of what is proposed. The IAC recommended that Kalbar be required to undertake a comprehensive risk assessment of transporting HMC through central Melbourne by rail. Should a decision maker wish to issue an approval for the project, I agree with the recommendation of the IAC that there are further scenarios, including emergency response, that should be considered in the context of transport through Melbourne and also recommend that those scenarios include an assessment of the Port of Geelong.

The prescribed occupational dose limit for mine workers is 20mSv per annum. The EES considered pathways for radiation effects to the workforce including external exposure to gamma radiation for workers in different part of the mining and processing plants, internal exposure to radiation from dust, and inhalation of Radon and Thoron gas. Annual dose rates for workers were calculated based on what were determined to be the key exposure pathways, external gamma radiation exposure and inhalation of dust. The EES also predicted radiation dose rates to workers involved in the transport of HMC. All predicted dose levels were considerably below the prescribed occupational dose limit. The Department of Health (Tabled Document 41) submitted that methods used in the assessment were appropriate and that the conclusions of the assessment were valid.

The health and radiation expert witness for Mine Free Glenaladale (Tabled Document 89) provided evidence on the health risks associated with radiation, which he stated are not adequately reflected in current regulatory limits. Mine Free Glenaladale's expert argued that the project should seek to achieve the lowest potential exposure, not just compliance with the current standards, and cited Australian Radiation Protection and Nuclear Safety Agency guidance to regulators on consideration of changes to dose coefficients for occupational exposures (Tabled Document 445).

The IAC supported the concept of minimising exposure as far as practicable and recommended that trigger points within the radiation management plans that cause review and investigation should be set well below current maximum dose levels to activate early intervention and assessment if radiation doses trend upward. I support this recommendation of the IAC.



The IAC noted inconsistency in how HMC is proposed to be managed within Kalbar's documentation, with references to closed systems for managing and transporting HMC, including use of silos, but also references to the use of stockpiles of HMC. Mine Free Glenaladale's experts gave evidence about the importance of management of HMC stockpiles to ensure that potential exposure pathways are limited. The IAC noted that Kalbar's air quality expert, in responding to questioning, had stated that the amount of HMC that is expected to be lost to wind had not been modelled. All experts agreed that every effort should be made to minimise handling, movement and open storage of HMC, and that ideally the HMC would be loaded via as closed a system as possible (Tabled Document 234). The IAC recommended that Kalbar should store stockpiles of HMC in a totally closed system capable of preventing water ingress and containing and treating any water runoff and ensuring that HMC cannot be spread through wind or other mechanisms and that Kalbar should ensure all stages of the export of HMC, including at port, are via closed systems to minimise risks for radiation exposure or loss of HMC to the environment. I generally support these recommendations of the IAC if a decision-maker considers issuing approvals for the project, noting that implementation of the IAC's recommendations may not be feasible and that if closed systems cannot be used, further assessment of the effects of the alternative storage and handling arrangements — in particular, relating to dust generation— should be required to inform the radiation management licence application.

The IAC was also strongly of the view that the radiation management plans should be open to public scrutiny. I note that the IAC's expert adviser confirmed with the Department of Health that these plans are typically treated as commercial in confidence between proponents and the Department of Health (Tabled Document 541). I support the principal of transparency and note the reasoning of the IAC in making the recommendation, primarily regarding improving confidence within the community and the adjacent agricultural and horticultural sector about how radiation would be managed. Equally there may be valid reasons that the Department of Health does not publish these plans. It is my recommendation that, should a decision maker wish to issue approvals for the project, the Department of Health should consider making the draft radiation management plans publicly available where possible.

### **Assessment**

It is my assessment that, as the predicted dose rates to the public and workforce are considerably below the prescribed dose limits and there is a strong regulatory framework for the management of radiation in Victoria, the potential radiation impacts from the project are likely to be manageable to an acceptable level.

I am concerned about the potential for significant dust effects, as identified in Section 5.2 of my assessment, and that there may be also be potential for radionuclides to be carried off-site through dust emissions. Should it not be feasible to manage the HMC within a closed system further assessment of potential radiation impacts arising from dust emissions from HMC stockpiles would need to be conducted.

I acknowledge that in the event a decision maker decides to consider approvals for the project, further baseline data collection and assessment would be required to support any approval decisions by the Department of Health. In that context, I also support the recommendation of the IAC that further detailed assessments required by the Department of Health to inform its potential approval of the project are completed prior to any overall project approval being considered by another decision-maker. If that eventuates, the Department of Health should consider making the radiation management plans for this project publicly available, where possible.

## 5.9 Traffic and transport

### Evaluation objectives

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

*To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.*

### Assessment context

Traffic and transport effects are addressed in Chapter 9.8 and the technical report appendix A012 of the EES, as well as in Chapter 11 of the IAC's report. A number of mitigation measures deal with traffic and transport as outlined in Attachment H of the EES which were then revised through the IAC process and presented in Tabled Document 777.

Potential effects of the project traffic and transport were examined through the EES and IAC process, which can be summarised as:

- adverse impacts on current and projected traffic volumes; and
- functionality, safety and amenity impacts associated with the potential transport options.

The EES concluded that the road network has the capacity to manage the projected increases in traffic volumes, and the range of intersection and other treatments proposed would achieve acceptable safety and transport functionality outcomes.

### Discussion

The EES assessed options for the transport of HMC including movement via truck to Port Anthony or Barry's Beach via the South Gippsland Highway for export overseas and transport of heavy mineral concentrate by road to a rail siding at Maryvale via the Princes Highway then by rail to the Port of Melbourne.

The preferred option identified in the EES was the construction of a new rail siding at Fernbank East for transport of the heavy mineral concentrate to the Port of Melbourne by rail. The secondary option for transport was using the existing rail siding in Bairnsdale, with two alternative truck routes to the Bairnsdale rail siding considered.

During the hearing, Kalbar proposed the use of the Port of Geelong, rather than the Port of Melbourne, for the export of HMC. The environmental effects of this option were not considered in the EES or during the public hearing. Should the project proceed, the IAC has recommended that the feasibility of transport of HMC freight by rail to the Port of Geelong should be assessed and confirmed. I accept the recommendation of the IAC.

The IAC accepted evidence that the overall volumes of traffic involved in the project are manageable within the capacity of current road infrastructure. However, the IAC noted that there was not consensus among the traffic experts that the EES had fully assessed the feasibility of several of the traffic measures that may be required, depending on the option(s) for transport of the HMC the proponent might adopt.

The IAC considered that the effects associated with road transport options to Barry's Beach/Port Anthony had not been fully assessed, however the proponent submitted that transport via rail from Fernbank East was its preferred option. The IAC found that transport via rail is preferred and that Fernbank East is the option with the least amenity and traffic impacts. The IAC noted there was consensus among the traffic

experts that this was the best option. I support the IAC's finding from a transport perspective. However, I note my finding that potential impacts to the Gaping Leek orchid would be unacceptable (see Section 5.1 of my assessment). To manage this risk, the IAC recommended that detailed designs for the rail siding should be prepared in consultation with and subject to DELWP agreement for access to the proposed rail siding to ensure optimal protection for this species. I generally support the recommendation of the IAC.

The proponent's preferred transport option for the HMC to the Fernbank East rail siding is via the construction of a private, sealed haul road adjacent to Chettles Road. Haulage is proposed to occur between 7am and 6pm. East Gippsland Shire Council's traffic expert (Tabled Document 98) noted the issue of separation of intersections along the Fernbank-Glenaladale Road and the control of the intersection of the private haul road and the Fernbank-Glenaladale Road. The IAC considered that there was significant merit in retaining the site access at the proposed roundabout and the private haul road should be grade separated at the Fernbank-Glenaladale Road intersection, which the IAC viewed would achieve the best functionality for all road users. I accept the finding and recommendations of the IAC on this aspect.

The Department of Transport submitted there would be significant costs associated with the Fernbank East rail siding option and that the feasibility of the option could not yet be confirmed (Tabled Document 376). The Department of Transport also noted concerns about the Bairnsdale Rail siding option which would require a roundabout treatment to be installed on the Princes Highway, where the speed limit is 100km/h, contending that it would impact the functionality of the highway. I find that this option would have significant impacts on the functionality of the Princes Highway in this location and this option generally would have greater traffic and amenity impacts than the Fernbank East option. I accept the IAC's recommendation to assess and resolve the feasibility and desirability of new roundabouts on the Princes Highway at Lindenow-Glenaladale Road intersection and Racecourse Road should this option be carried forward.

In order to deliver the project, Kalbar proposed a number of roads would need to be realigned or diverted through different stages of the project's life. The proponent advised of changes to the proposed road deviations exhibited in the EES (Tabled Documents 44-59) in order to align with land that was already owned by Kalbar (or where there was greater confidence land agreements would be reached), and to better align with the likely mining sequence and achieve better conformity with the Austroads design guidelines.

The Department of Transport raised concerns relating to the approach in the EES and the revised alignments, including that access to land to support the road diversions was not yet secure or clear. Further to this, the Department of Transport would not act as the acquiring authority for the land and was concerned about the potential for new or additional access points from properties to Dargo Road and about liability that could rest with the Department of Transport should the Kalbar default on its agreement to restore the temporary roads to their original alignment and rehabilitate land (Tabled Document 376).

The IAC found that the project is capable of achieving a functional road network subject to detailed design considerations, however noted the concerns of the Department of Transport and recommended that Kalbar 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. I accept the findings and recommendations of the IAC.

## Assessment

It is my assessment that traffic and transport effects are likely to be acceptable and accept the IAC's findings that the overall volumes of traffic involved are manageable within the capacity of current road infrastructure and that the project is capable of achieving a functional road network subject to detailed design considerations. I note that the feasibility and effects of the transport of HMC to and through the Port of Geelong have not been assessed and I support the recommendations of the IAC for further assessment of this aspect, should a decision maker wish to consider approvals for the project.

## 5.10 Land use and planning

### Evaluation objective

*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.*

### Assessment context

Land use planning impacts are addressed in Chapter 9.9 and technical report Appendix A013 of the EES and in Chapter 12 of the Inquiry Report.

The main impacts of the project on land use planning are:

- temporary change of productive agricultural land to mining over at least 20 years;
- whether the project is consistent with environmental policies that seek to protect and enhance areas of environmental values;
- the extent to which the project might have unacceptable and unknown impacts on surrounding environmental values including biodiversity, air quality, water and social; and
- the extent to which the project might have unacceptable land use impacts on existing and future surrounding land uses, including stemming from biodiversity, air quality, water and socio-economic impacts.

## Discussion

### *Strategic assessment of the project*

The relevant objectives of planning in Victoria, as specified in Section 4 of the *Planning and Environment Act 1987*, seek to:

- provide for the fair, orderly, economic and sustainable use and development of the land;
- provide for the protection of natural and man-made resources and the maintenance of ecological process and genetic diversity;
- facilitate development in accordance with these objectives; and
- balance the present and future interest of all Victorians.

These objectives have informed the Victoria Planning Provisions and the planning policy framework. All decision making under the *Planning and Environment Act 1987* must support these objectives.

Agricultural land across Victoria is identified in state planning policies, while in Gippsland specifically, it is identified in local planning policies in the East Gippsland Planning Scheme and the Gippsland Regional Growth Plan 2014, as an important asset which requires protection from permanent land use change. Resource extraction and mining is also identified as an important resource, when in balance with surrounding land uses, environmental values and social and economic factors. I agree with the IACs findings that there is strong planning policy support for both the protection and retention of agricultural

land and for mining in East Gippsland. However, I also acknowledge that the IAC is concerned about the level of unacceptable and unknown impacts to the surrounding land uses (especially the Lindenow Valley Horticultural District), environmental values, social and economic impacts and the uncertainty about whether the land can be successfully rehabilitated and returned to productive agricultural land during and after mining operations.

The project is to be located on land zoned as Farming Zone. The purpose of the Farming Zone is to provide for the use of land for agriculture and to encourage the retention of productive agricultural land. The project will temporarily remove agricultural land from production, but aims to return the land to agriculture, following closure of the mine and rehabilitation. This is planned for at least 20 years after mining operations begin. I am satisfied that the use of the land for mining is one that is contemplated by the Farming Zone and supported by relevant policies relating to the mineral resources. However, I note that planning policies require a balance between a change of use from agricultural land to mining, and the impacts on surrounding land uses (in this case, other productive agricultural and horticultural land) and environmental values, such as biodiversity, air quality and water. Therefore, I consider that a decision on whether the proposed use is acceptable under the zone, needs to consider the effects of the use on the surrounding environment as per the strategies in the planning scheme. I note that the planning policy framework and local planning policies also seek to restore and maintain environmental and landscape values of East Gippsland. Specifically, Clause 21.04-1 of the planning scheme identifies East Gippsland as being a reservoir of biodiversity in south-east Australia, due to its relatively unspoilt large tracts of native vegetation. Clause 21.06 emphasises the need to protect the natural resources of East Gippsland, including its productive agricultural land.

The IAC considered that the planning scheme does not necessarily favour mining over agriculture (or vice versa), which is contrary to the argument put forward by the proponent. Planning policy encourages mining that is in appropriate locations and with acceptable environmental outcomes. The IAC concludes that in the context of the specific location and some significant and unacceptable impacts on the surrounding environment, the project is not an acceptable use in this situation. Given the IAC's conclusion that the project will result in unacceptable impacts on the biodiversity, air quality, agriculture and horticulture, water and social values, I do not consider that the proposed land use meets the relevant environmental policies in the planning policy framework and local policy.

### *Land use impacts*

The predicted ongoing impacts of the project on existing and future land uses are mainly related to the removal of native vegetation, loss of biodiversity values, reduced air quality/dust, risks relating to surface water and impacts to social values. During the EES hearing, the IAC and many submitters raised concerns regarding the impact of the mine on surrounding agricultural land uses, especially the Lindenow Valley Horticultural District, which could not be alleviated to an acceptable level by the proponent at the time. As discussed in other sections of my assessment, the surrounding land use impacts caused by this project will be in direct conflict with planning policy supporting mining. I support the assessment of the IAC that the potential land use impacts associated with the mine works are not confined to the subject site and impacts will significantly affect some surrounding land uses, including important existing horticultural areas.

### *Planning Scheme Amendment C156egip assessment*

Under Section 42(7) of the *Mineral Resources (Sustainable Development) Act 1990*, a planning permit is not required for mining works and activities within the mining licence area if the proposal has been assessed through the EES process. Planning Scheme Amendment (PSA) C156egip to the East Gippsland Planning Scheme was prepared and exhibited with the EES, as Attachment C to the report. The PSA covered all

works proposed to be undertaken outside of the mining licence area by introducing an incorporated document into the planning scheme and applying the Specific Control Overlay (SCO) to the identified impacted area. The incorporated document included the management of road construction, upgrades to intersections, vegetation removal along roadsides, works related to the railway sidings, construction and maintenance of pipelines and powerlines, and other works associated with the mine, within the area outlined in the SCO. The incorporated document would also exempt the works from requiring additional planning permit approval, provided that the works are carried out in the SCO area and in accordance with the conditions set out in the document.

While not discussed in great length in the IAC report, it was acknowledged by the IAC, and I agree, that the planning controls introduced by PSA C156egip are generally acceptable as an avenue to manage all works outside of the mine licence area; many other major projects throughout Victoria have previously utilised similar planning mechanisms to regulate project works. If the project was to proceed to statutory approvals, despite my primary recommendation, the PSA would still need further work and updating, due to the passage of time and changes to the East Gippsland planning that have subsequently been gazetted since exhibition of the EES and PSA documentation. I accept the IAC's recommendation that any consideration of the PSA should apply the draft incorporated document as shown in Appendix E of the IAC's report with consideration of the further work required to inform approvals. However, as I have concluded that the environmental effects of the project are unacceptable, I consider that that the proposed PSA should not be approved.

### **Assessment**

It is my assessment that while there is policy support for mining within the East Gippsland planning scheme, it needs to be balanced against the protection of existing values and land uses, also supported in the planning scheme, including agriculture, biodiversity values, air quality, water and social values of the region.

I support the conclusion of the IAC that the planning scheme does not necessarily favour mining over agriculture, rather it encourages mining that is environmentally sustainable and appropriate for the location in terms of acceptable environmental effects/outcomes.

It is my assessment that given the likely effects of the project —some of which are unacceptable— the use of the land for the project is not supported by planning policies, particularly given the planning policy framework seeks to ensure development protects surrounding areas of agricultural land and environmental values. I am not satisfied that the likely effects on current and existing land uses can be appropriately mitigated to an acceptable level and some environmental risks can be effectively managed.

## **5.11 Landscape and visual**

### **Evaluation objective**

*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.*

*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.*

## Assessment context

Landscape and visual effects are addressed within Chapter 9.10 and the technical report Appendix A014 of the EES, as well as in Chapter 13 of the IAC's report. Sixteen mitigation measures deal directly with or are relevant to landscape and visual effects.

A number of potential landscape and visual effects of the project were examined through the EES and IAC process, in particular these can be summarised as:

- the landscape and visual impacts on nearby residences.
- the landscape and visual impacts on open spaces areas including the existing scenic value of the landscape;
- the landscape and visual impacts on the journey to the Mitchell River National Park and impacts on the tourism experience; and
- the landscape and visual impacts of night lighting.

## Discussion

The landscape and visual impact assessment (appendix A014) described that the elements of the project likely to cause the most visual impacts include:

- the mine voids;
- stockpiles of overburden, soil and heavy mineral concentrate;
- mineral processing facilities;
- infrastructure such as buildings, carparks and laydown areas;
- the proposed railway siding; and
- a services corridor from the mineral processing facilities to the rail siding which would include a haul road and powerlines;
- a groundwater pipeline from the borefield to the mineral processing facilities; and
- lighting required to operate the mine 24 hours a day.

### *Visual impacts on nearby residents*

The IAC considered that the visual impacts of the project on nearby residents would be mostly mitigated by screening vegetation proposed by the proponent but agreed with submissions that the estimates that vegetation would be mature enough to provide this screening within 10 years were unrealistic. The IAC noted that the screening around residences would block views of the wider landscape for rural residents, which would itself be a negative change.

Should the project proceed, the IAC recommended that the work plan and visual amenity management plan should include detailed plans including locations for screening vegetation, early implementation of plantings and the offer of advanced (more mature) planting stock. This would ensure that planted vegetation would be as mature as possible when screening was required. Additionally, the IAC recommended the visual amenity management plan include consultation with adjacent residents to minimise negative visual impacts of the project. I agree with this assessment and support these recommendations.

### *Impacts on open space areas*

The landscape and visual impact assessment (appendix A014) described the disturbance to the landscape setting during the operation of the mine as being of low to moderate impact due to the low vertical profile of the project components and use of screening vegetation. The visual impacts were stated to be like "the disturbance created by broad scale soil cultivation associated with agriculture, which can often be visible

for a number of years until surface vegetation establishes.” These impacts were described as transitional since areas will be progressively mined and then rehabilitated. The EES’ assessment stated that the landform would be returned to a profile similar to the existing one and that vegetation would be reinstated. Additional proposed mitigation measures include the planting of screening vegetation and construction of vegetated bunding at strategic locations.

Visual impacts of the Fernbank Rail Siding were described in the EES (appendix A014) as being low due to screening by existing vegetation, whilst the visual impacts of powerlines and acoustic bunds within the service corridor were determined to be moderate to high initially, reducing to low as vegetation establishes on the bunds.

The IAC considered that during the operation of the mine the landscape in the vicinity of the mine and infrastructure area would change from a rural to industrial landscape, contrasting starkly with the existing landscape. Visual impacts during operation would include increased traffic such as trucks and heavy machinery, water storage dams as well as the mine area itself. Even with dust mitigation measures, increased dust would be likely to impact on the scenic values of the area. The IAC noted that vegetation proposed for screening would take many years to be effective. I agree with the IAC’s assessment that impacts on the landscape value in the vicinity would be high during a large portion the operation of the mine.

The IAC determined that the impacts of the project on the landscape values of the project area and surrounds would be significant and long-lasting. The IAC considered that the EES downplayed the beauty of the area, noting that many submitters highlighted the scenic values of the landscape in which the project is proposed. These referred to the beauty of vistas which include the natural varied topography, native vegetation including large trees, farming land and clear air enabling views to distant hills. The IAC supported the opinions presented by these submitters and considered that the landscape is “an attractive treed rural setting that would be fundamentally impacted by the project,” in particular by the extent of vegetation loss and changes to topography. I agree with the IAC.

The IAC considered that the residual and long-term impacts on the distinctive landscape values of the area would be high, rejecting the comparison made in the Landscape and Visual Assessment to the impacts of soil cultivation. The IAC noted that the project would result in the removal of native vegetation and large trees and that visually interesting such as Perry Gully would be lost. Additionally, the IAC observed that the area of impacts is extensive, with 1,350ha proposed to be disturbed by mining activities. I agree with these conclusions and consider that the residual and long-term impacts on landscape values are likely to be high.

#### *Impacts on the journey to the Mitchell River National Park*

The Mitchell River National Park can be driven to from the project area or Bairnsdale by Bairnsdale-Dargo Road, or when travelling from the Princes Highway to the south by Fernbank-Glenaladale Road and the Bairnsdale-Dargo Road. The EES (appendix A014) describes that Bairnsdale–Dargo Road is proposed to be diverted south around year 5 of the mine life, returning to its original alignment in year 8 while Fernbank–Glenaladale Road would be realigned to the east in year 5. The landscape and visual impact assessment (appendix A014) noted that the diverted roads will have a very different landscape character from the existing one, primarily due to the absence of roadside vegetation and views of mining related activities. Three viewpoints were assessed along Bairnsdale-Dargo Road and one viewpoint was assessed on Fernbank-Glenaladale Road. Whilst the visual impact on these tourist routes was assessed as initially being high, the residual impact was stated to reduce to low after approximately 5 years post rehabilitation, due



to the establishment of trees throughout the landscape. I note that any trees planted for rehabilitation will take many years to grow to maturity and will be still very young at 5 years post rehabilitation.

Within the Mitchell River National Park itself the landscape and visual impact assessment (appendix A014) stated that the project would not have a visual impact from the six visitor nodes and key scenic attractions assessed. The proponent stated during its submission (Tabled Document 147) that tracks through elevated areas of the Mitchell River National Park may have a view of the project but the visual impact would be low. The reasons given for this were that these tracks are set within tall dense forest with limited outward views and more than 5km from the project area.

Mine Free Glenaladale and other submitters (Submissions 813 and 652 and Tabled Document 696) stated that roads in the vicinity of the project area are popular for tourist and recreational activities. They commented that the project would impact on the scenic values of the landscape and green image of the region for visitors who would have to drive through the mine area to access the Mitchell River National Park and other destinations.

The IAC considered that the project would have a significant impact on the landscape values of the journey to the Mitchell River National Park. Whilst agreeing with the proponent team that there would be limited impact on the views from key tourist destinations within the Mitchell River National Park, the IAC determined that the experience of journeying to the park would be negatively impacted. These negative impacts may detract from the overall recreational experience of visiting the park and result in negative impacts on tourist visitation. I agree with the IAC's finding on this matter.

### *The visual impacts of night lighting*

The project would operate 24 hours a day and require night lighting for on-site infrastructure, the active mine area, operating vehicles and potentially at road intersections. The existing rural landscape is one that is intrinsically dark at night. The landscape and visual impact assessment (appendix A014) stated that the impacts of lighting are expected to be low overall, however this would be dependent on individual perceptions and sensitivities.

The landscape and visual impact assessment (appendix A014) stated that for most locations within the region direct views of lighting would be obscured by vegetation, the mine stockpiles and screening measures. Mitigation measures such as screening for visual impacts would reduce the direct views to lighting on fixed structures, including for residences with surrounding vegetation. Direct views of lights from residences and nearby roads could occur when the mining operation is in close proximity. Mitigation measures to limit lighting impacts are proposed to be contained in a visual amenity management plan and informed by the Institute of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light GN01:2011 (appendix B in appendix A014), developed for the United Kingdom (Technical Note 10). The assessment states that for most locations within the region the lighting impacts from the project would be perceived as a "soft glow" and that overall the residual impact of lighting would be low. No modelling of light levels was undertaken as part of the assessment (Technical Note 10).

The IAC heard from several submitters who expressed concern about the impact of lighting within the dark rural nightscape. The IAC noted whilst the mine is proposed to operate 24 hours a day that night operations are proposed to be more limited than during the day. However, night time hours are stated to begin at 10pm, which would mean that greater lighting impacts would occur during the evening, particularly in winter.

Overall, the IAC concluded that lighting from the project would disturb the dark rural environment of adjacent properties at night and that light glow from the project would be visible across the landscape at night. I agree with this assessment and recommend that should the project proceed, best practice mitigation measures as proposed for the landscape and visual assessment must be implemented.

### **Assessment**

It is my assessment that the project would have significant and long-term visual and landscape impacts within the project area and regional surrounds. Whilst some visual impacts during construction could be mitigated through screening, these measures would take many years to be effective where dependent on the growth of plantings.

It is my assessment is that there would be long-term impacts on the existing scenic value of the landscape, primarily due to the removal of native vegetation including large trees and changes to topography.

Whilst there would not be impacts on views from high use areas in Mitchell River National Park, there would be high impacts on views along the journey to the park, particularly during mine operation, which would be likely to reduce visitation to the park and other nearby destinations. Visual impacts on nearby residences could be reduced to through the planting of screening vegetation. As this vegetation would take many years to mature, if the project proceeds the work plan and visual amenity management plan should include detailed plans including locations for screening vegetation, early implementation of plantings, consultation with landowners and the offer of advanced (more mature) planting stock. There would be impacts of lighting on the rural nightscape of the surrounding area during the operation of the project. If the project proceeds best practice mitigation measures as proposed for the landscape and visual assessment must be implemented to minimise lighting impacts as much as possible.

## **5.12 Heritage**

### **Evaluation objective**

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

### **Assessment context**

Aboriginal cultural heritage and historic heritage impacts are addressed in chapters 8.12 and 9.12 and Appendix A017 of the EES and in Chapter 15 of the IAC Report. EES Attachment H includes eight mitigation measures specifically addressing potential effects on Aboriginal and historic heritage values. IAC document 777, comprising the updated Mitigation Register which the proponent tabled towards the end of the IAC hearing, includes mitigation measures for Aboriginal and historic heritage.

The IAC considered submissions from several parties about Aboriginal cultural heritage. It noted that issues of particular concern included:

- the adequacy of the proponent's cultural heritage impact assessment, including with respect to lack of access to some properties within the project footprint;
- the incomplete status of the cultural values assessment at the time the EES was placed on exhibition;
- potential loss of tangible cultural heritage if the project proceeds;
- potential loss of intangible cultural heritage if the project proceeds; and
- the potential relevance of the Skull Creek massacre, relative to the project footprint.

Aboriginal cultural heritage and historic heritage are regulated and protected under the *Aboriginal Heritage Act 2006* and the *Heritage Act 2017* respectively. As the EES and the IAC report both deal with them together, this assessment does so also.

## Discussion

### *Aboriginal cultural heritage*

Under the *Aboriginal Heritage Act 2017* the project requires an approved cultural heritage management plan (CHMP). As an EES is required for the project it mandates the need for a CHMP, regardless of whether other triggers may apply. The *Aboriginal Heritage Act 2017* provides for approval of a CHMP to be determined by a registered Aboriginal party (RAP) appointed by the Aboriginal Heritage Council. At the time the proponent lodged the notice of intent to prepare the CHMP for the project, the appointed RAP, Gunaikurnai Lands and Waters Aboriginal Corporation (GLaWAC) was in administration and its RAP status was temporarily suspended. The proponent lodged its notice of intent with Aboriginal Victoria (now First Peoples – State Relations), given this was the case. Although GLaWAC has since resumed its RAP role, First Peoples – State Relations retains statutory responsibility for determining the CHMP. It will undertake this function in close consultation with GLaWAC.

### *Adequacy of tangible Aboriginal cultural heritage assessment*

The EES noted previous registrations of Aboriginal cultural heritage values in the vicinity of the project site, including two from within the site, an isolated artefact and a scarred tree which may have been destroyed by a bushfire since its original registration. The EES reported field investigations including walking transects and a program of shallow test pits. A predictive model informed the field work and in turn was revised in light of field findings. Field investigations sampled most but not all of the project site. Representatives of GLaWAC took part in the field program.

It is clear that the proponent has not been able to conduct comprehensive field investigations for tangible Aboriginal cultural heritage across the full extent of the project works area. It is also clear that an open-cut mining project would lead to the loss, or at least disturbance, of all *in situ* tangible Aboriginal cultural heritage within the works footprint. This could include artefact scatters, isolated artefacts, scarred trees and other trees of cultural significance, and other types of sites that might exist within the site. There may be scope for some salvage of cultural heritage material, but its context would be destroyed.

The sampling program for the EES identified 68 surface artefacts and located a further 281 artefacts in almost half of the 45 subsurface test pits excavated across the site. While the EES does not suggest that material found is of significance, it is indicative of long-term occupation and use of the landscape. The predictive model presented in the EES suggests medium to high likelihood of tangible values being distributed across much of the project site. Assessment of the cultural significance of the values that have been documented and those which may occur but have not yet been found will be a matter for First Peoples – State Relations to consider with respect to its determination of the CHMP, in close consultation with GLaWAC.

### *Cultural values assessment*

Cultural values assessment is a qualitative exercise addressing intangible (but nonetheless valid) forms of cultural heritage such as oral traditions, songlines and landscape attachments to stories, traditions, activities and events. Cultural values assessment is very much a matter for the Traditional Owners. While it is important for the EES process to acknowledge that such values may exist, it is for the Traditional Owners themselves to interpret cultural values in the context of the heritage and traditions for which they are custodians.

The IAC heard submissions indicating that the project area is likely to have been occupied and used by Aboriginal people for a variety of purposes over many thousands of years. The IAC did not accept the view submitted by the proponent that changes to the area since European settlement should be considered to have diminished its Aboriginal cultural heritage values significantly. While some tangible heritage may have been destroyed or damaged, the landscape context and the attachments embedded in cultural values remain and must be acknowledged and addressed. There is more to cultural heritage than just archaeology. The EES reported that discussions were in progress with GLaWAC and a detailed onsite cultural values workshop was proposed but at the time of exhibition, the study had not yet identified any specific intangible Aboriginal cultural heritage values associated with the project area.

### Potential loss of tangible and intangible Aboriginal cultural heritage

The purpose of the CHMP process is to enable informed and appropriate decision-making about how Aboriginal cultural heritage should be protected or, if it is determined that some degree of damage should be permitted, how it should be managed in the context of a given project. A CHMP should be prepared in close engagement with relevant Traditional Owners, including their participation in the scoping, planning and conduct of fieldwork. Ideally the statutory decision about approval of a CHMP would be made by the appointed RAP. In the absence of an appointed RAP, the decision to approve or to refuse to approve a CHMP rests with First Peoples – State Relations in the Department of Premier and Cabinet.

Due to the suspension of GLaWAC's RAP status at the time the proponent lodged its notice of intent to prepare a CHMP, statutory responsibility for making the CHMP decision remains with First Peoples – State Relations. Should it proceed with decision-making on the project, despite my primary recommendation, I understand that First Peoples – State Relations would undertake its consideration of the CHMP in close consultation with GLaWAC, particularly now that its RAP status has been restored.

If the project were to proceed, the tangible heritage within the works footprint, if not salvaged, would inevitably be destroyed, subject to the provisions of an approved CHMP. I note that the field assessment conducted for the EES was based on a sampling approach, and it is to be expected that as yet unknown tangible heritage will exist within the works footprint. The CHMP process can provide for protocols to be implemented in the event of the discovery of previously unknown heritage values. The key challenge would be the potential for unknown heritage to be destroyed without being discovered or recognised due to the extent of the areas to be stripped for mining and related works.

The proposed rehabilitation of the mine site could re-establish the original landform to the degree practicable. This may allow some intangible heritage values associated with the landscape and the site's landscape setting to be restored, although the relevant Traditional Owners may not agree this is restoration as such. However, intangible heritage values connected with trees or other biodiversity values would be lost either permanently or for as long as it might take for relevant species to recolonise any new habitat that may become established on the rehabilitated landform in years to come. Again, this is subject to the views of the Traditional Owners, as the loss and then slow recovery of some yet to be determined/understood aspects of biodiversity in the future may not restore cultural connections lost when the land clearance and mining occurs. I note that cultural values assessment has been undertaken to largely complement the site investigations of tangible cultural heritage and has not sufficiently informed an assessment of impacts on intangible cultural heritage, cognisant of the views of the Traditional Owners.

### Skull Creek massacre site

The IAC considered a submission about the possible location of the Skull Creek massacre, which involved the killing of Aboriginal people by European people in the early 1840s. Skull Creek is a tributary of the

Mitchell River, which flows through part of the eastern portion of the project site. While the occurrence of the massacre is not disputed, it is not known where along the creek the massacre took place. The IAC recommended that if the project were to proceed, the history and location of the site should be investigated further. I support this view.

I acknowledge the very significant nature of such an event, particularly to the surviving descendants of the victims and the Traditional Owners within this region, as well as the historical importance of this event at this location. Sadly, given the passage of time and the scant documentary records from the time of the event, it may not be possible ever to pinpoint the exact location of the massacre. It is possible that it took place lower down Skull Creek, outside the project works footprint, but that is unclear.

In the event that the project is approved to proceed, it would be appropriate for targeted archaeological investigations in the vicinity of Skull Creek to inform the CHMP with respect to illuminating the possibility that the massacre might have taken place within the project footprint and that tangible evidence may exist. It would be for First Peoples- State Relations, in close consultation with GLaWAC, to determine how the matter should be addressed in the CHMP.

### *Historic heritage*

The EES noted that no sites listed on Victorian State heritage databases occur within the project footprint. Some structures of lesser heritage significance may be present. Sites of lesser significance are known to occur in the vicinity of the project site but would not be expected to be affected. In the event that previously unknown historic heritage values are discovered on the site, relevant provisions of the *Heritage Act 2017* must be observed.

### **Assessment**

It is my assessment that, if it proceeds, the project could have significant impacts on tangible and intangible Aboriginal cultural heritage, which are yet to be fully characterised and considered by the relevant Traditional Owners. In considering a CHMP, First Peoples – State Relations should do so in close consultation with GLaWAC, particularly as it has resumed status as the appointed RAP for the Country within which the project is proposed to lie. If required, a CHMP should acknowledge the possibility that the Skull Creek massacre may have taken place within the project footprint and field investigations and previously unknown heritage protocols should appropriately reflect that possibility.

There are no known unacceptable or significant effects on historic heritage values arising from the project.

## **5.13 Economics**

### **Evaluation objective**

*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.*

*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.*

### **Assessment context**

Economic effects are addressed in Chapter 9.13 and the technical reports appendix A018 (including an Economic Impact Assessment as Appendix D of A018) of the EES, as well as in Chapter 17 of the IAC's

report. A number of mitigation measures deal with socioeconomic matters as outlined in Attachment H of the EES which were then revised through the IAC process and presented in Tabled Document 777.

A number of potential economic effects of the project and issues were examined through the EES and IAC process, in particular these can be summarised as:

- economic effects on existing industries including agriculture, horticulture and tourism;
- employment effects;
- compensation for landholders; and
- accuracy of the benefits and adverse effects of the project.

Effects on agriculture and horticulture specifically are covered in Section 5.3.

## Discussion

### *Economic effects on existing industries including agriculture, horticulture and tourism*

The project area and surrounds include dryland agriculture, including grazing and dairy, as well as forestry. The Lindenow Flats horticulture district is located adjacent to the north-east boundary of the project area. The total farmgate value of vegetable crops was estimated in the EES at \$62.6 million in 2018, however as discussed in Section 5.3 of my assessment the IAC adopted an estimate of \$100 to \$120 million per annum, reflecting the range of information provided by the proponent and submitters, although it could be possibly higher. The EES estimated that direct loss in agricultural gross margin, through the direct loss of 443 ha/year of land to mining and rehabilitation, would be approximately \$57,750 to \$83,000/year and a lost value of production of around \$87,250 to \$125,250/year.

MFG's expert witness highlighted in his expert witness statement that small reductions of between 1 and 10% on annual horticultural output could have considerable local economic impacts (Tabled Document 93, Table 20 of the IAC's report). The IAC considered MFG's expert witness evidence persuasive, noting his evidence showed that a modest impact on the horticultural area leading to a 5% reduction in output could result in losses of about \$3.2 to \$6 million to the region, reduce profits to the industry by about \$1 million and impact about 100 jobs. The IAC considered that the horticulture and agriculture industries could not co-exist in this context, particularly where there are no buffers between uses and given the resulting likely significant offsite impacts from the mine. I support the findings of the IAC, noting that my assessment has concluded the project's effects on air quality and horticulture are likely to be unacceptable, as set out in Sections 5.2 and 5.3.

The project area is located close to popular tourist destinations in East Gippsland, including tourist towns on Gippsland Lakes and is approximately 10 km south of the Mitchell River National Park. The EES noted a range of values for the tourism industry ranging from \$344 to \$785 million to the region's economy depending on the period or region within Gippsland for which the values were being report. The EES identified that the Gippsland region was seen as an area for nature-based tourism.

The IAC received submissions from Mine Free Glenaladale and some local tourism operators on the tourism values of the area including the Gippsland Lakes and Mitchell River National Park in particular, and on the effects the project would have on the image of the area as a nature-based getaway and or to their particular businesses in relation to specific values, characteristics and viewsheds. East Gippsland Shire Council (Tabled Document 407) submitted on the adequacy of the EES's assessment of effects on the tourism industry and likely effectiveness of proposed mitigation measures. The council identified that the proposed mitigation measures such as engagement with the tourism sector and maintaining access to the

Mitchell River National Park were a given, but that it was unclear how engagement with tourism operators would realistically be expected to mitigate the risks identified.

The IAC concluded that the project would have a negative impact on the existing tourism operations in the immediate vicinity of the project considering that there would be an impact as far as the project can be seen and heard. The IAC also considered the impacts extending to operations within the Mitchell River and the Mitchell River National Park, which could be impacted through impacts to landscape values for the journey to and from the National Park as discussed in Section 5.11 of my assessment, and if the East Gippsland region was to become associated with mining and its heavy industrial nature.

The IAC identified there was potential for the project to impact the Gippsland tourism industry more broadly however they felt there was not sufficient information before them to make a firm conclusion. I accept the IAC's findings on this matter, noting that this potential has not contributed to my overall assessment of the project's effects.

### *Employment effects*

The EES estimated that the project would generate an average of 180-200 full time equivalent direct jobs and at least a further 200 indirect jobs in the region and that the workforce would be sourced from both within and outside the local area.

The EES characterised the potential for competition for labour between the mining and horticultural sectors, noting the higher wages in the mining sector. The EES also acknowledged the skills and labour shortages faced across Australia within the agricultural and horticultural productions industries. This is likely to be exacerbated by the introduction of a mining project to the area.

The IAC heard submissions from the proponent, Mine Free Glenaladale, East Gippsland Shire Council and local agriculture and horticulture businesses about employment. The proponent asserted that the project would offer premium wages to local workers and that the higher wages and competition for labour were not a bad thing in the current economic climate. Some submissions were also received from local community members in support of the employment opportunities the mine would create.

Submissions from local businesses within the horticultural district spoke to the difficulties of finding appropriate applicants for positions, including machinery operators and drivers; and that the lack of analysis in the EES of how many agricultural jobs would be lost if the horticultural industry were negatively impacted. East Gippsland Shire Council submitted on the potential for cumulative effects of concurrent projects within the region (e.g. Star of the South, hospital, education, tourism, irrigation projects and bushfire recovery projects) on labour and skills supply within the local region and community.

The IAC concluded that the project would create jobs, some of which would likely be filled by local residents, but would also have negative impacts on workforces for existing industries in the region (agriculture, horticulture and tourism) potentially leading to job losses in those industries. The IAC considered these job losses would be through negative impacts from the project to the agriculture and horticulture industries, as discussed in Section 5.3 of my assessment, and through competition for labour with the mining industry. I agree with the finding of the IAC, while noting that the scale of both job losses and reduction in skilled workers available for these existing industries is perhaps unclear, but a significant risk for such businesses. This, in combination with the likely significant and unacceptable effects on air quality and the horticulture industry directly, will have significant impact on some important local employers within the region.

The IAC heard evidence from Kalbar's horticulture expert witness that the number of jobs per ML of water supply was roughly equivalent for the project and the adjacent horticulture industry (Tabled Document 73). A number of submitters asserted that the number of jobs per ML of water was much higher for horticulture than the project, however the IAC found they had no evidence to support this. The IAC accepted the evidence of the proponent's expert horticulture witness, and considered the hypothetical scenarios put forward by MFG's expert economic witness (Table 20 of the IAC report) about the effects of reductions in output from the adjacent horticulture industry and noted that small reductions could result in comparable reductions in employment in the horticulture sector as those the project is reported to generate.

The IAC found 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. I agree with the findings of the IAC and note that the horticulture industry would also be likely to be able continue to operate and generate those employment opportunities for a longer period than the project's life which is restricted to the exploitation of a finite resource.

### *Economic effects to landholders*

The EES contemplated potential effects to landholders within and near the project concluding that landholders within the project area would be compensated in accordance with the *Mineral Resources (Sustainable Development) Act 1990*. Potential effects such as housing affordability and availability during construction and operations and the lack of compensation for landholders whose land would not directly be impacted by the mine were also addressed. The risk of impacts was considered low after the application of proposed mitigation measures.

The IAC heard a number of submissions from community members, environment groups and the Victorian Farmers Federation about the difficulties associated with adjacent landholders both proving and then pursuing compensation claims under the *Mineral Resources (Sustainable Development) Act 1990*.

The IAC noted that the *Mineral Resources (Sustainable Development) Act 1990* provides a compensation framework for both on-site and off-site mining impacts. They noted that compensation for offsite impacts is left to be pursued by the individual or entity affected after the harm has occurred and the individual or entity must prove the mining activities caused the damage.

The IAC found the impacts of the project are unlikely to be completely offset by the compensation afforded to affected landowners under the *Mineral Resources (Sustainable Development) Act 1990*. The IAC recommended that, should the project proceed despite their primary recommendation, baseline data be made available to the public to provide benchmark information for future enforcement and/or compensation claims. I support the recommendation of the IAC.

### *Accuracy of the benefits and adverse effects of the project*

The EES estimated the net economic benefits over the life of the project would be about \$393 million, including \$159 million in direct benefits to the state and \$234 million in indirect benefits in the form of wages and benefits to local suppliers.

MFG's economics expert highlighted that the economic impact assessment lacked transparency and had taken a simplistic approach to valuing impacts on other industries. MFG's economics expert gave evidence that there was insufficient justification for the assessment's valuation of indirect benefits of about \$200 million (Tabled Document 93). The proponent submitted that MFG's expert did not give evidence that



project would not have positive economic effects on the local economy citing he accepted money being spent in East Gippsland would have a positive effect on the local economy and that payment of royalties at a state and national level would provide economic benefits (Tabled Document 358).

East Gippsland Shire Council submitted that the project would generate significant income, however considered that for the local community, the existence, magnitude and extent of those benefits are too uncertain to rely on. The IAC heard submissions from local community members that supported the potential economic benefits of the project and from others that were concerned about the adverse economic effects of the project.

The IAC considered that the economic impact assessment has over-stated the economic benefits of the project and under-stated its costs. The IAC considered, in particular, that the economic impact assessment had not adequately included the disbenefits to the existing industries, including agriculture, horticulture and tourism, in its assessment. The IAC noted that MFG's economics expert evidence identified that the economic impact assessment assumes that environmental impacts, for example 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 given no value in terms of external costs of the project (Tabled Document 93). The IAC accepted there would be economic benefits associated with the project. However, the quantum of these benefits and whether there would be an overall benefit remained unclear.

I support the findings of the IAC and I note that despite a number of submissions on this matter, Kalbar did not put forward an expert witness on the matter of economics to respond to submissions and provide further clarity on the assumptions underpinning their economic impact assessment. I agree with the findings of the IAC and accept that the project will have economic benefits, but I do not have sufficient information before me to sufficiently understand the scale of those benefits or how and where those benefits are likely to accrue, in particular in relation to the indirect or downstream benefits of the project. I also accept the IAC's findings that there is likely to be disparity in where the benefits of the project would accrue and where adverse effects are likely to occur. The IAC recommended that should the project proceed despite their primary recommendation, the proponent should work with local employment providers and training organisations to maximise the number of local employment opportunities. I accept this recommendation.

### **Assessment**

It is my assessment that the project would have economic benefits including for the state of Victoria, however I agree with the IAC that the scale of the benefits and how and where they would be accrued remains uncertain. I also accept that the project will have adverse effects on the local and potentially regional economy, including for the agricultural, horticultural and tourism industries, particularly given the likely significant and unacceptable effects on the horticultural industry as described in section 5.3 of my assessment.

## **5.14 Human health**

### **Evaluation objective**

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

## Assessment context

Human health risks are addressed in Chapter 9.13.5 and the technical report appendix A015 of the EES, as well as in Chapter 18 of the IAC's report. A number of mitigation measures deal with human health matters as outlined in Attachment H of the EES which were then revised through the IAC process and presented in Tabled Document 777.

The EES undertook a human health risk assessment including desktop review to inform a conceptual site model including identification of pollutant sources, migration pathways and points of exposure, review of the relevant technical studies for relevant environmental aspects that may influence human health. The EES described potential pathways and sources of human health risk as including:

- emissions of fine particulate matter, dust and exhaust gases from project related activities for residents near the project and transport routes;
- contamination of surrounding soil and crops from deposition of radionuclides resulting in human health impacts for regional residents and horticultural producers; and
- contamination of surrounding water sources, including surface water, rainwater tanks and dams and groundwater, from deposition of metals and radionuclides resulting in human health impacts to regional residents and recreational users.

## Discussion

The EES identified that additional mitigation measures for PM<sub>10</sub> dust emissions may be required on certain days where meteorological conditions indicate a greater potential for dust migration off-site. The EES is silent on the potential health risks related to dust emissions from the project if additional mitigation measures for dust suppression are not implemented or if mitigation measures are not effective.

Other sources and contaminants were determined to be below criteria and expected to result in negligible to low risks to human health.

The proponent's expert undertook further work (Tabled Document 302) in response to submissions on the exhibited EES investigating the health risks associated with exposure to contaminants of potential concern predicted in air/dust emissions from the project for exposure pathways including: consumption of beef and milk from livestock in the regional area; uptake of metals by crops affected by dust from the project; inhalation of contaminants in airborne particulates; and incidental ingestion of soils with potential contaminants from the project. The additional work by the proponent's expert concluded that potential future exposures are considered to be low and acceptable for sensitive receptor populations, regarding the predicted airborne contaminants of potential concern.

A number of submissions were made on the potential health effects of the project. East Gippsland Shire Council (Submission 716B) made submissions on the inadequacy of the human health risk assessment noting in particular that the human health risk assessment assumes project mitigation measures will be adequate. It also highlighted that additional baseline data is required and that the risk assessment would need to be revised if the underlying data and project assumptions change. The IAC also noted that under cross-examination from Mine Free Glenaladale, the proponent's expert confirmed that the assessment had not considered effects related to noise from the project.

The IAC found that the method used for the human health risk assessment is reasonable, however noted that it was a study that relied heavily on the findings and data from other technical studies, a number of which have been subject to criticism and recommendations for further baseline data collection and assessment. As such, it would be appropriate to review and revise the human health risk assessment as

further data is collected and that other assessment work is revised/refined. Should a decision maker wish to proceed with the project despite my primary recommendation, I accept this recommendation of the IAC for further work.

In Section 5.2 of this assessment, I have concluded that the airborne dust emissions from the project are likely to be unacceptable given that the EES has demonstrated that 24 hour average PM<sub>10</sub> criteria are only just met for a large number of nearby sensitive receptors, that standard mitigation measures are unlikely to be completely effective and reliable, and that there are additional potential points of failure with adaptive management measures that are required to achieve compliance at some receptors. I noted that these all increase the likelihood of air quality criteria exceedances and unacceptable effects. It is my view that such exceedances would lead to a risk to the health of the sensitive receptors that has not been considered through the EES. It is my recommendation that, should a decision-maker wish to proceed with the project despite my primary recommendation, the review and revision of the human health risk assessment include consideration of the potential health effects associated with likely exceedances of the PM<sub>10</sub> air quality criteria and ensure that these risks are minimised to the extent possible.

The IAC heard submissions that spoke to the mental health concerns in the community which have arisen during the assessment process and concerns for the mental health welfare of the community should the project proceed. The proponent's expert health witness acknowledged the numerous submissions on mental health, although stated that it was beyond her area of expertise to evaluate these impacts (Tabled Document 82).

The IAC acknowledged there was also the potential for beneficial mental health effects should the project proceed for those that experience financial gains or employment as a result of the project. The IAC found that they were not presented with a consistent, clear and articulate understanding of how the proponent has attempted to examine mental health risks. The IAC recommended that should the project proceed, the human health risk assessment would also need to be updated to include a thorough assessment of mental health impacts and additional (if appropriate) mitigation measures. I accept this recommendation of the IAC.

### **Assessment**

It is my assessment that the project's human health risks are not entirely clear at this stage given the residual uncertainty with some elements of the project and some of the related environmental effects, as well as the need for additional baseline information to be collected for a number of environmental aspects should a decision maker decide to proceed with an approval decision contrary to my primary recommendation.

It is also my assessment that given the likelihood of air quality criteria exceedances and unacceptable effects related to airborne dust there is a risk of health impacts that has not been considered through the EES. It is my recommendation that, should a decision maker wish to proceed with consideration of the project, despite my primary recommendation, the review and revision of the human health risk assessment needs to include consideration of the potential health effects associated with likely exceedances of the PM<sub>10</sub> air quality criteria, and ensure that these risks are minimised to the extent possible.

## 5.15 Soils and rehabilitation

### Evaluation objective

*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.*

### Assessment context

Rehabilitation and soils are addressed within the EES in Chapter 9.11 and 11 and the technical reports appendix A001, A020, A021, A022 and A023, as well as in Chapter 19 of the IAC's report. The independent peer review of the rehabilitation assessment and Kalbar's response is outlined in Attachment K of the EES. A number of mitigation measures deal with rehabilitation and soils as outlined in Attachment H of the EES which were then revised through the IAC process and presented in Tabled Document 777.

A number of issues related to rehabilitation and soils were examined through the proponent's EES and the IAC process, in particular these can be summarised as:

- the nature of soils on-site and erosion potential;
- dam stability;
- rehabilitation process and strategy; and
- proposed closure concept/end land-use(s).

### Discussion

#### *Soils on-site and dam stability*

The EES considered the risks associated with erosion of surface soils and sub-surface soils (tunnel erosion) to effective rehabilitation of the project area and identified the potential for loss of soils, land instability and increased turbidity and sediment entering waterways. The EES outlined a strategy for designing post-mining landforms to manage surface water flows, ensuring inclusion of rock into the surface soil and increasing the vegetation density to manage surface erosion risks.

Tunnel erosion risks, primarily associated with the Haunted Hills Formation, were also characterised in the EES. The EES outlined that potentially dispersive soils placed as part of a constructed subsoil would be treated with gypsum to reduce the exchangeable sodium and magnesium to levels that reduce the dispersive risk.

A number of submissions were received about the erosion risk at the project site, particularly tunnel erosion associated with the area's soils. The IAC noted that the presence of significant areas and depths of dispersive soils in the project area, which was not disputed and would require careful management. The IAC considered that its management would be a critical element to achieve an effective, stable, long-term rehabilitated landform.

The IAC considered that in theory stabilisation of landforms through revegetation is a sound approach to rehabilitation, however noted that 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. The IAC noted the significant design and development work still required, including on-site trials that are yet to occur.

The IAC also heard submissions about the failure of farm dams due to the presence of dispersive soils and the lack of appropriate clay material for construction and concerns regarding extreme weather events from

east coast lows, which could lead to the significant uncontrolled runoff and even catastrophic failure of the project's dams. In response to questions from the IAC, Kalbar (Tabled Document 500) outlined their intention that all runoff water storage dams would be designed and constructed in accordance with all relevant guidelines developed by ANCOLD. Kalbar submitted that dam break analysis had not been undertaken for the catchment storage dams but had been undertaken for the previously proposed temporary tailings storage facility and process water supply dam.

SRW submitted (Submission 92) that the water management dams would require licensing under section 67 of the *Water Act 1989* and that detailed engineering design and impact assessment of the proposed water management dams will be required by the proponent as part of licensing processes. SRW submitted concerns about the level of consideration of operational requirements, dam safety obligations and management of instream environmental and biodiversity impacts.

The IAC found that dams should be able to be constructed and maintained to an appropriate standard to manage the risk of catastrophic failure. The IAC noted however that there must be appropriate independent engineering oversight of dam design and construction and that management and maintenance of the dams is critical, particularly if the project is abandoned or an unplanned closure were to occur. The IAC recommended that bond calculation should allow for adequate dam maintenance and/or decommissioning costs to ensure water management dams are appropriately maintained. I accept the IAC's findings and recommendation acknowledging the further work that SRW would require to inform licensing of the proposed dams should the project proceed.

### *Rehabilitation*

The EES proposed a progressive rehabilitation strategy, including the rehabilitation of the active mine voids as they progress through the landscape. Mine voids would be back-filled with tailings and overburden material, including a manufactured sub-soil, then capped with topsoil prior to revegetation. The EES proposed a return to an agricultural landscape and the establishment of a grassy woodland restoration project as end-uses for the project area. The EES considered risks associated with closure including those related to contamination of soils, erosion of soils, poor or failed vegetation establishment or performance and geotechnical risks, including settlement and the topography of the existing landform. Residual risks were assessed as ranging from very low to moderate after the implementation of mitigation measures.

The independent peer review of the identified a number of key technical areas of uncertainty including the design life of the rehabilitated landform, potential for uneven settlement of materials in the rehabilitated landform, unknown water quality draining the landform in the long-term, volumes of material required to meet the landform design, and risks associated with decommissioning. The proponent addressed some of these aspects to a degree in Attachment K of the EES.

Mine Free Glenaladale's expert witness asserted that there was a lack of certainty about whether proposed rehabilitation would be successful and that it was not clear how material will be used or placed in the rehabilitation process (Tabled Document 90). Mine Free Glenaladale's expert witness was also concerned about the use of a manufactured sub-soil over the sub-soil from the project area. A number of submitters also raised concerns about the risk of unplanned closure and how rehabilitation and closure is regulated in the state of Victoria.

Kalbar's rehabilitation and soils expert witness submitted that rehabilitation of the project would be of relatively low difficulty as the project would not need to contend with common challenges associated with rehabilitation of mining projects such as sulfidic, asbestiform, saline and radioactive materials (Tabled

Document 75). The proponent acknowledged that further work is needed to refine its approach to rehabilitation and that limited information had been provided about unplanned closure.

Kalbar identified that it had proposed a demonstration pit within the proposed Mining Licence area and that a work plan had been lodged with Earth Resources Regulation in November 2020. Earth Resources Regulation subsequently advised Kalbar that they could not consider the work plan application due to the ongoing EES process.

The IAC considered that the test-pit would have been useful if applied for earlier in the EES process to provide inputs into a range of investigations to support the development of the EES. It is my view that the proposed test-pit (assuming it did not present effects of any significance), if undertaken prior to the referral of the project to me under the EE Act, or early in the EES process (as appropriate), would have provided helpful information to inform aspects of my assessment. This would have included some key technical aspects and feasibility of proposed rehabilitation methods at the site. The test-pit, applied for by Kalbar after the exhibition of the EES, was too late in the process to provide useful information to assist the EES, the IAC's deliberations or me with my assessment.

The IAC found that 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 considered or granted. The IAC noted that further work should be undertaken in consultation with stakeholders, including relevant agencies and the local and regional community which have a strong interest in successful rehabilitation. I agree with the findings and recommendations of the IAC on rehabilitation and soils.

### **Assessment**

It is my assessment that the project's effects related to rehabilitation and soils are not clear at this stage, given the need for additional baseline information to be collected and for longer term field scale trials to support and provide confidence in the proposed rehabilitation strategy.

## 6. Conclusion

My overall conclusion is that the project will result in unacceptable environmental effects and that the project should not proceed. The unacceptable effects relate primarily to effects on native vegetation, biodiversity, air quality, agriculture and horticulture, and social values of the project area and surrounds. I have also concluded that the project poses an unacceptable risk to surface water values downstream of the site.

The project would clear a very significant tract of native vegetation and many large old trees. Having regard to the extent and conservation status of the ecological vegetation classes represented in the vegetation proposed to be cleared, the clearing would result in an unacceptable impact to biodiversity. The project's potential adverse effects to listed threatened species and communities have also contributed to my conclusion that the project's effects on biodiversity would not be acceptable.

The proximity of the project to sensitive receptors and an important horticultural district, and with a reliance on adaptive management to only just comply with airborne dust criteria, will likely result in effects to air quality and risks to agriculture and horticulture that are not acceptable. The flow on effects to the local community's sense of place, cohesion and wellbeing, in circumstances where it has already experienced significant disruption through the initial mining exploration phase and statutory assessment processes, are also considered to be unacceptable.

I recognise that some effects may be uncertain and are best assessed in a risk context. Potential effects which may be uncertain are still relevant for the purposes of this assessment. Some effects may be indirect rather than immediate or direct. However, my assessment is integrated and presented under separate topic headings for convenience rather than to suggest that impacts operate in an artificially isolated manner. The Ministerial guidelines note that an EES should adopt a systems-based approach, and for the same reasons my assessment does likewise.

The IAC made a number of recommendations for decision makers to consider should they wish to proceed with project approvals, against the conclusion and primary recommendation of my assessment. My responses to the IAC's recommendations are presented in Section 6.1.

I wish to express my sincere thanks to the IAC for the work it carried out in conducting the hearing and submitting its report, which was of great assistance to me in making my assessment. I would also like to express my appreciation of the contributions made by the proponent and all stakeholders and submitters who engaged in the process.

### 6.1 Summary of response to inquiry recommendations

Table 1 summarises my responses to the IAC's recommendations and references the relevant section of this assessment.

**Table 1: Response to IAC recommendations**

IAC recommendation	Summary response	Section
1 The environment effects of the Fingerboards Mineral Sands Project cannot be managed to an acceptable	Supported	4, 5 and 6

level and the Project approvals should not be granted.

**Further recommendations:** The IAC was strongly of the view the project should not proceed for the detailed reasons outlined in their report and my assessment has supported this conclusion.

If a decision maker takes a different view, the following recommendations are made to assist in identifying the substantial and significant additional work the IAC and I have considered 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.	Generally supported. It is my recommendation that further work should be conducted to the satisfaction of the Regional Director, Gippsland Regional, DELWP	5.1
3	Implement a management plan for the Giant Burrowing Frog in the event the species is found within the Project or Infrastructure Area.	Generally supported. It is my recommendation that such a management plan should be agreed with the Commonwealth DAWE to satisfy requirements under the EPBC Act and should then be to the satisfaction of the Regional Director, Gippsland Region, DELWP	5.1
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.	Generally supported. It is my recommendation that characterisation of biodiversity values in those areas should be to the satisfaction of the Regional Director of Gippsland Region, DELWP. The proponent should also be required to demonstrate to the satisfaction of the Regional Director, Gippsland Region, DELWP that offsets in accordance with relevant standards for the biodiversity values in those areas have been secured before any works affecting such values are permitted to commence.	5.1
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.	Supported	5.1

**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.	Supported	5.5
7	Rerun the water balance model based on a proven water recovery rate from the full-scale trial.	Supported	5.5
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.	Generally supported. It is my recommendation that after further baseline data is collected modelling should also be undertaken to support assessment of cumulative impacts within and around the project area.	5.5



9	Develop a contingency plan to obtain another source of water in the event sufficient groundwater cannot be sourced from the Latrobe Group aquifer.	Supported	5.5
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.	Supported	5.5
11	Monitor the Woodglen Aquifer Storage and Recovery site to assess and mitigate potential risks on groundwater storage.	Supported	5.5
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.	Supported	5.5
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.	Supported	5.5
-		It is my recommendation that the agreed actions of the groundwater expert conclave report relating to groundwater and seepage quality (page 13 of Tabled Document 255) be undertaken to inform consideration of project approvals.	5.5
-		It is my recommendation that water quality be monitored at interception bores between the project area and the Mitchell River, to allow for corrective action to be taken (which could include pumping out water) if significant departures from predictions are identified.	5.5
<b>Surface Water</b>			
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.	Supported	5.6
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.	Supported	5.6
16	Design water management dams with sufficient capacity to prevent spills being less than 1 per cent as recommended by the Environment Protection Authority.	Supported	5.6
17	Collect site based rainfall and runoff data during an east coast low and apply the data to flood and dam capacity modelling.	Supported	5.6

18	Develop a contingency plan to manage the risk of untreated mine contact water entering watercourses when the dissolved air flotation plant is offline.	Supported	5.6
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.	Supported	5.6
20	Monitor the Chain of Ponds system during groundwater test pumping to assess impacts.	Supported	5.6
<b>Air Quality and greenhouse gas</b>			
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.	Supported	5.2
-		It is my recommendation that commitments to further greenhouse gas reductions as proposed by the proponent will need to be given effect in project approval documentation should the project proceed.	5.2
-		It is my recommendation that the greenhouse gas emissions from transport of the HMC via the Port of Geelong should be assessed to inform future project approvals, should the project proceed.	5.2
<b>Noise and vibration</b>			
22	Assess the vibration characteristics of the centrifuges during on-site trials to determine if any mitigation measures are required.	Supported	5.7
<b>Radiation</b>			
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.	Supported	5.8
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.	Supported	5.8
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 cannot be spread through wind or other mechanisms.	Generally supported. It is my recommendation that should a closed system not be feasible, further assessment of the effects of the alternative storage and handling arrangements — in particular, relating to dust generation — should be required to inform the radiation management licence application	5.8

26	Undertake a comprehensive risk assessment of transporting heavy mineral concentrate through central Melbourne by rail.	Generally supported. It is my recommendation that this also include consideration of transport of the HMC through the Port of Geelong.	5.8
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.	Supported	5.8
-	-	It is my recommendation that the Department of Health consider making draft radiation management plans for the project publicly available, where possible.	5.8
<b>Roads, traffic and transport</b>			
28	Update the Traffic and Transport Impact Assessment with current traffic counts, as required by the Department of Transport.	Supported	5.9
29	Assess and confirm the feasibility for heavy mineral concentrate freight by rail to the Port of Geelong.	Supported	5.9
30	Assess and resolve the feasibility and desirability of new roundabouts on the Princes Highway at Lindenow - Glenaladale Road intersection and Racecourse Road.	Supported	5.9
31	Retain the site access at the proposed new Fingerboards roundabout.	Supported	5.9
32	Grade-separate the private haul road at the Fernbank - Glenaladale Road intersection.	Supported	5.9
33	Implement legally bindings 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.	Supported	5.9
34	Develop a Traffic and Transport Management Plan to the satisfaction of the Responsible Authority and the Head Transport for Victoria.	Supported	5.9
-	-	It is my recommendation that detailed design plans for the Fernbank rail siding should be developed in consultation with and subject to the agreement with the Regional Director, Gippsland Region, DELWP, for access to the proposed rail siding, to ensure optimal protection for rare plants associated with the rail easement area.	5.9, 5.1
<b>Landscape and Visual</b>			
35	Include in the Work Plan or Visual Amenity Management Plan (as appropriate): a) requirement that sufficiently mature screening native vegetation is established at sensitive receptors (with the owner's consent)	Supported	5.11

	<p>b) detailed plans including locations for early implementation of visual screen planting prior to mining commencing to mitigate visual impact</p> <p>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.</p>		
<b>Agriculture and Horticulture</b>			
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.	Supported	5.3
<b>Cultural Heritage</b>			
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.	Generally supported. It is my recommendation that such documentation and recording should be documented in close consultation with GLaWAC.	5.12
<b>Economic</b>			
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.	Supported	5.13
-	-	It is my recommendation that the proponent should work with local employment providers and training organisations to maximise the number of local employment opportunities.	5.13
<b>Human Health</b>			
39	<p>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:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Consultation with stakeholders, including the local community, to ensure the method and results are clearly communicated and understood, and opportunities for feedback provided.</li> <li>• Allowance for sensitivity around the likely feasibility and effectiveness of mitigation measures.</li> </ul>	Generally supported. It is my recommendation that such a revision include consideration of potential health risks associated with PM <sub>10</sub> exceedances and minimisation of those risks to the extent possible.	5.14, 5.2

	<ul style="list-style-type: none"> <li>Measures to ensure that issues raised in the Human Health Risk Assessment are fed back to influence detailed Project design.</li> <li>Consideration of other physiological health impacts, including noise.</li> <li>Consideration of mental health.</li> <li>Review and oversight by a suitably qualified independent health expert.</li> </ul>		
<b>Soils and rehabilitation</b>			
40	Ensure bond calculations under the <i>Mineral Resources (Sustainable Development) Act 1990</i> are adequate to account for the uncertainties in rehabilitation success and the consequent timing, management, and removal of dams on site.	Supported	5.15
<b>Draft planning scheme amendment</b>			
41	Apply the Incorporated Document as shown in Appendix E (of the IAC's report) to the Project.	Generally supported, noting it should be revised to account for the significant further assessment work to be undertaken to inform an approval	5.10
<b>Environmental management framework</b>			
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.	Supported	4
<b>Matters of National Environmental Significance</b>			
43	<p>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:</p> <p>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.</p> <p>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.</p> <p>c) the impacts on the environment of the storage of heavy mineral concentrate stockpiles once their size, location and management has been clarified.</p>	Supported	Appendix A

A handwritten signature in blue ink that reads "Richard Wynne". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

**HON RICHARD WYNNE MP**

Minister for Planning

21 / 11 / 2021

## Appendix A Matters of national environmental significance

Under the EPBC Act bilateral (assessment) agreement between the Australian and Victorian governments, the EES and this assessment need to examine the project's likely impacts on matters of national environmental significance (MNES), as identified in the Commonwealth controlled action decision under the EPBC Act. The controlling provisions for this decision are sections 16 and 17B (in relation to the Ramsar listed Gippsland Lakes), sections 18 and 18A (in relation to listed threatened species and communities), sections 20 and 20A (in relation to listed migratory species) and sections 21 and 22A (in relation to nuclear actions).

This appendix consolidates information on likely effects of the project on MNES protected under the EPBC Act, drawing upon the assessment of specific matters discussed in other sections of my assessment. This includes assessment findings on biodiversity (Section 5.1) groundwater (Section 5.5), surface water (Section 5.6) and radiation (Section 5.8).

Potential impacts on MNES are summarised in Chapter 10 and Appendices A002, A003, A006 and A011 of the EES. The more detailed information about potential impacts that relate to my assessment of impacts on MNES can be found in Chapter 12 of the EES. The EES identifies the key issue for MNES as being a significant impact on the Gippsland Red Gum Grassy Woodland and Associated Native Grassland ecological community, which is proposed to be offset. The EES states that impacts on threatened and migratory species and the Gippsland Lakes Ramsar Site will not be significant. The EES' determined that there will not be impacts from radiation on the whole of the environment, including the workforce, members of the public, clean water, and aquatic and terrestrial ecosystems.

Chapter 23 of the IAC report examined the likely impacts on MNES. The overall finding of the IAC was that that whilst most impacts on MNES could be offset or managed through the mitigation and management measures, uncertainty remains about the impacts on the Gippsland Lakes Ramsar Site. This is explored below in relation to each of the specific MNES. I disagree with the IAC's conclusion on the significance of impacts expected on threatened species, including Grey-headed Flying-fox, Giant Burrowing Frog, Australian Grayling and Gaping Leek-orchid. I consider it possible that these species might be significantly adversely affected, which contributes to my assessment that project's effects on biodiversity values are likely to be unacceptable.

### A.1 Gippsland Lakes Ramsar Site

Gippsland Lakes Ramsar Site is listed under the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* (Ramsar, Iran, 1971), commonly referred to as the Ramsar Convention. Gippsland Lakes Ramsar Site is approximately 25 km southeast of the project area. The project area contains ephemeral streams which drain into the Mitchell and Perry Rivers, both of which discharge to the Gippsland Lakes. The Mitchell River drains into the Lake King and the Perry River drains into Lake Wellington, through a confluence with the Avon River. The Gippsland Lakes are also fed by groundwater, both directly and by the Mitchell River which receives baseflow flows from groundwater. The EES states that groundwater in the middle aquifers beneath the project area flows towards the Gippsland Lakes.

The IAC considered that the project has the potential for high adverse impacts on the Gippsland Lakes Ramsar Site. The main concerns centred on unplanned risk events involving untreated mine water entering waterways or the catastrophic failure of an onsite water management (e.g. DAF plant and/or storages). The IAC considered that there was insufficient evidence, particularly regarding groundwater and surface

water impacts, to conclude that the project would not have a significant impact on the Gippsland Lakes Ramsar Site. However, it is my assessment that unplanned risk events from the project could give rise to significant impacts on the Ramsar site.

The IAC considered that the key risk to the Gippsland Lakes Ramsar Site would be a catastrophic failure of an onsite dam. Whilst the likelihood of occurrence of large dam failure is low the consequences would likely be severe for the Gippsland Lakes. Although dams are proposed to be constructed in accordance with guidelines developed by the ANCOLD, the IAC noted challenges for dam construction and integrity including extreme rainfall events that can occur in the region, the dispersive soils present on site, as well as wombat burrows and the need to use appropriate engineering materials. The IAC considered that the risk of dam failure may be exacerbated if maintenance of dams falls below agreed standards due to the abandonment or unplanned closure of the project, as well as potential for east coast lows to create high risk, short, intense storm events that place significant pressure on the water management infrastructure. The IAC noted that they had been provided with examples of dam failures in mining projects. The proponent did not undertake dam break analysis for the catchment storage dams but stated that water management dams were sized to capture runoff from the 1:100-year ARI, 72 hour event.

Chapter 10 of the EES described the environmental consequences of a failure a TSF (which is no longer proposed) as extreme but did not discuss the consequences of a failure of a water management dam. The EES described the impacts of the structural failure of a tailings storage facility as including that “The force of such a discharge would cause erosion and/or sedimentation in creeks and rivers and impact on downstream aquatic habitats, for example, through changes to water quality and smothering.” The IAC noted that although water storage dams do not have the toxicity issues of tailings dams, the consequences of catastrophic failure could still be great. As this event has not been modelled or discussed in the EES the potential impact on the Gippsland Lakes Ramsar Site must be assumed to be significant.

The IAC considered that there was a significant risk of mine contact water entering natural watercourses and potentially the Gippsland Lakes. The project relies on the Dissolved Air Flotation (DAF) plant for the treatment of mine contact water during peak rainfall events, which would then be discharged into the freshwater dam. The IAC agreed with submissions that if the DAF plant were to fail or the freshwater dam was too full to receive treated water from the DAF plant then untreated mine contact water could overflow into natural waterways and potentially reach the Gippsland Lakes. Several submissions identified that extreme rainfall events during east coast lows could present challenges for onsite water management, which could impact on the Gippsland Lakes if contaminated water flows into the Mitchell or Perry Rivers. The IAC considered that the assessment of impacts from east coast lows were not adequately addressed in the EES. The IAC found that there is an unacceptable risk of untreated mine contact water entering natural watercourses if the DAF plant were offline. I support this conclusion and consider the consequences of these risk events to be significant and not reduced to an acceptable level.

The IAC considered evidence that flocculants used to treat tailings could have potential significant and unacceptable effects on groundwater quality that had not been assessed in the EES. Experts at the groundwater conclave noted that further information was required to determine if there could be impacts from flocculant biodegradation by-products entering the Gippsland Lakes (via groundwater discharge to the Mitchell River). I agree with this assessment and consider if the project were to proceed further information would be required to determine whether flocculant by-products could impact on the Gippsland Lakes Ramsar Site.



I consider that the downstream impacts of water quality the routine operation of the project are unlikely to have a significant impact on the Gippsland Lakes Ramsar Site, however further information on the surface water and groundwater impacts are necessary to be certain of this. There remains the risk of rare but extreme impacts on the Ramsar site resulting from events such as mine contact water entering waterways when the DAF plant is offline or cannot discharge into the freshwater storage, or severe rainfall events occur leading to overtopping of dams, or the catastrophic failure of the freshwater storage dam. These events, which have not been adequately considered by the proponent in the EES, could lead to significant environmental effects to the Gippsland Lakes Ramsar Site.

## A.2 Listed threatened species and communities

EPBC Act-listed threatened species to be addressed in the assessment as identified in the scoping requirements were:

- Giant Burrowing Frog (*Heleioporus australiacus*),
- New Holland Mouse (*Pseudomys novaehollandiae*)
- Long-nosed Potoroo (*Potorous tridactylus tridactylus*),
- Regent Honeyeater (*Anthochaera phrygia*),
- Dwarf Kerrawang (*Commersonia prostrata*),
- Gaping Leek-orchid (*Prasophyllum correctum*),
- Swamp Everlasting (*Xerochrysum palustre*),
- Dwarf Galaxias (*Galaxiella pusilla*),
- Australian Grayling (*Prototroctes maraena*),
- Australian Painted Snipe (*Rostratula australis*),
- Growling Grass Frog (*Litoria raniformis*),
- Green and Golden Bell Frog (*Litoria aurea*), and
- Australasian Bittern (*Botaurus poiciloptilus*).

These and other EPBC Act-listed species identified as potentially present in the project and infrastructure areas using the Protected Matters Search Tool were assessed during the EES. The majority of these were determined as being unlikely to occur within the project area and I will not cover them in this Appendix. These are discussed in Section 5.1 of my assessment. Seven species were either detected within the project area or have been recorded close nearby and these are discussed in further detail below.

Two nationally significant fauna species were recorded as being present in the Project areas during the assessment; Grey-headed Flying-fox and Australian Grayling. No nationally significant flora species were detected during the surveys. The EES identifies three flora species (Swamp Everlasting, Dwarf Kerrawang and Gaping Leek-orchid) and two terrestrial fauna species (Swift Parrot and Giant Burrowing Frog) as having a low to moderate, moderate or high likelihood of occurrence within the project or infrastructure.

One EPBC Act-listed threatened ecological community, Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Native Grassland, is present within the project area.

### Grey-headed Flying-fox

Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act. The EES stated that the species was recorded within the project area during field surveys in August 2019 and is expected to fly over and occasionally forage within the project and infrastructure areas. Whilst no known roost or camp sites are present within the project area the nearest camp site is adjacent to the Mitchell River in Bairnsdale, which is around 20 kilometres from the project area. This is within the nightly foraging range for the species. An assessment of the impacts of the project on Grey-headed Flying-fox under the Significant Impact Guidelines

1.1 for Vulnerable species was undertaken and it was determined that the species will not be significantly impacted (EES Chapter 10).

The IAC found the impacts, if any, on EPBC Act-listed species would be acceptable. Whilst I accept that the removal of 265 hectares of foraging habitat for the species is unlikely to trigger a significant impact under the significant impact criteria, I disagree with the EES assumption that the species is likely to use the area only occasionally. The project area is well within the nightly foraging range for individuals from the Bairnsdale camp and may be used by the species intensively when Eucalypts within the area are flowering. The removal of foraging habitats within the nightly foraging range from the camp may also put increasing foraging pressure on nearby commercial orchards, increasing the risk for persecution of the species by orchardists. The possibility that the species might be adversely affected is one factor contributing to my overall conclusion that the project's effects on biodiversity would be unacceptable.

### **Australian Grayling**

Australian Grayling is listed as Vulnerable under the EPBC Act. A population of the species is known from the Mitchell River, which the EES describes as constituting an 'important population' under the EPBC Act (Appendix A002). The EES describes that the species was detected twice in November 2018 during surveys along the Mitchell River, at the confluence of Perry Gully and the river, approximately 550 metres northeast of the project area. The species is amphidromous: adults spawn in the lower fresh water reaches of the streams, larval fish drift downstream into salt water, and juveniles migrate back upstream into the streams to fresh water.

An assessment of the impacts of the project on Australian Grayling under the Significant Impact Guidelines 1.1 for Vulnerable species was undertaken and it was determined that the species will not be significantly impacted (EES Chapter 10). The IAC found the impacts, if any, on EPBC Act-listed species would be acceptable. I disagree with this assessment for Australian Grayling based on the IAC's conclusion that there is insufficient evidence on the groundwater and surface water quality impacts of the Project and the risks from a dam failure or mine contact water discharge. It is likely that a significant proportion of the population in the river passes through the reach adjacent to the project site during the annual migration. If the project were to proceed, I consider that further information is required to determine that water quality impacts of the routine operation will not have a significant impact on Australian Grayling present within or migrating through the Mitchell River downstream of the Project area. It must be assumed that risk events could have a significant impact on the population. The possibility that the species might be adversely affected is therefore a factor contributing to my conclusion that the project's effects on biodiversity would be unacceptable.

### **Swamp Everlasting**

Swamp everlasting is listed as Vulnerable under the EPBC Act. Targeted surveys undertaken for the project did not detect the species. Whilst areas of potential habitat including Aquatic Herbland (0.93 hectares) and Plains Grassy Wetland (0.28 hectares) are proposed to be removed the EES states that no high quality habitat for these species occurs within the project footprint. The EES (Chapter 10) notes that the species has previously been recorded, most recently in 2016, within the infrastructure options area. Records also occur within 3.4 kilometres of the project area and 500 metres from the proposed rail siding (within Saplings Morass Flora and Fauna Reserve adjacent to Cowell's Lane).

An assessment of the impacts of the project on Swamp Everlasting under the Significant Impact Guidelines 1.1 for Vulnerable species was undertaken and it was determined that the species is unlikely to be significantly impacted (EES Chapter 10). However, the assessment against the significant impact criteria

states that it is possible that the project could lead to a long term decrease in the size of an important population as any individual present within the project or infrastructure areas would be classified as an important population. Similarly, it states that it is possible if undetected individuals are present the project would reduce the area of occupancy of an important population. It is stated that if individuals were present, they would be avoided or salvaged and translocated. It is proposed in the Ecological technical report (Appendix A005) that the Project Environmental Management Plan will include a Significant Flora Salvage and Translocation Plan. This has not been included within the Environmental Management Framework.

I recommend that a mitigation measure be added to the Environmental Management Framework requiring the development of a Significant Flora Salvage and Translocation Plan to deal with the contingency that threatened flora species are found. The Significant Flora Salvage and Translocation Plan is to be developed in consultation with and to the satisfaction of DELWP and the Commonwealth Department of Agriculture, Water and the Environment (DAWE). This plan must be developed prior to the removal of any native vegetation for the project. If the project proceeds, I consider it unlikely there would be a significant impact on Swamp Everlasting provided all mitigation measures are implemented.

### **Dwarf Kerrawang**

Dwarf Kerrawang is listed as Endangered under the EPBC Act. Targeted surveys undertaken for the project did not detect the species. The species has been recorded within 2.5 kilometres to the east of the infrastructure options area. Small areas of potential habitat for the species occur within the project and infrastructure areas in wetland and aquatic habitats. An assessment of the impacts of the project on Dwarf Kerrawang under the Significant Impact Guidelines 1.1 for Critically Endangered and Endangered species was undertaken and it was determined that the species is unlikely to be significantly impacted (EES Chapter 10). The significant impact assessment states “Should the species be detected within the project area, there is a potential to establish populations in cultivation as part of the restoration commitments for the project” (EES Chapter 10). I recommend that mechanisms to facilitate this are incorporated into the Significant Flora and Salvage and Translocation Plan I have recommended be included as a mitigation measure of the Environmental Management Framework.

### **Gaping Leek-orchid**

Gaping Leek-orchid is listed as Endangered under the EPBC Act. Targeted surveys undertaken for the project did not detect the species. The species has been recorded within 50m of the proposed Fernbank East rail siding, directly east of Cowells Lane. The EES states that the areas where the species is known to occur will be avoided by the proposed works, however a small strip of low-quality habitat for the species occurs in the area of the proposed siding. Whilst targeted surveys were not undertaken in this area it is stated that there is a low likelihood of occurrence of the species in this area due to high weed cover and that these areas will be covered in future surveys. An assessment of the impacts of the project on Gaping Leek-orchid under the Significant Impact Guidelines 1.1 for Critically Endangered and Endangered species was undertaken and it was determined that the species is unlikely to be significantly impacted (EES Chapter 10).

As targeted surveys have not been undertaken in the area of the proposed rail siding, proximate to a known population, it cannot be ruled out that individuals of the species occur there, despite the high weed cover. If the Gaping Leek-orchid does occur in this area, removal could result in a significant impact to the species.

If the project proceeds, I recommend targeted surveys must be undertaken in this location prior to design of the siding. If individuals of the species are found in this location they should be avoided through the design, to prevent a significant impact on the species. If removal is unavoidable, then mechanisms to facilitate salvage and translocation are to be incorporated into the Significant Flora and Salvage and Translocation Plan I have recommended be included as a mitigation measure of the Environmental Management Framework.

### **Swift Parrot**

Swift Parrot is listed as Critically Endangered under the EPBC Act. The EES identifies that the species may be an infrequent visitor to the project area, with around 265 hectares of suitable forest, woodland and scattered tree habitat present within the Project and infrastructure area (EES Chapter 10). It is stated that area is outside the Swift Parrot's core over-wintering habitat, with few documented sightings in the nearby area. An assessment of the impacts of the project on Swift Parrot under the Significant Impact Guidelines 1.1 for Critically Endangered and Endangered species was undertaken and it was determined that the species is unlikely to be significantly impacted (EES Chapter 10). I agree with this assessment.

### **Giant Burrowing Frog**

Giant Burrowing Frog is listed as Vulnerable under the EPBC Act. The species was not detected within the project area during targeted surveys. However, the IAC heard a submission from a frog researcher (Document 387) that a more intensive acoustic survey using an automated recording system detected the species within the project area in April 2021. A species expert listened to the call and confirmed that in his opinion it is a Giant Burrowing Frog call. Previously the submitter had detected the species on three occasions in May 2021 from a location eight kilometres from the project area. Both the April 2021 and May 2020 records have been added to the Atlas of Living Australia. The submitter stated that the May 2020 "call habitat was a degraded, ephemeral stream pond within cleared, grazing country".

The EES states that the surveys were in accordance with the *Survey Guidelines for Australia's Threatened Frogs* (DEWHA, 2010c), and the *Approved Survey Standards: Giant Burrowing Frog Heleioporus australiacus* (Clemann et al, 2011) (Appendix A005). However, for this highly cryptic species which has a very low detection probability, I consider it is highly unlikely that the species would have been detected with only four nights of nocturnal survey effort even if present at or near the survey locations.

The EES identifies that 15.2 ha of "very low-quality habitat" for Giant Burrowing Frog will be removed and disturbed by the project. As the submitter is confident that the species was detected within the project area in April 2021 (and verified the call with other species experts) and that habitat it was recorded in in May 2020 was similar in quality to the "very low-quality habitat" mentioned above, it should be assumed that the species is present within the project area and could be present in all 15.2ha of identified habitat. Furthermore, given the unknowns around the habitat requirements for the species, this habitat should not be assumed to be very low quality for the species and may be of higher value.

An assessment of the impacts of the project on Giant Burrowing Frog under the Significant Impact Guidelines 1.1 for Vulnerable species was undertaken and it was determined that the species is unlikely to be significantly impacted (EES Chapter 10). I do not have confidence in this assessment given the risk that the assumptions are incorrect. It is my conclusion that it is not possible to determine from the information available whether the project will have a significant impact on the Giant Burrowing Frog. The possibility that the species might be adversely affected is one factor contributing to my conclusion that the project's effects on biodiversity would be unacceptable.

### **Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Native Grassland ecological community**

Gippsland Red Gum Grassy Woodland and Associated Native Grassland is a nationally threatened ecological community, listed as Critically Endangered under the EPBC Act. The EES identifies that approximately 1.74 hectares of this community is proposed for removal, within the road reserve of Fernbank-Glenaladale Road and Bairnsdale-Dargo Road.

Section 5.1 of my assessment recognises the possibility that a greater extent of the ecological community might be affected, either because it lies in areas that were not surveyed or because it may have been misidentified as a different ecological community.

The EES also identifies that 5.64 hectares of this Gippsland Red Gum Grassy Woodland and Associated Native Grassland occurs within the infrastructure options area and 6.68 hectares occurs immediately adjacent to the project and infrastructure options areas. It is stated that this vegetation is not proposed for removal and will be clearly defined, marked and protected (EES Chapter 10). I note that the EES states that micro-siting of infrastructure and the location of access tracks away from areas with the ecological community will be undertaken to mitigate impacts on the ecological community.

An assessment of the impacts of the project on the Gippsland Red Gum Grassy Woodland and Associated Native Grassland under the Significant Impact Guidelines 1.1 for Critically Endangered and Endangered ecological communities was undertaken and it was determined that the ecological community will be significantly impacted (EES Chapter 10). I agree with this assessment.

An offset will be required for the loss of this ecological community prior to its removal. The EES states that the project will be required to secure an offset of approximately 8 to 10 hectares of the ecological community, the actual size of which will be determined using the Offset Assessment Guide offset calculator. A detailed offset management plan for the offset site is to be provided to the Commonwealth Department of Agriculture, Water and Environment for approval. The EES states that the Proponent has identified “several suitable offset sites which contain an area of the ecological community that can be protected and enhanced, meeting the likely offset requirements”. The IAC considered that the loss of the ecological community is likely to be able to be offset in accordance with requirements. I recommend that an offset strategy for the ecological community and an approved offset management plan be required prior to any approval by DAWE.

### **A.3 Listed migratory species**

Migratory species listed under the EPBC Act are those protected under international agreements to which Australia is a party. This includes species listed under the Bonn Convention, Japan-Australia Migratory Bird Agreement, China-Australia Migratory Bird Agreement and Republic of Korea-Australia Migratory Bird Agreement.

The Protected Matters Search undertaken for the EES identified 20 migratory species which have been recorded or have the potential to occur within 10 kilometres of the project area. Of these, the EES identified only two which are likely to occur within the project areas and infrastructure area; Rufous Fantail (*Rhipidura rufifrons*), which was recorded during the assessment and Latham's Snipe (*Gallinago hardwickii*). The scoping requirements for the project specifically mentioned that the project could result in the direct loss of degradation for habitat for migratory species including Little Tern (*Sterna albifrons*), Red-necked Stint (*Calidris ruficollis*) and the Sharp-tailed Sandpiper (*Calidris acuminata*). The EES states that these and other species have a low likelihood of occurrence within the project or infrastructure area as

there is a lack of suitable habitat (EES Chapter 10). Areas outside the project and infrastructure areas which are likely to be more important for migratory bird species are along the coast and within the Gippsland Lakes Ramsar Site (Chapter 10).

The ecological assessment states that individuals or a small number of Latham's Snipe may occur within the project and infrastructure areas on an occasional basis, however the site is unlikely to support an important population (EES Appendix A005). Suitable habitat for the species within the area is described as including wetland habitat such as the edges of dams and waterways.

Rufous Fantail was recorded during the field assessment. The ecological assessment identifies that riparian areas within the project and infrastructure areas provide suitable habitat for the species. It is stated that as the species is nomadic it has the ability to disperse to other suitable habitat if the project proceeds (EES Appendix A005).

A combined significant impact assessment was undertaken for migratory species within the project and infrastructure areas in accordance with Significant Impact Guidelines 1.1 (listed migratory species) and the significant impact guidelines outlined in EPBC Act Policy Statement 3.21 (EES Chapter 10). It was found that there is unlikely to be a significant impact on migratory shorebirds within these areas from the construction and operation of the project. I agree with this assessment.

I note that the EES does not assess the impacts of the project on migratory species outside the project and infrastructure areas. Of particular note are migratory shorebird species which may be present within the Gippsland Lakes Ramsar Site. As noted in A.1 above the IAC identified that there was insufficient information on the impacts on surface and groundwater to rule out significant impacts on the Ramsar site. The EES did not assess the impacts of a risk event, such as a catastrophic dam failure or discharge of untreated mine contact water on migratory shorebirds present within the Ramsar site. Whilst I think it unlikely that routine operations would result in a significant impact on shorebirds, insufficient information has been provided to conclude that risk events would not result in a significant impact on these migratory species. I must therefore assume that risk events could have a significant impact on listed migratory species.

If the project were to proceed, I recommend further assessment is undertaken of the impacts these risk events on migratory bird species.

#### **A.4 Nuclear action**

The project is classified as a nuclear action as it involves the storage of radioactive materials (uranium and thorium present in the mineral monazite) which are present within the Heavy Metal Concentrate stockpiles, which exceed levels set out in the Environment Protection and Biodiversity Conservation Regulations 2000. The triggering of EPBC under nuclear actions requires a whole of environment assessment. This has been addressed through the broader scope of the assessments occurring via the EES.

#### **Radiation impacts**

Radiation impacts is discussed in detail above in section 5.8 of my assessment. It is my assessment that, as the predicted dose rates to the public and workforce are considerably below the prescribed dose limits and there is a strong regulatory framework for the management of radiation in Victoria, the potential radiation impacts from the project are likely to be able to be managed to an acceptable level.

I am concerned about the potential for significant dust effects, as identified in Section 5.2 of my assessment, and that there may also be potential for radionuclides to be transported off-site through dust emissions. Should it not be feasible to manage the heavy mineral concentrate within a closed system further assessment of dust emissions from heavy mineral concentrate stockpiles, in particular, would need to be conducted.

I acknowledge that further baseline data collection is required to support approval decisions by the Department of Health and I have supported the recommendation of the IAC for the further detailed assessments required by the Department of Health to inform their approval of the project to be completed prior to any overall project approval being considered. The Department of Health should consider making the radiation management plans for this project publicly available, where possible.

### **Whole of environment assessment**

It is my overall conclusion that the project will result in unacceptable environmental effects. Those unacceptable effects would include the following:

- Unacceptable environmental effects with respect to agriculture and horticulture (Section 5.3), resulting from air quality impacts, potential effects on water availability and water quality and significant detracting from the region's reputation for horticultural and agricultural produce.
- Unacceptable environmental effects on biodiversity (Section 5.1), resulting from the very substantial clearing of native vegetation most of which belongs to ecological vegetation classes classified as Endangered and Vulnerable within the Bioregion, including many large (and presumably) hollow-bearing trees. This includes the nationally Critically Endangered Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Native Grassland ecological community and habitat for state and nationally threatened species including Grey-headed Flying-fox, Giant Burrowing Frog, Australian Grayling and Gaping Leek-orchid.
- Considerable uncertainty around the water needs of the project, water availability and allocation and the advisability of introducing a high water-demand user into an area of constrained water availability in a drying climate (Section 5.5) and that the project presents the risk of significant impacts to surface water environmental values, including to the Gippsland Lakes Ramsar Site.
- Unacceptable environmental effects on air quality (Section 5.2) resulting from dust which could impact nearby sensitive receptors and the adjacent high value horticultural areas. The proposed mitigation measures and the adaptive management approach are considered unlikely to be completely effective and increase the risk of exceedance of airborne dust criteria.
- A significant social impact (Section 5.4) in a relatively densely settled rural area with a mix of farms, and rural residential uses, where the significant and unacceptable environmental impacts and risks described in Section 5 of my assessment are likely to contribute to significant impacts on the community's sense of place and community cohesion.

### **A.5 Assessment**

- Uncertainties around groundwater and surface water impacts, particularly regarding risk events mean it is not possible to rule out significant impacts on the Gippsland Lakes Ramsar Site and it must be assumed that risk events could have a significant impact on the site.
- Uncertainties around groundwater and surface water impacts, particularly regarding risk events, mean it is not possible to determine whether the project could have a significant impact on migratory shorebirds within the Gippsland Lakes Ramsar Site and it must be assumed that risk events could have a significant impact on these species.
- Uncertainties around groundwater and surface water impacts, particularly regarding risk events, mean it is not possible to determine whether the project could have a significant impact on

Australian Grayling and it must be assumed that risk events could have a significant impact on this species.

- It is not possible to determine from the information available whether the project will have a significant impact on the Giant Burrowing Frog. The possibility that the species might be adversely affected is one factor contributing to my conclusion that the project's effects on biodiversity would be unacceptable.
- The EES may have under-estimated the value of the project area as foraging habitat for Grey-headed Flying-fox at the nearby Bairnsdale camp. The possibility that the species might be adversely affected is one factor contributing to my conclusion that the project's effects on biodiversity would be unacceptable.
- Uncertainties around the presence of Gaping Leek-orchid in unsurveyed areas adjacent to a known population mean it is not possible to determine whether the project will have a significant impact on the species.
- Impacts of the project on all other EPBC Act-listed threatened species assessed during the EES do not meet significant impact criteria under the Significant Impact Guidelines and are considered acceptable.
- The potential radiation impacts from the project are likely to be able to be managed to an acceptable level as there is a strong regulatory framework for the management of radiation in Victoria. I am concerned about the potential for radionuclides to be transported off-site through dust emissions should it not be feasible to manage the mineral concentrate within a closed system.
- It is my assessment from the whole of environment assessment undertaken for the EES that the project will result in unacceptable environmental effects on biodiversity, air quality, nearby agriculture and horticulture and water availability and unacceptable social impacts on the surrounding community.