

RMCG

02 FEBRUARY 2021

Fingerboards mineral sands project Expert witness statement.

Horticulture Impact

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Executive Summary

1. My statement consists of three main sections.
2. The introductory section (Section 1) covers:
 - i. An overview of my background and experiences relevant to acting as an expert witness covering horticulture (including viticulture), and my signature
 - ii. Acknowledgement of country, paying respect to traditional owners
 - iii. Acknowledgement of today's communities, who have connected to the land over the past 170 years and live in regional communities
 - iv. My instructions instructed by White & Case, on behalf of Kalbar Operations Pty Ltd.
3. Section 2 provides an overview of:
 - v. My role in preparing the Horticultural Impact Assessment (HIA) and report; I focussed on the review of EES technical expert reports and primary information relevant to concerns voiced by horticultural producers in the Lindenow region during interviews; these were conducted by two of my colleagues. I was a co-author of the HIA report.
 - vi. A description and summary of the HIA and report.
4. Section 3 covers:
 - vii. The context I applied when preparing responses to submissions, specifically the use of published data and identifying any opinions and assumptions
 - the presumption that a mineral sands mine in the Fingerboards region would be operated under appropriate licence conditions and abide by applicable legislation and that the operators will have a compliance culture and always employ all required and additional mitigation procedures as set out in the Mitigation Register 2020 (Attachment H to the EES, and
 - the assumption that the independent technical expert's EES reports are a reliable, objective source of information
 - viii. My review and responses to submissions that refer to horticulture and viticulture.
 - ix. Below table summarises the main themes and issues I responded to.

THEME AND ISSUES	RESPONSE
5. Data use, ground truthing and RMCG expertise	The HIA and my responses to submissions are based on published information, including but not limited to data by the Australian Bureau of Statistics (ABS), Agriculture Victoria and my knowledge of horticultural production processes nationally (refer to Section 1) and the region.

THEME AND ISSUES	RESPONSE
<p>6. Dust impacts on conventional and organic vegetable production</p>	<p>My response refers to the relevant EES report by Katestone Environmental and mitigation processes suggested in the report and additional mitigation recommended in the HIA report. I know that concerns have been raised about the wind strengths measurements in the report by Katestone. I cannot comment the approach and data because the HIA did not collect primary data where well qualified technical experts had already been engaged.</p> <p>My response mentions the value of windbreaks around the Project site and in the productive landscape as an important mitigation measure that also has environmental and production benefits.</p> <p>The HIA report and my response describes typical dust issues and mitigation practices by vegetable producers, as well as relevant (to dust and dirt) food safety (QA) standards and certification. The reference to food safety certification is included to explain that produce, if affected by dust or dirt from any source (including from agricultural activities or traffic) would not be sent to market based on QA standards.</p> <p>My response includes reference to literature on the potential effect of dust on plant growth and concludes that insufficient data is available for vegetables. Based on data on the effect of dust on photosynthesis of roadside vegetation I estimated that a dust at the level of the daily guideline limit of 120 mg/m² would be unlikely to reduce vegetable crop growth, considering that overhead irrigation used at least once per week unless there is sufficient rain. The irrigation or rain would wash dust off.</p> <p>I acknowledge that a standard for dust deposition levels in vegetables does not exist.</p>
<p>7. Certifications (food safety, organic production)</p>	<p>Organic, environmental and food safety certifications focus on management on farm. Environmental and Australian Organic certification also deal with controlling risks of farming on the surrounding environment.</p> <p>I responded to concerns raised about potentially losing certifications and described why this would be unlikely to occur, if the Project was to go ahead. I summarised the relevant information on standards and certification to provide the rationale for my response.</p> <p>In summary, the air quality modelling and mitigation recommendations by Katestone (EES technical report on air quality), recommended by the HIA report and the already existing dust management measures by vegetable producers (to deal with dust from current sources under food safety QA) show that acceptance of fresh produce by buyers and consumers would not be affected.</p>
<p>8. Residue limits (export) and bans</p>	<p>Air quality modelling and mitigation recommendations by Katestone (EES technical report on air quality) explain that heavy metal contamination of vegetables is unlikely to occur under recommended dust mitigation.</p> <p>In my response to maximum residue limits (MRLs) I explain that different governments classify and regulate contaminants differently for heavy metals, aflatoxins, natural toxicants, dioxins, PCBs, and other regulated substances (e.g., pesticides, drugs) and that changes occur frequently. Exporters keep up to date with regulations to ensure produce is compliant with regulations in the importing country. In Australia, currently only lead and cadmium limits exist for different vegetable crops.</p>
<p>9. Water quality</p>	<p>A full technical response on water quality issues is outside my area of expertise. I am referring to the technical EES report by Water Technology Pty Ltd and agree that adequate water quality is important for the environment, irrigators and the community.</p> <p>I provide comment to clarify that under current food safety regulations, river water cannot be used for the final wash or hydrocooling of vegetables or to produce ice for cooling if the ice or thawed water can get in contact with produce.</p>

THEME AND ISSUES	RESPONSE
10. Water availability to landholders, importance of and impact on aquifers	<p>Mitigation and safeguarding measures for irrigators, especially under climate change impacts have to be addressed by regulators / the responsible water authority.</p> <p>Horticultural production relies on access to sufficient water. A (likely) increased competition for available irrigation water amongst existing horticultural producers, (and other users) and the Project, may present production and economic (cost of water) challenges for horticultural producers, especially under climate changes scenarios.</p>
11. Jobs per ML of water	<p>Making a comparison between projected jobs per ML (annual water use) for the Project and estimated jobs per ML at peak employment time in the Lindenow area, I estimated that overall direct employment opportunities in both industries (mining and vegetables) are comparable.</p>
12. Competition for labour	<p>I am of the opinion that the horticulture industry will be competing for workers in several areas. Shortages in the horticulture industry have been reported in the areas of truck, tractor and forklift drivers as well as trades.</p> <p>As stated in the HIA report, payment rates are generally higher in the mining industry and work is not affected by seasonal fluctuations.</p> <p>As mentioned in the HIA mitigation section, it is important that the vegetable industry is supported by current initiatives and targeted programs to attract, train and maintain a viable workforce.</p>
13. Climate change risks and flooding	<p>Climate change is likely to increase the competition for water in the Lindenow area. Changes rainfall patterns may lead to flood events.</p> <p>I did not provide detailed response to the climate change issue on top of what was included in the HIA report because risks have been addressed by EES technical experts who have the required expertise.</p>
14. Provenance. Image, consumer perception, brand	<p>In my response, I refer to information provided in the HIA and also reference additional publications. Research into the importance of provenance for vegetables or 'local food systems' in general is still inconclusive. Information collected by different survey methods and standard agricultural and business data is limited in its capacity to adequately document local food production, the operation of local food systems and their importance to the local economy.</p> <p>The vast majority of vegetables from the Lindenow area are 'exported' from the East Gippsland region and are currently not identifiable for consumers outside of the region e.g., via branding. The regional vegetable processor VegCo also 'imports' fresh vegetables from other regions around Australia.</p>
15. Clean green image	<p>In my response I refer to relevant measures for 'clean green'. Even though I know from my work that vegetable producers are focussed on soil and crop health as well as resource use efficiency and avoiding off-site impacts, I could not find objective evidence of environmental performance indicators for the area that underpin the claim.</p>

THEME AND ISSUES	RESPONSE
16. Economic data	<p>In my response I refer to differences in information in submissions on the value of the horticulture industry.</p> <p>I believe that there are differences in the use in statistical data in submissions due to the use of different statistical divisions (e.g., Gippsland, East Gippsland) and the use of data for agriculture, forestry and fisheries or all of agriculture (horticulture, broad acre crops, dairy and grazing) when talking about the horticulture industry. Also, references to the type of value reported are not clear e.g., gross value or farm gate value seem to have been used interchangeably. In some instances, output data (gross revenue) may have been used instead of gross values. Also, multiplier effects mentioned are not clearly explained and correctly referenced.</p> <p>A 2019 strategic report for East Gippsland by KPMG notes that “horticulture does not have as much readily available data at the orchard or farm level (as the dairy industry)”</p> <p>While I have provided a brief response to economic claims referring to the value of horticulture, I refer to the relevant expert reports submitted with the ESS for a full economic analysis.</p>
17. Soil survey	<p>Soil in only one area relevant to the vegetable production area was point sampled and analysed. Based on my soil science knowledge, and sampling instruction from agriculture, I agree that this is not representative for a paddock, farm or wider area.</p>
18. Failure of mitigation/ breaches	<p>Failure to implement, maintain, review and, if required improve mitigation measures (refer to Appendix H of the EES) can, in my view, have impacts on horticultural producers.</p>

1 Statement introduction

1.1 THE EXPERT WITNESS

1.1.1 BACKGROUND AND RELEVANT EXPERTISE

19. This report has been prepared by Dr Doris Blaesing of RM Consulting Group Pty Ltd (RMCG), current office address: 9 Arnold Street (rear office), PO Box 316, Penguin TAS, 7316.
20. RMCG is a consulting business that operates nationally with offices in Melbourne, Bendigo, Torquay, Warragul, Orange, Canberra, Hobart, Penguin and Launceston. We have extensive experience in working with rural industries including research and development, economic analysis, agribusiness advice, stakeholder consultation, strategic reviews and investment planning, due diligence, communication, technology transfer, natural resource management and program evaluation.
21. I am an Associate of RMCG. I hold the following degrees from Hannover University, Germany: Dipl. Ing. Ag. (equivalent to M. Agr. Sc) and Dr. rer. hort (equivalent to PhD, Horticulture). I have majored in horticultural production (fruit) and soil science, and I conducted post-doctorate studies at the Macaulay Land Use Research Institute in Aberdeen, Scotland (via a British Royal Society Grant). I thoroughly understand horticultural production, both from a scientific and practical perspective. I have a basic working knowledge of field based livestock production, especially relationships between soil and pasture management. I have worked in horticulture and agriculture in Australia since 1990, mainly in Victoria and Tasmania, and travelled to all other states as part of my work. I worked in vegetable production and post-harvest management, including supply chains for many years, and have visited most vegetable production regions in Australia. I have extensive knowledge of integrated production systems, sustainable production, resource use efficiency, food safety and supply chains. My work included emission reduction, soil and crop health management and the reuse of wastewater and recycled organics. I am not an economist, but I understand and have applied basic economic principles to socio-economic assessments on the potential value of irrigation development in Tasmania. Over the last 5 years, I have worked on issues relating to workforce development, especially attracting, retaining and training people in the agriculture sector.
22. Prior to consulting I worked as a lecturer, scientist (university, government and private organisations), horticulture manager in an export business and technical manager in an agribusiness company where I set up an analytical lab (soil plant, water testing). I have extensive experience in managing agricultural, business development, RD&E and natural resource management projects. I have a good understanding of horticultural and agricultural production, supply chains, markets and related business and resource management issues.
23. I have visited East Gippsland many times. My first visit to the vegetable production area was in 1992, after three of 10 factories operated by the Edgell-Birds Eye division, including Bairnsdale, were to be closed. I then worked for the Victorian Department of Agriculture with a focus on postharvest management and modified atmosphere packing. I was asked for advice on options for using the existing processing facilities for fresh vegetable washing, cooling and packing. Since that time, I have visited the area with local agronomists to assist with soil and crop nutrition decisions.

1.1.2 DECLARATION

- 24. No other persons contributed to preparation of my statement.
- 25. I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Inquiry and Advisory Committee.
- 26. I visited the proposed site and surrounding areas on 20 January 2021.
- 27. I have read the Planning Panels Victoria Guide for Expert Witnesses (April 2019 version) and agree to be bound by it.

Signature.....

- a. Name Dr Doris Blaesing

- b. Date 02 February 2021

1.2 ACKNOWLEDGEMENT OF COUNTRY

- 28. I acknowledge the Gunai/Kurnai People, who inhabited the Gippsland region for at least 18,000 years, as the Traditional Owners of the Land. I especially recognise the Bidwal, Gunnaikurnai and Monero (Ngarigo) indigenous nations from the area now known as 'East Gippsland'.
I recognise their continuing connection to land, waters and culture. I pay my respects to their Elders past, present and emerging.
- 29. I appreciate that the Victorian Government acknowledges the spiritual, social, cultural and economic relationship that the Gunai/Kurnai People have with their traditional lands and waters and the emerging recognition by communities of Traditional Owner and other Aboriginal people.

1.3 ACKNOWLEDGEMENT OF TODAY'S COMMUNITIES

- 30. Over the past 170 years or so, the Gippsland region experienced a multicultural settlement by peoples from other places. The East Gippsland Shire is now inhabited by more than 47,000¹ citizens, nearly 1/3 of which have at least one parent who was born outside of Australia, many in Asian countries².
- 31. I understand a connection to the land and the enduring natural environment in the region by those who live off the land and by many others in the community. I accept that a sense of place and community is important to all in the region.

1.4 INSTRUCTIONS

- 32. I have been instructed by White & Case, on behalf of Kalbar Operations Pty Ltd (Kalbar), to act as an independent expert in relation to the Fingerboards Mineral Sands project (Project), focussing on issues

¹ <https://app.remplan.com.au/eastgippsland/economy/summary> East Gippsland Economy, Jobs and Business Insights

² Source: GIPPSLAND MULTICULTURAL STRATEGIC PLAN 2017-2020, funded through the Victorian Department of Premier and Cabinet under the Office of Multicultural Affairs and Citizenship

associated with potential impacts of the planned Project on the horticulture industry in the Lindenow production region, Shire of East Gippsland.

33. I have been asked to prepare an expert witness statement, and, if required, prepare and present expert evidence at the inquiry hearing.
34. In this statement, I briefly describe and summarise the Horticultural Impact Assessment (HIA) prepared in support of the EES and my role in preparing it. I explain any corrections or clarifications in the HIA or wish to elaborate on and set out any additional information that I consider necessary to mention, including any additional assumptions. I considered the submissions that are relevant to my area of expertise and respond to issues raised.

2 The Horticultural Impact Assessment (HIA) and Report

35. RM Consulting Group (RMCG) was engaged on 20 August 2018 to undertake a horticultural impact assessment of the proposed Fingerboards Mineral Sands Project (the Project) and prepare a report. Figure 1 provides an overview of the activities undertaken.
36. The HIA report was prepared in support of the EES. This section of my statement explains my role and that of colleagues involved in the HIA, the report and associated activities. It provides a brief description and summary of the HIA report.

2.1 THE EXPERT WITNESS'S ROLE IN THE HIA REPORT

37. I was part of the RMCG team that prepared an earlier report which informed the proposal under consideration by the Inquiry and Advisory Committee. The report is referenced below.
- x. RMCG. 2020. Fingerboards Mineral Sands Project Horticultural Impact Assessment. Report prepared for Kalbar Operations Pty Limited, V 13, July 2020, which is exhibited as Appendix A016 of the EES.
38. My role in preparing the HIA report included inputs in all aspects of the report including:
- i. reviewing information from EES reports prepared by technical experts.
 - ii. conducting primary research in the areas of labour, climate change, regional image, water availability and coexistence case studies, and reviewing the primary research on these subjects by my colleagues Karl McIntosh and Clinton Muller.
 - iii. reviewing interviews with landholders conducted by my colleagues Adrian Kennelly and Karl McIntosh (who since left RMCG) and investigating concerns they brought up, in cooperation with my colleagues Karl McIntosh and Clinton Muller.
 - iv. in cooperation with my colleague Clinton Muller (refer to paragraph 21iii.) preparing the HIA's background information on the Lindenow area, the risk and impact assessment based on EES technical expert report recommendations and RMCG primary research and suggesting additional mitigation options to minimise potential impacts.
 - v. in cooperation with my colleague Clinton Muller (refer to paragraph 21iii.) responding to requests by the Project's Technical Review Group (TRG) and updating the HIA accordingly.
 - vi. Reviewing the final Horticultural Impact Assessment report.
39. Three further RMCG employees were involved in the HIA. They worked cooperatively where roles overlapped. Their names, positions and roles are listed below.
- i. Adrian Kennelly, Principal; role - Project Director, project oversight, client liaison, RMCG team coordination, landholder interview lead, HIA report quality assurance and approval for release to the client.
 - ii. Karl MacIntosh, Senior Consultant; role - conducting landholder interviews with Adrian Kennelly. Desktop review of EES technical expert reports that relate to landholder concerns; commencement of the HIA. Karl does not work for RMCG anymore.
 - iii. Clinton Muller, Senior Consultant; role - in cooperation with myself desktop reviews of EES technical expert reports that relate to landholder concerns and RMCG primary research, risk and impact

assessments and responses to TRG requests and comments; Clinton prepared a PowerPoint presentation for a TRG meeting held 15 November 2018, providing an overview of the HIA; he presented an updated version of the presentation at a community information session in Lindenow in November 2019, and answered questions from the audience.

40. Where I was not directly involved in activities that provided information for the preparation of the HIA report or advice that informed the Planning Scheme Proposal i.e., conversations with landholders in the Project region (interviews) and case studies (such as conversations with landholders in the vicinity of rehabilitated sands mines) other than that in Western Australia, and where I used additional information not included in the HIA, my statement includes as required:

- i. reference to documents and materials I have used in preparing the statement other than those referenced in the HIA report
- ii. the facts, matters and assumptions on which I relied on in preparing the statement
- iii. a summary of my opinion(s), including provisional opinions and their rationale
- iv. any aspects that are falling outside my expertise.

41. I adopt the HIA as the basis of my evidence.

2.2 DESCRIPTION AND SUMMARY OF THE HIA REPORT

42. The objective of the HIA has been to assess:

- i. the potential impact of a proposed mineral sands mining operation on nearby horticultural businesses within the Lindenow Valley (the Valley), on the Mitchell River flats, and
- ii. whether mineral sands mining and horticultural production, especially of vegetable crops, could coexist, and
- iii. proposed impact mitigation strategies (by EES technical reports) and additional strategies to further reduce potential impacts.

43. Vegetable crops in the said region cover approximately 4,700 hectares valued at over \$62 million in 2018, at the time the HIA commenced. The main crops grown include beans, broccoli, capsicum, carrots, cauliflowers, sweet corn, lettuce, spinach and other baby leaf salad vegetables, peas, pumpkin, and onions. Wine grapes are a high value crop produced on about 30 ha in the Valley.

44. The EES scoping requirements guided the HIA and in that regard the HIA was informed by:

- a. Consultation with key horticultural landholders operating vegetable and viticulture businesses in the study area and an appraisal of issues and concerns raised by landholders, considering:
 - i. Recognised, typical horticultural production aspects and requirements.
 - ii. Relevant published data and information (objective evidence).
 - iii. Independent technical reports produced as part of the overall EES process.
 - iv. Case studies.
- b. A separate risk assessment focused on the Project's potential impact on identified horticultural values and possible coexistence of mineral sands mining and horticulture in the region.

45. Figure 1 provides an overview of the HIA approach.

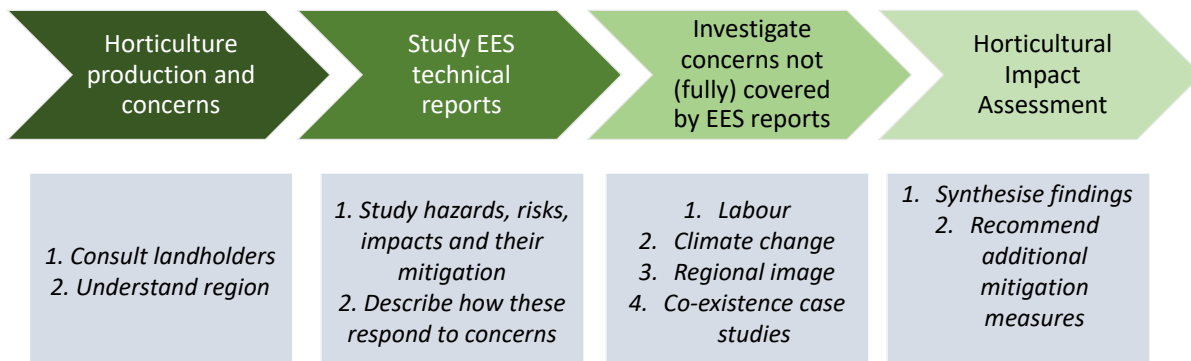


Figure 1: Overview of the HIA activities

46. Landholder concerns about the potential impact of the Project on horticultural production in the Lindenow Valley have been a key driver for the HIA. The key concerns identified via consultation and their appraisal are summarised in section 6 of the HIA report. The assessments and conclusions relating to key issues of concern to landholders are based on the consultation/interviews and findings from relevant independent EES technical reports. Only where an EES report has not been available, relevant information has been obtained via primary research (desktop research and interviews). References to the origin of all information used for the HIA have been provided in the HIA report. The following key concerns were raised:

- i. Dust generation and deposition
- ii. Potential contaminants in dust particles
- iii. The quality of run-off water from the Project site
- iv. Irrigation water availability
- v. Traffic, road safety and road conditions
- vi. Competition for labour
- vii. Damage to landscape amenity and the industry's perceived 'clean-green' image
- viii. Future impacts of climate change (in combination with the vicinity to the Project)
- ix. Landholder engagement for the HIA study
- x. Varying views regarding the potential impacts the Project may have on individual businesses and the broader horticulture production environment were identified and considered as part of the HIA.

47. The following values and hazards causing potential risks to horticultural production were assessed as part of the HIA; they are detailed in the HIA report (Section 7, Table 7.1):

- i. Fertile soils – Contaminants transported by air (dust) or water.
- ii. Stable landforms – Water and wind erosion of soil from the Project's site.
- iii. Livelihoods of landholders – Proximity of mine and associated infrastructure to production region.
- iv. Crops – Contaminants deposited by air (dust) or water.
- v. Local employment – Pressures on regional infrastructure and availability of labour for horticulture as a result of employment for mine operations.
- vi. Landscape – Altered landscape close to a horticultural production region.
- vii. Regional reputation – Proximity of a mine and associated infrastructure to the production region.
- viii. Efficient road network and safe roads – Movement of additional vehicles, mobile plant and equipment.
- ix. Adequate water supply – Water availability for all users and competition for water licences.
- x. Adequate water quality – Damage to crops and / or equipment on farms by substandard quality water.

48. The horticulture impact and risk assessment, detailed in Section 7 of the HIA report, determined mainly low residual risks of impacts from the Project on the horticulture industry in the region only if full mitigation to the identified key values for horticulture production are always being applied. It identified moderate residual risk for employment in the horticulture sector (Table 2-1).

49. In Table 2-1, 'Risk' refers to the rating of mitigation actions suggested in relevant technical reports; "Residual Risk" refers to the rating of risk after applying additional mitigation. Table 2-2 presents the risk assessment matrix that was used for the HIA.

Table 2-1: Horticultural values and risk ratings

#	ASPECT	HORTICULTRE VALUE	RISK	RESIDUAL RISK
1	Land.	Fertile soils.	Low.	Low.
		Stable landforms.	Low.	Low.
2.	Socio-economic.	Crops (productivity).	Moderate.	Low.
		Livelihoods.	Moderate.	Low.
		Local employment (opportunities); access to labour.	Moderate.	Moderate.
		Landscape (environmental, social/cultural, economic aspects).	Moderate.	Low.
		Regional reputation (related to landscape values).	Moderate.	Low.
3	Transport.	Efficient road network.	Low.	Low.
		Safe roads.		
4	Water.	Adequate water supply.	Moderate.	Low.
		Adequate water quality.	Moderate.	Low.

Table 2-2: Risk assessment matrix.

		LIKELIHOOD				
		Rare	Unlikely	Possible	Likely	Almost Certain
CONSEQUENCE	Negligible	Very low	Very low	Very low	Low	Moderate
	Minor	Very low	Low	Low	Moderate	Moderate
	Moderate	Low	Low	Moderate	High	High
	Major	Low	Moderate	High	Major	Major
	Extreme	Moderate	High	Major	Major	Major

50. The HIA report states in relation to residual risks:

- i. Government policy and regulation in key areas (for instance biosecurity, drinking water and recycled water) aim to reduce risks to a low or very low level, but not to zero. This is acknowledging that, even though desirable, a zero risk situation does not exist.
- ii. Community and landholder engagement, as well operations and monitoring (as per applicable legislation, regulations and license conditions) for the Fingerboards Project, will allow an adaptive approach to risk management i.e., continuous improvement in risk identification, monitoring and mitigation to keep residual risks at a minimum.

3 Submission review and responses

3.1 SUBMISSION RESPONSE CONTEXT

51. The response refers to submissions relevant to my area of expertise and which are pertinent to issues raised in the HIA report.
52. In my responses, I have relied on published data and information. References have been included as footnotes throughout the statement. Any deductions, assumptions or opinions are explained.
53. My responses are based on the premise that a mineral sands mine in the Fingerboards region would be operated under appropriate licence conditions and abide by applicable legislation and that the operators will have a compliance culture and always employ all required and additional mitigation procedures as set out in the Mitigation Register 2020 (Attachment H to the EES):
- iii. to protect the environment and communities to not have a negative impact on the region, and
 - iv. to be open and transparent with reporting, monitoring and actions to control off-site impacts.
54. As explained in Section 2.2 and illustrated in Figure 1: Overview of the HIA activities, the HIA and my statement assume that the independent technical expert's EES reports are a reliable, objective source of information.

3.2 RESPONSES TO ISSUES RAISED IN SUBMISSIONS

55. The following table presents themes and issues raised which relate to the HIA and horticulture in the Lindenow region, and my responses.

THEME	ISSUE RAISED	RESPONSE
56. Agriculture / Horticulture and Food production general	<p>1. The Project will affect:</p> <p>a. food production within the horticultural area of the Lindenow Valley, and</p> <p>b. broader agriculture within the area.</p>	<p>The statement is very general and more detail about the overall concern is provided via other issues that have been collated in the following points of my statement. I have addressed those which fall in the area of my expertise and raise issues based on the HIA.</p>
57. Current agricultural and horticultural practices in the project area, including key factors influencing sustainable cropping and outputs.	<p>2. The baseline agricultural and horticultural assessments involved a desktop review and consultation with stakeholders and desktop resources and secondary data were reviewed to understand the type and value of existing agricultural production within the project area and surrounds. An average of 443 hectares will be removed from agricultural production each year during the Project during the life of the project and progressively rehabilitated. Land use in the Local Agriculture Region includes agriculture, plantation forestry</p>	<p>The issue raised does not seem to refer to Appendix A016 Horticulture Impact Assessment (HIA) of the EES. In the HIA, land use has been adapted from Victorian Land Use Identification Scheme, 2016, the latest data set available at the time, to show the area used for vegetables. The vegetable production area is presented in Figure 5 1 of Appendix A016 Horticulture Impact Assessment: “Land use for vegetable production in the Lindenow Valley”. According to the above-mentioned data source, the total area of the Lindenow Valley used for vegetable production is approximately 4,700 hectares.</p> <p>The HIA also referred to Australian Bureau of Statistics (ABS) data 7503.0 - Value of Agricultural Commodities Produced, Australia, 2016-17 and 46270DO001_2016-17 Land Management and Farming in Australia-2016-17³. According to 2016-17 ABS data, the total area of vegetable production in all of East Gippsland in 2016-17 was 3,265 ha comprising 19 businesses. The later published 2018-2019 ABS data reports 3,308 ha of vegetable production in East Gippsland.</p> <p>In my opinion, the Victorian Land Use Identification Scheme, 2016 provided the most accurate dataset. It was therefore used for Figure 5.1 of Appendix A016 Horticulture Impact Assessment.</p> <p>The ABS data is still useful as it set provides information on types of production by area including land management/production inputs used as well as number of businesses and gross & local (farm gate) values for each type of production in East Gippsland. This kind of statistical data is also available on a finer grid for statistical area levels (SA4 and SA2).</p> <p>ABS data is often criticised, however, for much of the information needed, it is the only published reference that is not based on or includes personal views and estimates. The Victorian Land Use Identification Scheme</p>

³ Data for 75030DO002_201819 Value of Agricultural Commodities Produced, Australia, 2018-19 was not available at the time of preparing the HIA.

THEME	ISSUE RAISED	RESPONSE
	<p>and native forests. Agricultural enterprises include raising sheep for wool and meat, beef, dairy, vegetable production and broadacre cropping. The Assessment was a review of available desktop information and stakeholder consultation.</p> <p>3. Issue - No ground truthing of horticultural and agricultural data has occurred, rather the land use in the project area is an estimation based on consultation and review of aerial imagery. Additionally, the reports do not give an indication if all relevant/affected landholders attended the interviews (to ensure representativeness).</p>	<p>is one example of an alternative data source. Most publications on many aspects of agriculture refer to ABS data, including state and local government.</p> <p>Ground truthing of available data for the Lindenow areas would have meant to collect business data from each landholder (area, types of crops, gross value of production by crop and management input data). While this would have been possible in principle, previous experience (e.g., an attempt to benchmark vegetable production in Victoria) has shown that the majority of landholders would not provide business data.</p> <p>The HIA scope did not include assessing all of the productive agricultural area (i.e., land commercially used for wool and meat sheep, beef, dairy, vegetable, fruit and broadacre production cropping), plantation forestry and native forests in the region. The scope included production of vegetables and wine grapes.</p>
58. RMCG expertise	4.RMCG's failure to know local farming practises.	<p>The HIA is based on knowledge of vegetable production practices in Australia and RMCGs specific knowledge of the Lindenow region based on previous work as well as published information on production and environmental conditions.</p> <p>East Gippsland Shire, submission #716 reads: The assessment identified key values, risks and mitigation of horticulture production within the Lindenow Valley. The horticultural definition is considered adequate.</p> <p>I also refer to Section 1 of my statement outlining my expertise. I also refer to the RMCG led live broadcast from EGVID 2020 which has been part of work I am closely involved in:</p>

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		<p>https://www.soilwealth.com.au/resources/articles-and-publications/soil-wealth-icp-broadcasts-live-from-egvid-2020/. It is one example that demonstrates my understanding of horticulture and vegetable production.</p>
59. Horticultural area	5. The horticultural production area could be increased, if water was available.	<p>RMCG did not undertake an assessment of the potential for increased production from the intensive agricultural precinct (Lindenow region), presuming that additional water volume and supply certainty was possible.</p> <p>EES scoping requirements guided the impact assessment for the HIA. Assessing the potential for increased production would require a detailed industry development plan underpinned by a review of market opportunities for potential industries/production enterprises, and an analysis of whether the region can offer the land (soil conditions and areas), energy, climate, capacity of producers (financial, skills, labour), potential investors and infrastructure to support this (apart from water). Environmental impacts of an expansion of irrigated agriculture would need to be considered as well.</p> <p>Also, increased production does not necessarily require more land (or water). It could be achieved by higher productivity and economic returns from existing land and resources. The main question is about markets – can the product be sold at a profit, if produced. The vegetable market is usually well or oversupplied and very competitive, the same is true for wine. It may be possible to increase export volumes; this option would need to be investigated.</p> <p>Still, the region may have potential to increase productivity and resource use efficiency (land, water, energy, fertilisers, pesticides, labour) e.g., by producing hydroponic crops under cover (protected cropping). Protected cropping has the advantage of protecting the crop from rain, wind and dust from adjacent areas without vegetation (e.g., due to poor pasture cover during dry summers, fallow paddocks, vehicles on dusty roads).</p> <p>KPMG (2019⁴) in its report on accelerating growth in the Gippsland food and fibre industry also suggested protected cropping referring to https://www.worldhorticenter.nl/en/home for inspiration. KPMG talk about the aspirational expansion plans/ideas for Gippsland and recommend a detailed assessment of land and energy resources, considering environmental and climate change issues, to underpin growth plans and determine appropriate actions.</p> <p>The scope of the HIA did not include an assessment as suggested by KPMG or of the potentially productive agricultural area and potential impacts of sands mining on such a greater potentially productive area⁵.</p>

⁴ KPMG 2019. Accelerating growth for the Gippsland food and fibre industry. <https://home.kpmg/au/en/home/insights/2019/03/accelerating-growth-gippsland-food-fibre-industry.html>

⁵ <https://soe.environment.gov.au/theme/land/topic/land-use-and-management>

THEME	ISSUE RAISED	RESPONSE
		<p>The scope for the HIA was an impact assessment of the Project for the EES and did therefore not include an industry development plan. Still, the identified horticultural values, risks, potential impacts and their mitigation presented in the HIA report are independent from the productivity of the land or the maximum land area of potentially suitable land that could be intensively cropped.</p>
60. Farming practices	<p>6. The Project will potentially cause interruption to existing farming concerns in and around the project area via disruption of stock transporting routes, severance of land parcels, fences, water supply lines and properties, surface water harvesting, loss of carrying capacity, management of pest animals and weeds, biosecurity risks, uncertainty and general disruption due to construction elements and mine operations</p>	<p>Issues raised about livestock movement and infrastructure are outside my expertise as a horticultural expert, apart from 'biosecurity risks' in horticulture. I agree that movement of soils, plant materials and water between properties and paddocks within properties by any means must be prevented where land or crops are affected by exotic pests or diseases.</p> <p>It is in the interest of landholders to also use 'biosecurity principles' to prevent the spread of any endemic pests, diseases and weeds between properties and paddocks within properties.</p> <p>Refer to the Plant Health Australia (PHA) Vegetable Industry Biosecurity Manual and listings of Victorian biosecurity legislation⁶ for relevant biosecurity principles and regulation.</p>
61. Dust	<p>7. The land uses of mineral sands mining and horticulture/agriculture cannot co-exist particularly due to contaminated dust emissions.</p>	<p>Refer to section 6.1 of the HIA for information relating to dust and vegetable production.</p> <p>Head type vegetables, (e.g., broccoli or cauliflower) are typically trimmed and packed without washing. In most operations, broccoli is hydrocooled prior to packing which removes dust and dirt. While broccoli heads are exposed to the open air during growing, cauliflower has wrapper leaves around the head. Growing cauliflower varieties with good leaf cover is vital because uncovered heads turn yellow when exposed to light. Yellowing on cauliflower heads is not accepted by retailers; therefore, affected heads never go to the</p>

⁶ <https://agriculture.vic.gov.au/biosecurity/moving-plants-and-plant-products/plant-biosecurity-legislation>
<https://www.planthealthaustralia.com.au/industries/vegetables/> (which provides a link to potato industry resources).

THEME	ISSUE RAISED	RESPONSE
	<p>a. Air quality (dust) will have an impact on the acceptance of direct-to-market food products (vegetables) grown in the Lindenow Valley.</p> <p>b. Coexistence of mineral sands mining, and horticulture / agriculture is not possible because there are concerns that supermarkets and customers will reject vegetables that are contaminated with dust.</p> <p>c. Dust may lead to produce being rejected by large-scale buyers and (lead to) lost revenue.</p> <p>d. Certain types of crops are not typically washed prior to sale.</p>	<p>market. The wrapper leaves also protect cauliflower heads from dirt (e.g., from rain or overhead irrigation splash) and dust from farming operations (e.g., generated by tillage machinery or vehicles on farm tracks).</p> <p>Loose leaf salad mix vegetables are washed and sanitised after harvest while large leafy vegetables, such as kale or silver beet are often packed dry, without washing, unless washing is required. Herb bunches are often packed unwashed, but herbs used as part of salad mixes are washed. Green beans and snow peas may be washed, depending on the type of grading/processing line used. Root vegetables, including carrots and beetroot, are commonly washed because they are dirty. Sweet corn is not washed as it is protected by wrapper leaves in the field. The outer leaves, and with that any dirt or dust, are removed as part of the grading and packing process.</p> <p>Sometimes trimming and packing of vegetables such as head lettuce is done in the field. Trimming involves taking off the outer leaves, which can be dirty. Kale or silverbeet do not have protective outer leaves are removed. Therefore, dust or dirt deposits from any source on unwashed leafy vegetables could be an issue.</p> <p>Food safety standards for vegetables require that vegetables supplied to markets have to be free of foreign matter, including excessive dirt from on or off farm sources. Affected produce with unacceptable dirt is therefore rejected on farm (not harvested) or at the grading/packing facility and not sent to market. What is acceptable can vary to some degree depending on the type of vegetable, markets and seasonal conditions. Major retailers commonly have stricter standards than wholesale or local markets.</p> <p>The Guidelines for On-Farm Food Safety for Fresh Produce, 2019, define sources of dust and management controls on farms. “Dust sources are for instance fertilisers and soil amendments (e.g., composts), roads, paths, livestock and vehicle movements in the vicinity of crops. Dirt from the bottom of harvest containers used in the field and placed on top of others can contaminate harvested product or be transferred from clothing and gloves.” Rain and irrigation splash can also transfer dirt onto vegetables. According to the Guidelines, harvest equipment and packing facilities have to be cleaned regularly to remove dust and dirt. Guidelines state that “for produce grown in contact with the soil, a pre-wash may be used to remove dirt and debris. A final wash (with water of E. coli <1 cfu/100mL, potable water) is then to be used to clean the product.” This confirms that dust and dirt removal as well as sanitation are a common practice in horticulture because they are required to maintain food safety. Many producers use overhead irrigation to ‘pre-clean’ vegetables if required and where possible (personal experience and communication).</p> <p>Consumer advice has long recommended washing fruit and vegetables before using them: “rinse them well with water to remove any unwanted residues from their surfaces⁷”.</p> <p>Wine grapes may or may not be washed prior to crushing depending on preferences of the wine maker. Using unwashed grapes appears to be the preference for most. Winegrapes are grown with drip or under</p>

⁷ <https://www.healthline.com/nutrition/washing-vegetables>

THEME	ISSUE RAISED	RESPONSE
		vine sprinkler irrigation, which will not remove dust from leaves and grapes. Therefore, dust deposits from any source on winegrapes would be an issue for winemakers who are not able to or do not want to wash their fruit, especially, if they cannot rely on rainfall to remove dust.
62. Dust	8. Concerns have been raised by local residents and horticultural producers that excessive levels of dust generated by the project would reduce vegetable growth.	<p>The extent of which dust levels impact on plant growth is variable and based on a range of plant characteristics including for instance their architecture, morphology, leaf surface characteristics, stomatal density and dust particle size. Fine dust particles can affect stomata (openings on the underside of leaves to allow gas exchange and transpiration), if dust occurs when these are open. Stomata are typically open during the day to allow photosynthesis (gas and water exchange); they also open at night to release carbon dioxide.</p> <p>Findings of a study by Thompson et al. (1984⁸) on the effects of dust on the photosynthesis capacity of roadside plants determined a range of 5 -10 g dust per m² to effect photosynthetic capacity. Most studies on the effect of dust on vegetation have been conducted on plants at roadsides and in cities and in regions where dust pollution his high (visible). Katestone Environmental⁹ reports that dust deposition modelling data showed dust deposition rates below the required limit of 120 mg/m² or 0.12 g/m² per day. In theory, it would take more than 40 days without irrigation or rain and continually reaching the abovementioned limit to accumulate 5 g/ m² of dust.</p> <p>During the vegetable growing season, dust from any source can only be removed via rain and overhead irrigation. Irrigation frequency varies with seasonal weather conditions, crop type and crop stage. Windbreaks can offer effective dust reduction¹⁰ and provide productivity and environmental benefits¹¹. They are currently not commonly used in the Lindenow region (own observation) even though dust from vehicles and exposed soil (paddocks, pastures) can occur in the vicinity of crops, especially when conditions are dry.</p>

⁸ Thompson, J.R., P.W. Mueller, W. Flückiger, and A.J. Rutter. 1984. The effect of dust on photosynthesis and its significance for roadside plants. Environmental Pollution (Series A) 34(1984):171–190.

⁹ Katestone Environmental Pty Ltd. 2020. Stage Two Air Quality and Greenhouse Gas Assessment for the Fingerboards Mineral Sands Project. Report prepared for Kalbar Operations Pty Limited, April 2020.

¹⁰ <https://www.amsj.com.au/using-dry-fog-dust-suppression-and-wind-breaks-to-control-dust/>

¹¹ <https://agriculture.vic.gov.au/farm-management/soil/erosion/effective-shelterbelt-design>

THEME	ISSUE RAISED	RESPONSE
63. Dust	<p>9. A regulatory standard for dust deposition levels on vegetables does not currently exist. Mitigation measures to be applied and modelling conclusions (Issue raised by East Gippsland Shire, the last sentence appear to be incomplete).</p>	<p>Correct, there is no standard for maximum dust deposition levels on vegetables. Currently there appears to be little data that would help to develop standards for different types of vegetables. The bulk of research has focussed on dust deposits on vegetation near roads, in cities, manufacturing and also mining in areas where air pollution is at a high (visible) level.</p> <p>While standards may be desirable, in my opinion, it may still be challenging in some cases to trace back the source of dust in a region on a windy day given that dust could originate from unsealed roads and tracks, fallow paddocks or paddocks with poor pasture cover (e.g., due to drought).</p> <p>Food safety standards refer to a range of dust sources and some raise concerns about dust from manures as it may contain human pathogens. Food safety standard for dust levels me not exist because there is no sufficient data. There also may be concerns that prescriptive levels are not desirable for producers given they cannot avoid some dust (or dirt) from their own activities reaching crops at times.</p>
64. Dust	<p>10. Wind strength and its frequency (and with that the risk of dust developing) have been significantly under-reported.</p>	<p>The HIA did not include measurements or modelling of potential dust development and deposits resulting from all phases of developing, operating and rehabilitating a mineral sands mine in the Fingerboard area. This is not in my area of expertise.</p> <p>The effect of wind and other factors on dust emissions from the project has been investigated by Katestone Environmental¹². They reported that their measurements and modelling demonstrated compliance with the relevant air quality objectives at the sensitive receptor sites.</p>
65. Certifications	<p>11. EnviroVeg is used to track industry progress regarding sustainable farming practices and assist farmer management. Membership requires annual completion of an internal self-assessment and continual improvement in sustainable practices.</p>	<p>The information on EnviroVeg and Freshcare was included in the East Gippsland Shire Council submission #716.</p> <p>I have been a member of the EnviroVeg grower committee for 10 years and am on the technical advisory team. EnviroVeg members can participate on a voluntary basis and submit an annual self-assessment for industry environmental performance benchmarking or achieve 3rd party (e.g., via Freshcare Environmental or EnviroVeg¹³. Certification). This provides more credibility to data captured.</p> <p>The HIA refers to Freshcare as an example of Food safety certification. Other systems are used and acceptable to comply with the Australia New Zealand Food Standards Code (Code) and customer imposed food safety requirements.</p>

¹² Katestone Environmental Pty Ltd. 2020. Stage Two Air Quality and Greenhouse Gas Assessment for the Fingerboards Mineral Sands Project. Report prepared for Kalbar Operations Pty Limited, April 2020.

¹³ <https://enviroveg.com.au/>

THEME	ISSUE RAISED	RESPONSE
	<p>12. Freshcare operates as an industry benefit organisation, providing assurance standards for the Australian fresh produce industry. Mitigation to concerns includes a community engagement plan to actively manage issues with public perception; a working group with growers to discuss specific issues of concern and potential responses, encouragement to obtain EnviroVeg or Freshcare environmental certification and an annual local community event to attract visitors to the region.</p>	<p>The standards in the Code are legislative instruments under the Legislation Act 2003. The authoritative versions of these standards are on the Australian Government Federal Register of Legislation and can be found via https://www.foodstandards.gov.au/code.</p> <p>Food safety standards under the Code place obligations on Australian food businesses to produce food that is safe and suitable to eat. A food business is any business or activity that involves the handling of any type of food for sale, or the sale of food in Australia.</p> <p>Primary production and processing standards under the Code apply in Australia for agricultural commodities such as seafood, poultry meat, specific cheeses, wine, dairy products and seed sprouts. Horticulture is not included at this stage. However, all major retailers demand food safety certification from suppliers. The Harmonised Australian Retailer Produce Scheme members (ALDI, Coles Supermarkets, Costco, Metcash (IGA) and Woolworths) accept a suite of food safety standards that will allow growers and packers to complete a single audit against a single standard that will satisfy all retailers, rather than multiple audits against multiple standards. The following food safety standards are acceptable:</p> <ul style="list-style-type: none"> ▪ BRC Global Standard for Food Safety ▪ BRC Agents and Brokers Standard ▪ Freshcare Food Safety & Quality Standard ▪ Freshcare Food Safety & Quality Supply Chain Standard ▪ GLOBALG.A.P. - Integrated Farm Assurance ▪ SQF - Food Safety Code <p>The HARPS is open to all fresh produce businesses that undertake the following activities:</p> <ul style="list-style-type: none"> ▪ Grow produce for retail sale ▪ Pack produce for retail sale ▪ Operate as an aggregator, distributor, broker or agent supplying produce for retail sale ▪ Are direct Suppliers or subcontracted Supplier, i.e. pack in retailer-branded packaging or bulk loose packs <p>The scope of the HARPS is for the growing and packing of whole produce (whole fruit, whole vegetables and in-shell nuts). The scope does not include the processing or value-adding of produce, these fall under the Food Standards Code as explained above.</p>

THEME	ISSUE RAISED	RESPONSE
		<p>According to the Fresh Produce Safety Centre Australia and New Zealand¹⁴, when a fresh produce food safety issue does occur from Australian or New Zealand produce, the most likely cause is one of the following:</p> <ul style="list-style-type: none"> ▪ Pathogens such as salmonella, E.coli and listeria due to on-farm use of insufficiently treated manures and compost, poor personal hygiene of workers, ineffective sanitising steps at packing (of equipment and water), changing climate, wildlife and neighbouring businesses, in particular, intensive livestock (E.coli transfer via manure). ▪ Pesticides and residues from nearby crops and other agricultural production ▪ Physical contaminants, examples are frogs, spiders, bolts, wire. ▪ Tampering (intentional to cause harm) examples include new employees, casual labour, redundancy/sacking, change in employment status. ▪ Allergens through cross-contamination of the product causing allergic reactions.
66. Certifications (relating to dust)	13. The consequences of dust in relation to acceptance of product under quality assurance (QA) schemes to horticulture have not been calculated or addressed as a key socioeconomic issue.	<p>Guidelines for On-Farm Food Safety for Fresh Produce, 2019 and food safety standards require that fresh produce is free from physical contamination, including dirt and dust from any source.</p> <p>Katestone Environmental¹⁵ reported that their measurements and modelling demonstrated compliance with the relevant air quality objectives at sensitive receptor sites. Mitigation procedures and typical on farm and regional dust management procedures (such as sealing of roads and major tracks) are expected to prevent dust related food safety QA issues. I also refer to my responses to issues 7 (theme dust) and 14 (theme certifications) which explain that acceptance of fresh produce would not be affected.</p> <p>Strategic vegetation buffers (and wind fences) around the mine site reduce the risk of dust leaving the site. As mentioned previously, windbreaks and shelters in the productive farming landscape have additional benefits for crops (e.g., via reduced wind stress/wind erosion, less insect pressure due to providing shelter for beneficial insects).</p>

¹⁴ <https://fp-sc-anz.com/managing-a-food-safety-issue/>

¹⁵ Katestone Environmental Pty Ltd. 2020. Stage Two Air Quality and Greenhouse Gas Assessment for the Fingerboards Mineral Sands Project. Report prepared for Kalbar Operations Pty Limited, April 2020.

<p>67. Certifications</p>	<p>14. Vegetable farmers (organic included) will not be able to obtain or will lose existing certifications if their crops are contaminated with dust.</p>	<p>Organic, environmental and food safety certifications focus on management on farm and controlling risks of off farm effects. My previous responses referring to issues around dust, food safety certification (QA) apply to conventional and organic production. Provided all dust mitigation and food safety measures are used, I do not expect that critical non-conformances that can lead to a suspension or loss of certification related to sands mining will occur.</p> <p>The following information describes (i) the key differences between conventional and organic production and (ii) when certification can be suspended.</p> <p>(i) The key difference between conventional and organic production is that for organic production, only natural inputs are permitted. Synthetic inputs such as manufactured/altered fertilisers and crop or animal protection products cannot be used. The definition of 'natural' in Australian Organic Standard is: "Any material, not otherwise expressly prohibited in this Standard, which has been harvested, mined, or collected, which may be processed without chemical reaction (allowing washing, distilling, grinding/milling, separation and/or concentration of the material by physical (including steam) or biological means, to yield a material that is identifiable in the original source material."</p> <p>As part of the organic certification process and to maintain certification of organic management soil and/or tissue samples are tested for contamination from veterinary and agricultural chemicals, heavy metals and/or GMOs, etc., where applicable. Organic producers have to have a plan describing their pest, disease and weed management; biodiversity and environmental management; water management; contamination prevention and food safety management. Record-keeping system including monitoring practices (e.g., for soil fertility, salinity, etc.); and Livestock feed, health and welfare management (where relevant) and use of restricted products and regular use of products have to be included.</p> <p>(ii) Conventional vegetable producers who are certified via EnviroVeg or Freshcare Environmental have similar requirements but, rather than only using natural products, they plan for integrated crop management i.e., using cultural practices and natural or 'soft' products as much as possible.</p> <p>Suspension of certification for both conventional and organic farmers can happen in case of a critical non-conformance/compliance with the applicable standard i.e.:</p> <ul style="list-style-type: none"> ▪ serious breaches of the relevant standard are detected during an audit (= critical non-conformance/compliance/conformity) where the system is clearly not operational and/or where the participant is clearly not committed to the maintenance of, or able to maintain, certification and the requirements as specified in the standard. ▪ a customer complaint alerts the certification or auditing body to a critical non-conformance. ▪ a serious food safety issue has occurred and tracing back of a foodborne illness leads to a certain production site. ▪ a recall of produce is required.
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THEME	ISSUE RAISED	RESPONSE
		<p>In the case of a critical non-conformance (e.g., a serious food safety issue and or product recall) the certification will be suspended, and trading will have to cease until the issue is resolved.</p> <p>The Australian Organic Standard refers to suspension as a result of contamination as follows: “Non-conforming certified produce residue tests from random sampling by the CO shall require immediate corrective action to ascertain its source. Suspension of certification may occur where the operator cannot verify that such contamination did not arise from on-farm practices, processing or packaging throughout the production chain controlled by the certified operator.”</p> <p>Major non-conformances are usually closed out if addressed via the required corrective action within 28 or 30 days (depending on the standard) of issue being detected; minor non-conformances usually have to be fixed via the requested corrective action by the next annual audit.</p> <p>Corrective actions need to demonstrate that the producer is following the certification program/standard and makes every possible effort to reduce any risk he/she can control as much as possible.</p> <p>In my opinion, based on my understanding of certifications, the WA case study and presuming all recommended mitigation actions are implemented, the loss of certification or refusal of certification to QA or organic standards is highly unlikely just based on the vicinity of a mineral sands mine.</p>
<p>68. Residue Limits (especially for export)</p>	<p>15. Most countries to which the produce is exported have point-of-entry heavy metals testing. Detection of heavy metals results in a two-year import ban into that country.</p>	<p>The statement made is not entirely correct. Different governments classify and regulate contaminants differently for heavy metals, aflatoxins, natural toxicants, dioxins, PCBs, and other regulated substances. New standards are being developed, while other standards are changing quickly. The Australian Government provides links to relevant Maximum Residue Limit (MRL) information for key export countries and the EU (https://www.agriculture.gov.au/aq-farm-food/food/nrs/databases). A subscription service by Bryant Christies Inc. provides contaminant limits for over 80 contaminants in over 95 markets and allows to compare standards easily between different countries and which contaminant limits are being revoked. The service provides access reports that give a full regulatory picture for each country including testing needs (https://www.bryantchristie.com/BCGlobal-Subscriptions/Contaminant-Limits).</p> <p>Information for Australia and a list of chemicals tested in National Residue Survey (NRS) programs as well as on contract laboratory use is included. Exporters have to ensure that their produce is compliant. Vegetable exporters understand this and manage their crops accordingly i.e., via not using certain crop protection products or maintaining relevant withholding periods for crops destined for export.</p> <p>I am not aware of a case of heavy metal detection in vegetables leading to a two year ban of imports from Australia or from a certain supplier in an importing country. A reference for the claim made in the submission was not provided.</p>

THEME	ISSUE RAISED	RESPONSE
		<p>The Australia New Zealand Food Standards Code (FSANZ) - Standard 1.4.1 - Contaminants and Natural Toxicants is relevant to different types of contaminants and maximum residue limits in different kinds of products; refer to https://www.legislation.gov.au/Details/F2015C00052. The Code includes MRLs for vegetables. They list limits for lead (Pb) in all vegetables and cadmium (Cd) in leafy and root vegetables.</p> <p>I note that for organic producers according to the Australian Organic Standard, “heavy metal residues in the tissue of certified products shall not exceed 10% of the maximum limit as set out by FSANZ for each specific food group or item where specified. Exceptions may be granted where up to 100% of the maximum limit will be accepted where it can be verified that historical land use or naturally occurring background levels are high but where levels in certified produce remain within the FSANZ guidelines. Such exceptions would be accompanied by an ongoing monitoring program and require verification by the operator that through time such contaminants were not continuing to rise on the farm based upon farming practices and/or selection of inputs.”</p>
69. Water quality	16. The land uses of mineral sands mining and horticulture/agriculture cannot co-exist due to pollution of water resources.	<p>The technical EES report “Fingerboards Mineral Sands Revised Landscape Stability and Sediment Transport Regime Assessment by Water Technology Pty Ltd states that without adequate controls, increased erosion and sedimentation of downstream watercourses may occur. A range of avoidance, management and mitigation measures have been recommended to minimise risk as much as possible.</p> <p>I am presuming that the experts have provided adequate advice, that it will be followed and any improvements to avoidance, management and mitigation measures that are possible, will be identified and implemented.</p> <p>I agree that water quality, i.e., as per the ANZECC & ARM CANZ 2000 Guidelines¹⁶, is important for all who rely on it, including the environment, irrigators and the community.</p>
70. Water quality	17. River water is used (by some) to wash vegetables and make ice for cooling broccoli in transit	<p>River water cannot be used to wash vegetables unless they are subsequently washed with potable water and in most cases sanitised. Ice that gets in contact with fresh produce as it is done with broccoli for instance must be made with potable water. The Freshcare and other food safety standards provide the following information on water quality used postharvest:</p> <p>“Manage postharvest water to minimise the risk of contaminating produce.</p> <ul style="list-style-type: none"> ▪ Water sources contaminated by toxic algae are not used postharvest.

¹⁶ <https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000>

THEME	ISSUE RAISED	RESPONSE
		<ul style="list-style-type: none"> ▪ Water used postharvest for pre-washing (removing soil and debris) where there is a subsequent wash step, must meet E. coli <100 cfu/100mL. Evidence is kept. <p>All other water used postharvest is suitable for the intended purpose and not a source of food safety risk, and meets, or is treated to achieve, E. coli <1 cfu/100mL. Evidence is kept.</p> <ul style="list-style-type: none"> ▪ Water in recirculation systems, water dumps, flumes and treatment tanks, is treated and/or changed at an appropriate frequency to maintain water quality, E. coli <1 cfu/100mL. A record is kept. ▪ Any variations to postharvest water quality must be supported by a risk assessment and associated documentation and be verified at audit.
71. Water availability	18. Clear misunderstanding of the importance of the extensive, local shallow water aquifer system (e.g., Latrobe aquifer) and its critical value in our agricultural activities.	The issue is out of my area of expertise. I agree that adequate water supply and surety are vital for irrigators.
72. Water availability	<p>19. The Project will compete with the local agricultural / horticultural businesses for water using 3 GL a year over 15 years. A dryer climate will make the situation worse, considering that irrigation restriction have already been in place in drier years.</p> <p>a. Kalbar is accessing water allocations that are not available to farmers.</p>	<p>The HIA mentions that competition for water, especially under climate change impacts can be an issue for irrigators. Horticultural production and its economic success relies on access to sufficient water for irrigation.</p> <p>Mitigation and safeguarding measures have to be addressed by regulators / the responsible water authority.</p>

THEME	ISSUE RAISED	RESPONSE
	<p>b. Kalbar is capturing run off water, taking it away from refilling waterways.</p>	
<p>73. Water availability</p>	<p>20. If water required for the Project was redirected to agriculture, many more jobs could be created than the jobs being created by the Project.</p>	<p>Kalbar states on its website that the Project will create 200 direct jobs over the 15-20 year life of the project. The estimated water requirement for the Project is about three gigalitres (3 GL = 3000 megalitres, ML) per year. This means the project would create 0.067 jobs for 3000 ML water used (or 0.04 jobs per ML if the project required 5 GL per year). It is assumed that this job level, if created in year one of mine operation will be maintained i.e., the mine will not create 200 jobs each year.</p> <p>One publication¹⁷ claims that irrigated agriculture creates 0.3 jobs/ML in the local economy but does not provide relevant references. The figure appears to be very high.</p> <p>Based on a vegetable production area on 4700 ha in the Lindenow area and an estimated average water use of 4ML/ha (based on experience in the vegetable industry), 18,800 ML (18.8 GL) would be used each year in the Lindenow area to produce vegetables. The Victorian vegetable production area (ABS 2018-19) was 31,172 hectares and total local employment level in the Victorian vegetable industry at its peak in November 18 was 5430 local (Victorian) jobs (according to Employment Victoria and ABARES¹⁸) amounting to 0.17 local people per hectare.</p> <p>Assuming that the number of jobs per hectare in Victoria is representative, at peak employment time 0.17 local jobs would be available in the Lindenow area at peak employment time. Based on 4700 ha of vegetables and a total irrigation water use of 18,800 ML (4 ML/ha) that would amount to about 800 local jobs in the Lindenow vegetable industry or 0.04 jobs per ML.</p> <p>Non-local employment (from overseas and other states) in the Victorian vegetable industry was reported to be 3610 people at its peak in November 18, bringing the total employment in the industry at that time to 9040 people in Victoria and to 1363 in the Lindenow area or 0.07 jobs/ML based on the Victorian figure of 0.29 jobs/ha for local and non-local employment.</p> <p>The overall direct employment opportunities in both industries (mining and vegetables) are comparable, based on the above estimates (using peak employment numbers for the vegetable industry).</p>

¹⁷ Thompson D. (not dated) Regional Development Australia, Northern Inland: Economic Impact of Water – Northern Inland NSW. <https://www.rdani.org.au/files/pages/projects/current/murray-darling-basin/Economic-Importance-of-Water-Northern-Inland-NSW-docx.pdf>

¹⁸ <https://www.agriculture.gov.au/abares/research-topics/labour> and <https://profile.id.com.au/australia/employment-status>

THEME	ISSUE RAISED	RESPONSE																		
74. Labour	21. The Project will compete with the local agricultural / horticultural businesses for labour	<p>Kalbar states on its website that the Project will create 200 direct jobs over the 15-20 year life of the project¹⁹ in the following areas: Engineering (Civil, Environmental, Mining, Process, Mechanical, Electrical, Hydraulic), Geology, Metallurgy, Drafting, GIS; Planning, Surveying, Laboratory Technician; Accounting, Bookkeeping, Payroll; Administration, Marketing; Human Resources, Training, Occupational Health & Safety; Environmental, Rehabilitation, Community Consultation, Communications; Procurement, Storeman, Freight & Logistics; Plant Operators (Excavators, Dozers, Scrapers, Dump Trucks, Drill Rig), Truck Drivers, Crane Drivers; Tradesmen (Mechanics, Electricians, Fitters), Maintenance; Supervisors, Managers, Superintendents; Field Officers, Process Plant Operators, Technicians.²⁰</p> <p>I am of the opinion that the horticulture industry will be competing for workers in several areas mentioned above. Shortages already have been reported in the areas of truck, tractor and forklift drivers as well as tradesmen. As stated in the HIA, payment rates are generally higher in the mining industry and work is not affected by seasonal fluctuations. Comparisons between the two industries can also be made via https://joboutlook.gov.au/industries/. As mentioned in the HIA mitigation section, it is important that the vegetable industry is supported by current initiatives and targeted programs to attract, train and maintain a viable workforce.</p>																		
75. Labour/jobs	22. The Project places the horticulture industry and its 2,000 direct jobs at risk.	<p>Several submissions claim that the horticulture industry employs 2000 people directly (region and date were not stated). Employment Victoria²¹ provides the following employment information for the entire Victorian vegetable industry (31,172 ha):</p> <table border="1" data-bbox="1048 890 1899 1289"> <thead> <tr> <th data-bbox="1048 890 1384 986">Employment type</th> <th data-bbox="1384 890 1630 986">FY 18-19, Nov. 18 (peak employment)</th> <th data-bbox="1630 890 1899 986">FY 18-19, June 19 (lowest employment)</th> </tr> </thead> <tbody> <tr> <td data-bbox="1048 986 1384 1050">Non-local casual or contract</td> <td data-bbox="1384 986 1630 1050">770</td> <td data-bbox="1630 986 1899 1050">490</td> </tr> <tr> <td data-bbox="1048 1050 1384 1114">Overseas casual or contract</td> <td data-bbox="1384 1050 1630 1114">2840</td> <td data-bbox="1630 1050 1899 1114">1780</td> </tr> <tr> <td data-bbox="1048 1114 1384 1177">Local casual or contract</td> <td data-bbox="1384 1114 1630 1177">2230</td> <td data-bbox="1630 1114 1899 1177">1400</td> </tr> <tr> <td data-bbox="1048 1177 1384 1241">Part time</td> <td data-bbox="1384 1177 1630 1241">230</td> <td data-bbox="1630 1177 1899 1241">230</td> </tr> <tr> <td data-bbox="1048 1241 1384 1289">Full time</td> <td data-bbox="1384 1241 1630 1289">2970</td> <td data-bbox="1630 1241 1899 1289">2970</td> </tr> </tbody> </table>	Employment type	FY 18-19, Nov. 18 (peak employment)	FY 18-19, June 19 (lowest employment)	Non-local casual or contract	770	490	Overseas casual or contract	2840	1780	Local casual or contract	2230	1400	Part time	230	230	Full time	2970	2970
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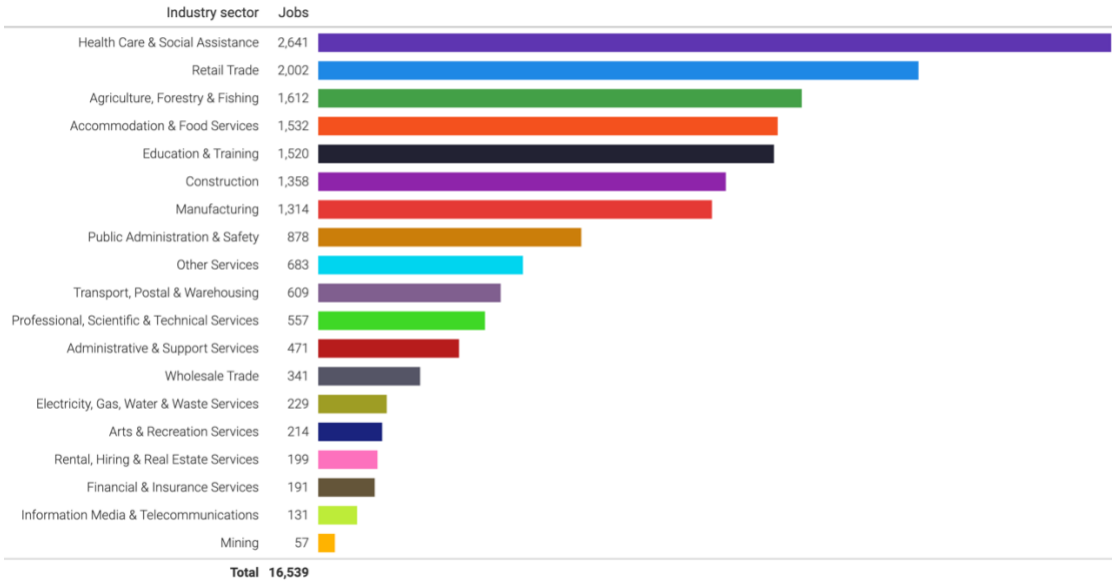
¹⁹ <https://www.fingerboardsproject.com.au/>

²⁰ <https://www.fingerboardsproject.com.au/about-kalbar/working-with-us/careers-with-kalbar>

²¹ <https://profile.id.com.au/australia/employment-status>

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		<p>REMPPLAN²² estimated that there are 754 jobs in total in the Lindenow – Granite Rock area in 2018/19 which accounts for 4.6% of all jobs in the East Gippsland region. The industry sector with the largest employment within the Lindenow – Granite Rock area is Agriculture, Forestry & Fishing with 421 jobs accounting for 55.8% of jobs in the selected area and 26.1% of all jobs for the Agriculture, Forestry & Fishing industry sector within the East Gippsland region. These figures do not include seasonal labour.</p>																													

²² REMPLAN <https://app.rempln.com.au/eastgippsland/economy>

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		<p>The below graph illustrates 2016 employment figures for East Gippsland by industry sector (Source: East Gippsland Shire Community Profile (https://profile.id.com.au/east-gippsland/industries)). It shows that then all of agriculture, forestry and fishing employed 1,612 people. The sector is the 3rd biggest after healthcare and retail trade. The age profile in the sector shows that the majority of people are aged 45 and older. Succession and attracting young people is therefore a concern for the sector. Even though the data is older, I am of the opinion that the importance of the sector and its age profile have not changed significantly.</p> <p>East Gippsland</p> <p>Employment</p>  <table border="1" data-bbox="907 566 2016 1149"> <thead> <tr> <th>Industry sector</th> <th>Jobs</th> </tr> </thead> <tbody> <tr><td>Health Care & Social Assistance</td><td>2,641</td></tr> <tr><td>Retail Trade</td><td>2,002</td></tr> <tr><td>Agriculture, Forestry & Fishing</td><td>1,612</td></tr> <tr><td>Accommodation & Food Services</td><td>1,532</td></tr> <tr><td>Education & Training</td><td>1,520</td></tr> <tr><td>Construction</td><td>1,358</td></tr> <tr><td>Manufacturing</td><td>1,314</td></tr> <tr><td>Public Administration & Safety</td><td>878</td></tr> <tr><td>Other Services</td><td>683</td></tr> <tr><td>Transport, Postal & Warehousing</td><td>609</td></tr> <tr><td>Professional, Scientific & Technical Services</td><td>557</td></tr> <tr><td>Administrative & Support Services</td><td>471</td></tr> <tr><td>Wholesale Trade</td><td>341</td></tr> <tr><td>Electricity, Gas, Water & Waste Services</td><td>229</td></tr> <tr><td>Arts & Recreation Services</td><td>214</td></tr> <tr><td>Rental, Hiring & Real Estate Services</td><td>199</td></tr> <tr><td>Financial & Insurance Services</td><td>191</td></tr> <tr><td>Information Media & Telecommunications</td><td>131</td></tr> <tr><td>Mining</td><td>57</td></tr> <tr><td>Total</td><td>16,539</td></tr> </tbody> </table> <p>Benchmarks: None Industry sectors: All Selected</p> <p>Given the above data and estimates, it is unlikely that the vegetable industry in the Lindenow area directly employs 2000 people, even if non-local employment is included. Assuming food processing is included in 'Manufacturing' (even though salad vegetable prepacking may be not), jobs in both sectors in all of East Gippsland amounted to under 3,000 in 2016.</p>	Industry sector	Jobs	Health Care & Social Assistance	2,641	Retail Trade	2,002	Agriculture, Forestry & Fishing	1,612	Accommodation & Food Services	1,532	Education & Training	1,520	Construction	1,358	Manufacturing	1,314	Public Administration & Safety	878	Other Services	683	Transport, Postal & Warehousing	609	Professional, Scientific & Technical Services	557	Administrative & Support Services	471	Wholesale Trade	341	Electricity, Gas, Water & Waste Services	229	Arts & Recreation Services	214	Rental, Hiring & Real Estate Services	199	Financial & Insurance Services	191	Information Media & Telecommunications	131	Mining	57	Total	16,539
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76. Climate Change	<p>23. Climate change is a major risk for the industry and its impact has not been adequately addressed.</p> <p>a. The risk from flooding events has not been included in the impact assessment.</p>	<p>HIA states that the primary climate change risk to horticultural production in the Lindenow Valley that may be exacerbated by the project is the availability and security of (access to sufficient) irrigation water, especially if, as predicted temperatures increase and winter and spring rainfall decrease (refer to 'Climate Ready Victoria, a state government publication). The (likely) increased competition for available irrigation water amongst existing horticultural producers, (and other users) and the Project, may present production and economic (cost of water) challenges for horticultural producers.</p> <p>Other potential impacts associated with climate change risks, such as dust, are a secondary issue to water availability, hence making the security of future water availability a priority for producers.</p> <p>The HIA provides the following information:</p> <p>The Lindenow Valley can experience heavy rainfall events²³ and subsequent flooding (climate change may increase the frequency of heavy rain events). Significant flood events in recent years have decimated horticulture production and impacted on national supplies of product lines, including baby leaf salad due to the inundation of production land²⁴. An uncontrolled, major erosion event could deposit particles from the mining site into surface water and from there onto crops via irrigation or process wash water. This could have an impact on food safety certification and or market acceptance, if particular residues were found on vegetables in the market or water turbidity affected post-harvest sanitation. The use of sanitation systems that can handle higher concentrations of organic matter could be used to mitigate the risk. Areas of existing erosion can be seen in the steep gullies close to the Fingerboards proposed project area.</p> <p>A comprehensive water management plan and proposed abatement measures have been suggested in relevant technical EES reports. Coffey²⁵ presented a review of individual reports^{26, 27, 28, 29, 30, 31, 32} to demonstrate water availability of the required quality, and measures to minimise the risk of offsite movement of water carrying sediments to downstream horticultural producer's land and irrigation water resources. The Coffey report addresses mitigation of changes to groundwater and surface water quality at all project phases, including effects from drawdown and rebound of groundwater levels in the vicinity of water supply</p>

²³ Rainfall of 58.6 mm over a 24 hour period statistically forecast to be expected on average once per year Coffey Groundwater and Surface Water Impact Assessment (2018) pg. 30

²⁴ ABC Rural, "Supermarkets face national baby leaf salad supply shortage after storms and flooding hits Victorian crops", 25 July 2016, URL: <http://www.abc.net.au/news/rural/2016-07-25/baby-leaf-shortage-after-vic-storms-flooding/7656822>

²⁵ Coffey Services Australia Pty Ltd. 2020. Fingerboards Mineral Sands Project – Groundwater and surface water impact assessment. Report prepared for Kalbar Operations Pty Limited, April 2020.

²⁶ Water Technology. 2020. Fingerboards Mineral Sands Surface Water Assessment – Regional Study. Report prepared for Kalbar Operations Pty Limited, April 2020.

²⁷ EMM. 2020. Fingerboards Groundwater Modelling Report In support of the Environmental Effects Statement. Report prepared for Kalbar Operations Pty Limited, April 2020.

²⁸ Water Technology. 2020. Fingerboards Mineral Sands Landscape Stability and Sediment Transport Regime Assessment. Report prepared for Kalbar Operations Pty Limited, April 2020.

²⁹ EMM. 2020. Fingerboards Mineral Sands Project. Conceptual Surface Water Management Strategy and Water Balance. Report prepared for Kalbar Operations Pty Limited, April 2020.

³⁰ EMM. 2020. Fingerboards Project. Water Supply Options Study. Technical Groundwater Assessment. Report prepared for Kalbar Operations Pty Limited, April 2020.

³¹ Pye, S. 2017. Fingerboards Mineral Sands Project Water Supply Options. East Gippsland Water / Mitchell River Concept Design and Investigation. Report prepared for Kalbar Operations Pty Limited, May 2017.

³² Water Technology. 2020. Fingerboards Mineral Sands Surface Water Assessment – Site Study. Report prepared for Kalbar Operations Pty Limited, April 2020.

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		bores, present contaminants (including radionuclides), as well as downstream and upstream effects on ecological values (e.g., groundwater dependent ecosystems, EPBC Act ³³ listed communities and the Gippsland Lakes Ramsar site ³⁴).
77. Provenance. image, consumer perception, brand	24. The impact statements on provenance and supply chain issues are not supported by current consumer information	<p>The comment is correct given the HIA scoping did not include capturing primary data. We looked for published data about the importance of provenance for purchasing decisions and branding of East Gippsland or Lindenow horticultural produce in the supply chain³⁵. Local food was clearly identified in one of the local Bairnsdale supermarkets and identifiable in the local fruit shop. The Bairnsdale Coles supermarket did not identify local produce when I inspected the store, but it may do so when product is available.</p> <p>I further researched the issue of provenance and purchasing decisions. The following citation from the most recently published study³⁶ summarises findings: “There is a significant body of research on the perceived benefits to consumers who purchase and consume regionally grown foods both internationally and in Australia. However, there is limited research detailing more wide-spread consumption patterns of regionally grown foods. While some research has been conducted, inconsistent methodologies have been applied, and few studies have managed to accurately estimate the amount of local food consumed. Some studies have attempted to quantify local food consumption on a population level, by evaluating census data from small-scale food businesses and data measuring food sales direct to consumers. More consumer-focused research has surveyed consumption of local foods, categorizing consumers into purchasers and non-purchasers. However, these data are limited and highlight a missed opportunity to quantify local food consumption using traditional nutritional assessment methodologies. Habitual food consumption is frequently determined using semi-quantitative food frequency questionnaires (SFFQ), where consumption of specific foods (with pre-defined portions) are estimated over a specified period. An adapted version of such a tool may be useful for further quantifying consumption of regionally grown foods in consumers, and to identify the specific regionally grown foods that consumers are eating.”</p> <p>Earlier work by Colmar Brunton³⁷ provides the following information, which was not in the HIA. “It was revealed that consumers are willing to spend more on Australian-grown vegetables. Provenance is highly important information to consumers, especially the knowledge that their vegetables are grown in Australia. Provenance importance increased from 6.3/10 at the start of the tracker to a total Vegetable Average of</p>

³³ Department and Agriculture, Water and the Environment. 1999. Environment Protection and Biodiversity Conservation Act 1999

³⁴ A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention. The Convention on Wetlands, known as the Ramsar Convention, is an intergovernmental environmental treaty established in 1971 by UNESCO, which came into force in 1975.

³⁵ Examples are: <https://www.visiteastgippsland.com.au/lindenow> and Australia's Food Bowls at <https://foodsustainability.eiu.com/australias-food-bowls/> and Sheridan, J., Larsen, K. and Carey, R. (2015) Melbourne's foodbowl: Now and at seven million. Victorian Eco-Innovation Lab, The University of Melbourne and <https://rubiconsnobscreekreserve.org/water/the-food-bowl-of-victoria/> and http://www.c4gs.com.au/wp-content/uploads/Vegetable-Growers-Prospectus_V2.pdf and

Carey, R and McConell, K (2011) A Resilient Fruit and Vegetable Supply for a Healthy Victoria. Working together to secure the future. A report by the Food Alliance.

³⁶ Int J Environ Res Public Health. 2020 Jan; 17(1): 63. Published online 2019 Dec 20. doi: 10.3390/ijerph17010063

³⁷ <https://ausveg.com.au/infoveg/consumer-research/project-harvest/> and Consumer and market program for the vegetable industry. Jenny Witham, Colmar Brunton. Project Number: VG12078 + VG14060

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		<p>6.6/10 by the end. The tracker measured a noticeable increase in provenance measures after the health scare around pre-packaged lettuce at the beginning of 2016. Providing prominent origin and provenance information at point of sale will encourage consumer purchase as well as strengthening confidence in their fresh vegetable purchase."</p> <p>At a similar time to the Colmar Bruton study a Victorian study³⁸ concluded the following: "Consumers (recognising that consumption patterns vary and are influenced by culture, nutritional needs, dietary preferences etc) are very sensitive to the of price of food (and yet waste is also an issue). They have little knowledge, awareness or care about where their food comes from or the impact of their purchasing decisions (aided by poor labelling and lack of transparency). They prioritise convenience in their purchasing decisions. Have dietary preferences that are driving supplier behaviour."</p> <p>Research into the importance of provenance for vegetables or 'local food systems' in general is still inconclusive. Information collected by different survey methods and standard agricultural and business data is limited in its capacity to adequately document local food production, the operation of local food systems and their importance to the local economy. The vast majority of vegetables from the Lindenow area are 'exported' from the East Gippsland region and are currently not identifiable for consumers outside of the region e.g., via branding. The local food processing company Vegco (One Harvest) sources much of its produce from the Lindenow area but also 'imports' from other regions around Australia to be able to provide to the required volumes of vegetable and fruit based products to retailers.</p>
78. Clean green image	25. Would like to ensure that full consideration has been undertaken on consequences to provenance, image, and future sustainability; should risks occur that irrevocably impair the brand and consumer perception of East Gippsland produce, specifically from the Lindenow Valley area.	<p>For information on impacts on the horticulture 'clean green image'. Refer to section 6.8 of the HIA.</p> <p>In addition, I made a further attempt to find objective evidence of the 'clean green' image of the horticulture industry and its products in the region.</p> <p>I have found promotional information and a 'Gippsland Grown' 'green' logo by a South Gippsland fruit and vegetable marketer https://aherns.com.au/gippsland-grown/ as well as claims made by a South Gippsland farm https://maccasfarm.com.au/our-story/. The east Gippsland Food Cluster also promotes a clean green image.</p> <p>Activities by the agricultural sector to protect threatened vegetation would be one way of providing evidence of 'clean green'. Another, as mentioned in the HIA is certification via EnviroVeg or Freshcare Environmental and using this for marketing purposes.</p> <p>It is my opinion, based on my understanding of the EnviroVeg and Freshcare Environmental Standards that environmental certification of production under these schemes and the vicinity of a mineral sands mine are</p>

³⁸ <http://files.australianfutures.org/Mapping-Victorias-Food-System.pdf> 2016 report

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		<p>not mutually exclusive. The certification focusses on activities on the farm to ensure the farming operation uses sustainable, safe practices and minimises its environmental footprint.</p> <p>The Australian Certified Organic Standard (ACOS), includes specific guidance on and expectations of environmental management. ACO certification therefore attests to 'clean green' production. Section 4.7 of the standard "Contamination: Soils; Produce; and Buffer Zones" provides guidance on residues, maximum residue limits (MRLs) and monitoring.</p> <p>Section 4.7 of the ACOS states: "The aim of organic certification is to minimise residues and to disallow residues to be present that are suspected to be used in the production and preparation chain. Decertification of products may occur where such residues have not otherwise arisen from historic, ambient or unintentional post-farm-gate practices.</p> <p>The ACOS refers to requirements for buffer zones in section 4.7 as follows:</p> <p>4.7.19. The operator shall employ measures including barriers and buffer zones to avoid potential contamination and to limit contaminants in organic products. Where neighbouring or regional activities may pose risk of contamination or related risks to certified farm units, appropriate buffer zones shall be established and/or maintained. This may include roadways and fallow areas; tree and shrub zones along borders; and/or sections of crops or produce that shall be deemed uncertified along relevant boundaries. Effectiveness of such buffer zones shall be aimed at precluding contamination, and a timeline for development shall be established, with monitoring such as residue testing where risks to end-product integrity are noted as significant.</p> <p>4.7.20. Buffer zone widths and lengths shall be determined on a case-by-case basis and shall be accompanied by on-farm risk management by the certified operator. As a guide, buffer zones should be no less than 15 metres in the case of intensive cropping or broadacre cropping activities.</p> <p>4.7.21. Where water contamination, or waterborne agents, pose risks to certified farm units, appropriate management practices and technical means such as spillways, trenches, run-offs and/or wetland areas may be required to ensure no contamination may occur.</p> <p>4.7.22. In case of reasonable suspicion of land and / or product contamination, the certified operator shall advise the CO and provide factual evidence on the matter, and a proposed plan for management and monitoring of the potential contamination."</p> <p>The HIA has considered the requirements of the ACOS when suggesting additional mitigation steps for all horticultural produce.</p> <p>I have been involved in a national assessment of environmental performance of the vegetable industry: Horticulture Innovation Australia, 2015: Environmental Assessment of the Vegetable Industry by Dr Anne-</p>

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		<p>Maree Boland, Stephanie Drum and Dr Doris Blaesing, RMCG and Alison Kelly, Kelly Consulting; Project Number: VG13057.</p> <p>The performance report for 2015 includes an assessment against identified indicators for each of the environmental themes. Importantly, the analysis describes what information needs to be collected at the short-term and medium-term (environmental) outcome levels. Unfortunately, concise data collection as suggested by the framework is still lacking on a national or regional level.</p> <p>Hui-Shung (Christie) Chang and Paul Kristiansen investigated Australia’s claim to a clean green image in 2006: Selling Australia as ‘clean and green’. The Australian Journal of Agricultural and Resource Economics, 50, pp. 103–113</p> <p>The authors conclude: “As consumers become more concerned about food safety and environmental impacts of industrialised agriculture, the demand for ‘clean and green’ products will increase. The strong growth in the demand for organic food is a clear example. Governments and business organisations are responding to such consumer preferences by marketing their products as ‘clean and green’ based on the image of unspoilt nature. However, examination of most ‘clean and green’ claims indicates that they have serious shortcomings. Flying the ‘clean and green’ flag may have helped exporters in the past, but as consumers become more sophisticated and demanding and as global competition intensifies (who is cleaner and greener?), it is no longer enough to simply claim to be ‘clean and green’. Rather, credible evidence to substantiate such claims will be required. Therefore, the key to success is not a ‘clean and green’ image but a ‘clean and green’ credential.”</p> <p>East Gippsland is claiming to be the clean and green ‘foodbowl’ of Victoria, providing 25% of the state vegetable production. Still, other Victorian regions claim the same (foodbowl) for the production areas around Melbourne³⁹ and the Goulburn Valley⁴⁰: “The Goulburn Valley is truly the food bowl of Victoria”. and “The Goulburn Valley has a Mediterranean climate, suitable for the production of a wide variety of fruits and vegetables throughout the season. Commonly grown vegetable crops in the region are tomatoes, capsicums, zucchini, corn, cauliflowers and broccoli, just to name a few.” Unfortunately, Carey and McConell (2011⁴¹) did not refer to the East Gippsland region when reporting on “A Resilient Fruit and Vegetable Supply for a Healthy Victoria”.</p> <p>Many horticultural production regions in Australia, and Australia as a food exporter⁴², are claiming a ‘clean green’ image (examples are Tasmania, Manjimup WA, Lockyer Valley and Atherton Tablelands Qld, Northern Adelaide Plains SA).</p>

³⁹ Sheridan, J., Larsen, K. and Carey, R. (2015) Melbourne’s foodbowl: Now and at seven million. Victorian Eco-Innovation Lab, The University of Melbourne

⁴⁰ <https://rubiconsnobscreekreserve.org/water/the-food-bowl-of-victoria/> and http://www.c4gs.com.au/wp-content/uploads/Vegetable-Growers-Prospectus_V2.pdf

⁴¹ Carey, R and McConell, K (2011) A Resilient Fruit and Vegetable Supply for a Healthy Victoria. Working together to secure the future. A report by the Food Alliance.

Hui-Shung C. and P. Kristiansen. 2006. Selling Australia as ‘clean and green’. The Australian Journal of Agricultural and Resource Economics, 50, pp. 103–113

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		<p>Unfortunately, none of these claims are substantiated by objective evidence of environmental performance. Evidence could include for example one or more of the following measures: pesticide/herbicide residue screening in produce, soils and waterways, evidence that nutrients and soil do not pollute waterways (leaching, run-off, erosion, livestock access to waterways), evidence of low greenhouse gas emissions and high water use efficiency, proof of maintaining or increasing biodiversity, good management of riparian zones and control of environmental weeds.</p> <p>Vegetable specific environmental performance indicators were established in 2015⁴³ as follows:</p> <ul style="list-style-type: none"> ▪ Water use and waterway management – industry water use (ML) and water use per area (ML/ha) ▪ Soil and nutrient management – organic carbon (t/ha) ▪ Air quality management - tonnes of carbon dioxide equivalent (CO₂e) per year (from greenhouse gases) and tonnes of CO₂e per year specifically from nitrous oxide (N₂O) emissions ▪ Biodiversity management – area and condition of native vegetation ▪ Energy use management – electricity fuel, oil and grease costs. ▪ Chemical use – use of integrated pest management, use of ‘soft chemicals’ and biopesticides. <p>Based on my understanding of production practices in the region, the vegetable industry in the Lindenow area uses standard vegetable production practices (conventional or organic). Many landholders focus managing soil health and using inputs efficiently. Integrated Pest Management (IPM) is used where possible.</p>
79. Clean green image	<p>26. Buyers know where the produce comes from. Wholesale buyers of fresh produce, including the major supermarkets will not purchase produce from a grower or region if they have concerns either perceived or real about the quality or safety of that produce, or the reliability of its supply.</p> <p>RMCG did not mention the role of</p>	<p>Under the Horticulture Code of Conduct (Code)⁴⁴ fruit and vegetable producers who sell through an agent or to a merchant must, by law, have a written contract. All major retailers have contracts with their suppliers; reliability of supply is important.</p> <p>As explained, major retailers require food safety systems to be in place. Growers who sell directly to the public or make ‘value added’ fresh produce (diced, cut, ready to eat) are a ‘food business’ and must have a food safety system in place. The food safety system covers measures/controls, monitoring, record keeping and traceability to ensure produce is safe for consumers. This includes freedom from actual physical, chemical and microbiological contamination. It is correct that, if produce is out of specification (e.g., in shape, size, appearance, or tested chemical residues, heavy metals, human pathogens) it will not be accepted by major retailers (usually returned to the supplier at his/her cost).</p>

⁴³ Boland et al. 2015. Environmental Assessment of the Australian Vegetable Industry. VG13057 Final Report, Horticulture Innovation Australia


⁴⁴ <https://www.accc.gov.au/business/industry-codes/horticulture-code-of-conduct>

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	<p>buyers, instead focusing on consumer purchasing habits. If the buyer does not purchase the fresh produce it will never reach the consumer, so consumer purchasing habits and provenance are not the main determinants of reputational risk.</p> <p>a. Mitigation strategies proposed such as committees and reference groups, EnviroVeg certification are not going to address the potential reality of buyers deciding not to purchase from the area because there is a hazardous mine close by. The risks are high that regional reputation will be impacted which could result in the collapse of the sector and its associated local industries.</p>	<p>Therefore, producers of fresh produce make sure through their QA system, that the produce that leaves the packing shed meets the relevant food safety standard. Still, the consumer advice for all fresh produce is that it is washed prior to consumption, especially if eaten raw.</p> <p>Distribution chains that do not supply supermarkets (e.g., wholesale markets / merchants) do commonly not require a food safety system from their suppliers. Longer distribution chains often have poor traceability so that, if for instance a food safety issue occurred, it would be hard to trace back to a farm. Contamination in multi-step supply chains is possible. This also decreases traceability.</p> <p>In my understanding, the suggested mitigation and additional mitigation strategies (refer to Appendix H of the EES) are adequate to ensure that buyers and consumers continue to buy produce from the Lindenow region. The Western Australian case study (refer to HIA) also provides confidence that buyers and consumers do not reject high quality produce because it is produced in the vicinity of mineral sands mining.</p>

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80. Noise	27. Noise was not a study that RMCG referenced, however it should have been included so the risks from noise have not been mitigated.	We were asked to address concerns raised by horticultural landholders. Noise was not mentioned as a concern during consultation. However, I agree that noise levels should be below the relevant standards for residents and workers.
81. Economic loss to horticulture	28. Potential economic loss/damage to the Agriculture/Horticulture industry (including value adding, indirect and/or supporting/dependent industries), for both present and future uses is inaccurate and underestimated.	I refer to other response made in this statement on industry data and economic issues; I also refer to the socioeconomic EES report which has been prepared by economists.
82. Economic data	<p>29. of the \$150 million per year Lindenow Valley horticulture industry, placing that industry and its 2,000 direct jobs at risk.</p> <p>30. RMCG understated the financial value of the industry by more than 50% claiming its farmgate worth as \$62 million annually. RMCG's valuation does not accord with the facts. It is</p>	<p>The HIA report states on page 22 that, according to ABS data, the gross value of Irrigated Vegetable Production in East Gippsland in 2016-17 was \$91.9 million. The 2018-19 ABS data for vegetable production in East Gippsland reports a gross value of \$101.2 million. The total value of all crops in east Gippsland was reported as \$120.3 million. The total gross value of all of agriculture in the region as \$251.3 million.</p> <p>According to REMPLAN⁴⁵ 2016 data the largest contributor to annual economic output for the Lindenow-Granite Rock area is Agriculture, Forestry & Fishing, which represents \$154.447 million or 54.5 percent of total output (gross revenue - not gross value - also referred to as total sales or total income) of that region and 23.9% of output from the East Gippsland region. The output data is different from the gross value of production which is calculated using gross prices realised at the point(s) of valuation where ownership of the commodity is relinquished by the agricultural sector.</p>

⁴⁵ <https://app.rempln.com.au/eastgippsland/economy/industries/employment>

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	<p>contended that RMCG stated such a low valuation to reduce the perceived adverse effects of the mine on a major pre-existing industry</p> <p>31. also, in submission 54: Hamilton SierraCon (2020; pg 24) and BAEconomics (2020; pg 20) stated Agriculture Victoria estimates the local farmgate value of production as around \$120 million per annum. (Further independent industry statistics support this figure.) Based on information from the industry quoted in the media, the value of production is over \$155 million annually and is expected to increase further with expansion plans.'</p>	<p>The Agriculture, Forestry & Fishing industry sector contributes the most for regional exports with \$97.013 million accounting for 73.5% of all exports in the Lindenow-Granite Rock area and 20.1% of all exports for the Agriculture, Forestry & Fishing industry sector within the East Gippsland region.</p> <p>The Agriculture, Forestry & Fishing industry sector also spends the most on regional imports with \$34.505 million accounting for 41.6% of all imports in the Lindenow-Granite Rock area and 24.1% of all imports for the Agriculture, Forestry & Fishing industry sector within the East Gippsland region.</p> <p>The Agriculture, Forestry & Fishing industry sector is the largest value added contributor with \$73.780 million accounting for 62.7% of all value added in the Lindenow-Granite Rock area and 24% of all value added for the Agriculture, Forestry & Fishing industry sector within the East Gippsland region.</p> <p>I believe that there are differences in the use in statistical data in submissions due to the use of different statistical divisions (e.g., Gippsland, East Gippsland) and the use of data for all primary industries or all of agriculture when talking about the horticulture industry. Also, references to the type of value reported are not clear e.g., gross value or farm gate value seem to have been used interchangeably. In some instances, output data (gross revenue) may have been used instead of gross values.</p> <p>Table 5-4 of the HIA presents the gross value of vegetable production in the Bruthen-Omeo region (based on ABS SA2 data 2015-16) only as \$62 million. The Bruthen-Omeo SA2 level covers the Lindenow area but not all of East Gippsland. An expansion of the Lindenow production area since the ABS data used for the HIA was published may extend further than the Bruthen-Omeo SA2 level.</p> <p>The map below shows the Bruthen-Omeo SA2 statistical division, illustrating that it covers the Lindenow region north of Bairnsdale. However, I agree that the economic importance of a regions usually extends further than the direct area. For that reason, the HIA also included data for the entire region of East Gippsland.</p>

THEME	ISSUE RAISED	RESPONSE
		 <p data-bbox="907 933 2038 1013">I would like to refer to my comments made elsewhere in this statement about the ‘correctness’ and reason for my use of ABS data. Independent industry statistics have been mentioned in some submissions without reference or explaining how they have been compiled, when, by whom and where they have been published.</p> <p data-bbox="907 1045 2038 1101">Furthermore, a strategic report by KPMG (2019⁴⁶) for Food and Fibre Gippsland comments on good data availability for the dairy industry in the region and states about "Food and Fibre industries":</p> <p data-bbox="907 1133 2038 1332">...."Other sectors like horticulture do not have as much readily available data at the orchard or farm level. Improved collation of data about Gippsland’s food and fibre sector performance will provide a more precise baseline of value chain gross regional product (GRP) and enable annual repeatable assessments of the industry’s progress towards an aspirational growth target. The sector also needs to transform innovation processes from the traditional Research, Development & Extension linear models. Contemporary best practice should consider a framework of the EU Smart Specialisation concept with elements of clustering design-led innovation and open innovation as a hybrid of the best parts."</p>

⁴⁶ KPMG 2019. Accelerating growth for the Gippsland food and fibre industry. <https://home.kpmg/au/en/home/insights/2019/03/accelerating-growth-gippsland-food-fibre-industry.html>

THEME	ISSUE RAISED	RESPONSE
83. Economic data	<p>32. The multiplier effect (“every direct job in agriculture creates four indirect jobs) plus the economic impacts of value adding post farmgate were not included by RMCG in assessing the full value and importance of the horticulture industry. This means its full worth has not been reported, possibly to diminish its significance as a pre-existing industry that has major beneficial flow-on effects to other regional businesses and the local economy.</p> <p>a. It also follows that every job lost in horticulture has a four times multiplier flow-on loss effect which will have a major impact on the local economy and is a significant adverse effect should loss of jobs occur to the industry as a result of the mine.</p> <p>b. Lack of considering economic multipliers, several submissions</p>	<p>The HIA includes general information on possible multiplier effects an irrigated agriculture industry may have for a regional community (pages 19 and 20). Multiplier effects commonly reported for irrigated agriculture are between 1.7 and 2.5⁴⁷ for a number of reasons, including:</p> <ul style="list-style-type: none"> ▪ Whether business turnover is measured at the farm gate, or includes the flow-on effects to other businesses (as in the cited study) ▪ Whether the study was based on a ‘normal’ season or not and whether more than one season were included in the analysis ▪ The natural and economic/business environment in the region, affecting potential enterprises ▪ Whether the study looked at introducing irrigation to a previous dryland area, introducing additional water to a region or introducing higher value crops to a region ▪ Whether the study accurately calculated the economic multipliers for the region in question using primary data or used secondary data ‘borrowed’ from other studies. <p>I assume that the multiplier reference in submissions is meant to be taken from the National Farmers Federation (NFF) publication “Food, Fibre & Forestry Facts. A Summary of Australia’s Agriculture Sector. 2017 Edition”, which is the only NFF publication I could find that talked about jobs in agriculture and supply chains. It provides the following information:</p> <ul style="list-style-type: none"> ▪ As of May 2017, 304,200 people were directly employed in the Australian farm sector (217,000 full-time workers, and 87,200 part-time workers) — accounting for about 3% of the national workforce. SOURCE: Australian Bureau of Statistics, Labour Force, Australia, Detailed, Quarterly, May 2017 Catalogue No. 6291.0.55.003. ▪ Across the supply chain agriculture powers 1.6 million jobs. SOURCE: Australia’s Farm Dependent Economy: Analysis of the role of Agriculture in the Australian Economy. <p>This data may have been used to determine a multiplier based on employment and supply chain jobs.</p> <p>The EES included a socioeconomic analysis so that it was not in RMCG’s scope to conduct a detailed primary economic study.</p>

⁴⁷ Department of Agriculture Western Australia. 2003. Agricultural Processing and The Western Australian Economy.

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	<p>stated that, according to a National Farmers Federation (NFF) publication, for every direct job in agriculture, 4.26 indirect jobs are created.</p>	
<p>84. Economic data</p>	<p>33. Undervaluing of non-horticultural systems, non-provision of a detailed assessment of impacts of the proposed mine on livestock production and its consequent flow-on economic consequences. The inclusion of a limited selection of not particularly relevant and mostly out-of-date animal studies is disingenuous</p>	<p>The Horticultural Impact Assessment (HIA) did not investigate any aspects of livestock or dairy production in the region; it was not part of the scope.</p> <p>Citation from submission 812 appears to relate to point 33; “To assist those who are not familiar with agriculture and agricultural parlance, high input farming means spending lots of money and time on throwing fertiliser, seed, water and other inputs around.”</p> <p>Different production systems require different inputs and have different economic indicators. All food and fibre production systems are important.</p>
<p>85. Environment</p>	<p>34. Role of biodiversity in (ag) ecosystems has not been considered.</p>	<p>The vegetable production area has a very limited area of natural/remnant vegetation and habitat for native flora and fauna biodiversity. Results were comparatively high for cobalt (Co), copper (Cu), lead (Pb), and zinc (Zn). Apart from lead the heavy metals are all plant nutrients and copper is also used as a fungicide. Lead is a component of fuel which may explain its relatively high level.</p> <p>The results from the testing of one area are not representative of the vegetable production area. I believe that the purpose of sampling was not to create baseline data for the industry but a comparison to other land uses and the proposed Project area.</p> <p>I understand that horticulturist would like to have an understanding of baseline levels of potential contaminants in their soils.</p>

THEME	ISSUE RAISED	RESPONSE
86. Soil Survey	35. Soil testing has been inadequate	Appendix-A001_Landform, Geology and Soil Investigation and Appendix-A002_Geochemistry & Mineralogy Summary Report refer to soil test sampling and results. Soil in only one area (point samples) was sampled and analysed for the vegetable production area. Based on sampling instructions for agriculture ⁴⁸ , I agree that limited sampling points are not representative for a paddock, farm or wider area.
87. Environment	36. No consideration of the impact of natural recent historical events such as the recent bush-fire and extended drought? Why have the severity and longevity of the impacts of these major events neither been adequately acknowledged, nor their importance recognised?	<p>The Horticultural Impact Assessment (HIA) did not investigate any aspects of 'recent natural events' in the region.</p> <p>HIA states that the primary climate change risk to horticultural production in the Lindenow Valley that may be exacerbated by the project is the availability and security of (access to sufficient) irrigation water. The (likely) increased competition for available irrigation water amongst existing horticultural producers, (and other users) and the Project, may present production and economic (cost of water) challenges for horticultural producers.</p> <p>Other potential impacts associated with climate change risks, such as dust, are a secondary issue to water availability, hence making the security of future water availability a priority for producers.</p> <p>Sufficient water availability is one factor that is important for dust management, not only by the mine. Lack of water leads to an increase in land area not covered by crops, pasture or vegetation.</p>
88. Failure of mitigation/ breaches	37. The land uses of mineral sands mining and horticulture/agriculture cannot co-exist due to the consequences if proposed mitigation measures do not succeed	Failure to implement, maintain, review and, if required improve mitigation measures (refer to Appendix H of the EES) can, in my view, have impacts on horticultural producers.

⁴⁸ Gourley CJP and Weaver DM (2019) A guide for fit for purpose soil sampling, Fertilizer Australia, Canberra, Australia.