





Growing vegetables below the area of the proposed mine



La Trobe aquifer

- Recently, initiatives taken to improve sustainability of aquifer utilization and mitigate over-extraction from this aquifer. E.g. East Gippsland Water's Woodglen ASR scheme
- Large new extractive water licence in the aquifer could jeopardize these improvements.

Aquitarid



Source: East Gippsland Water - <https://www.egwater.vic.gov.au/customer-info/water-supply-systems/woodglen-boosts-the-regions-long-term-water-supplies/>

Latrobe Group Aquifer

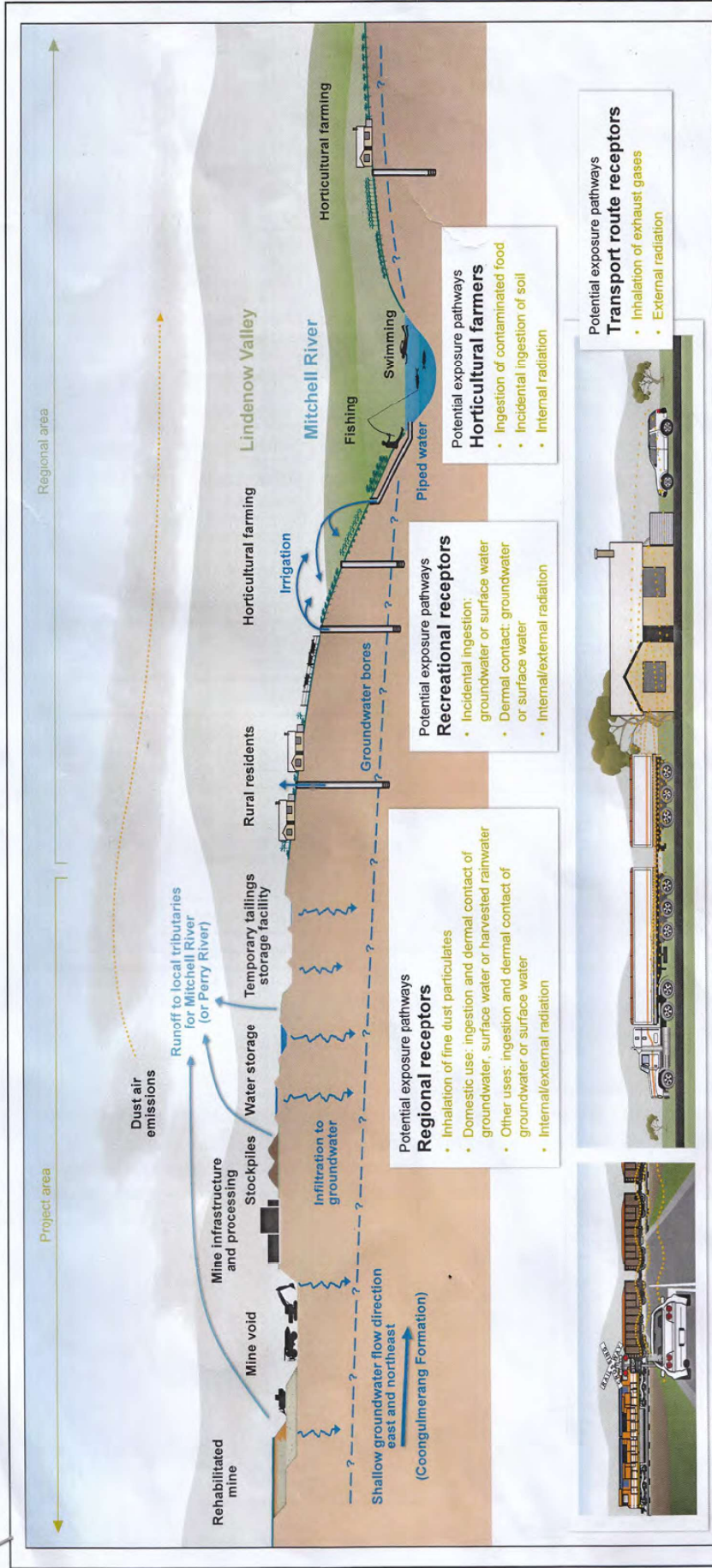


Figure No: **6.3**

KALBAR OPERATIONS PTY LTD

Kalbar Operations Pty Ltd
 Fingerboards Mineral Sands Project

Date: 02.06.2020
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 ENVAUBTF11607_2_25_63_GRA

coffey
 A PTY LTD

Conceptual site model –
 potential exposure pathways

Venturi effect

SOUTH WEST WIND

DUST

Mineral Mine Sand border

Knover border

Plateau

steep Hill

River

Vegetation Crops

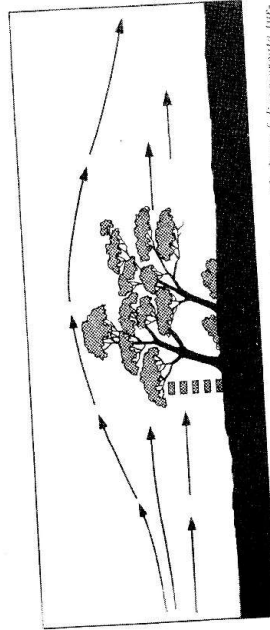
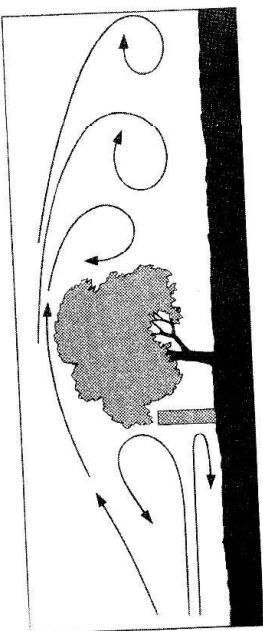
Mithun River

(3)

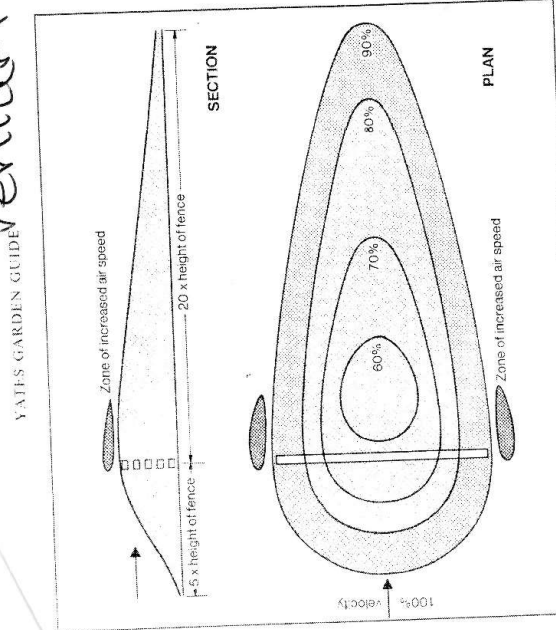


Venturi + Turbulance Effect

STARTING A GARDEN



Solid barriers such as a paling fence, a brick wall or trees with dense foliage create turbulence on both sides of the wind barrier. Slatted fences or trees and shrubs with light foliage will filter the wind and reduce its speed.



A windbreak gives protection to plants for a distance of up to twenty times its height on the leeward side. But wind speed increases just above and at the sides of the windbreak, as shown above.

provide an effective shelter zone when planted well back from garden or vegetable beds.

The best wind-barriers are those which filter the wind. Slatted fences, lattice or perforated concrete blocks (with about 50 per cent opening) are more effective than solid paling fences or brick walls. Solid barriers create wind turbulence on both sides. In the same way a tree or shrub with dense foliage will create turbulence out lightly foliaged plants will filter wind and reduce its speed. The correct placement of suitable windbreaks will prevent plant damage and create a better microclimate for the garden. Some of the effects of different windbreaks are shown in the diagrams.

CONSIDER WHAT YOU HAVE
Bushland sites may include native trees or shrubs which you want to keep.


Disturb the ground as little as possible until you are quite ready to make improvements—otherwise the weeds move in as soon as the natural cover is removed. Rocky outcrops may also be worked into the garden design. Even a low-lying wet area may be useful—for an ornamental pool, perhaps. Subdivisions in older settled areas usually contain worthwhile specimens of trees and shrubs, which should be retained if possible to give your garden a flying start. Subdivisions in areas which were previously farming land usually have little in the way of ornamental plants or existing features, so you have to start your design from scratch.

Another point to consider is the existing outlook from the house or from the garden. Pleasant outlooks can often be improved by making suitable plantings as a 'frame', while the reverse situation

may apply to an unsightly outlook. This should be screened from view with trees, shrubs, a hedge or a garden wall. Sometimes more privacy is required from adjacent buildings or from public view. This may be the case if the block of land is overlooked by neighbour's windows or located on the low side of a roadway where traffic noise and perhaps headlights will be a further disadvantage. These unsightly or disturbing aspects must be noted for future screening.

SOIL TYPE, DRAINAGE
This topic is described fully in Chapter 3 but a few points here may help in the planning stage.

Heavy clay soils are more fertile, than light sandy soils, but may present drainage problems. Sandy soils will often have a clay subsoil, or a rock layer close to the surface which traps water—even on sloping ground. Usually a deep rubble drain on the high side of the block will divert run-off water or seepage from above. On very steep slopes, surface run-off water may be excessive. This is best overcome by terracing the slope with retaining walls or rocky treatment. Whatever type of soil you have—clay, sand or loam—remember the topsoil is the most valuable. It is a good idea to remove about 5 cm of topsoil from the actual house-site, if you are building a



DUST STORM NEAR GLENDALE 12TH FEB '19. WILL SUCH A DUST STORM CONTAIN SILICA AFTER THE MINERAL SANDS MINE IS DEVELOPED?

Dust impacts on vegetable production

RMCG relied on the EES technical report by by Katestone Environmental. I refer to mitigation procedures in the relevant EES report and additional mitigation recommend in the HIA report:

- *Cease certain activities when real time monitoring and or weather forecasts alert to risks*
- *Work with landholders to develop further mitigation as required.*

Rain, overhead irrigation and post harvest washing and sanitation can remove dust from all sources.

In addition to the HIA report, my statement emphasises:

Windbreaks (natural and manufactured) around the Project site are a key mitigation measure.



<https://www.mining-technology.com/products/wind-fence-types/>



Image Source; Weekly Times, February 15, 2019

Continued on next slide

Spike in microscopic dust levels has Moranbah residents thinking of leaving their town

ABC TROPICAL NORTH - TIM SHEPHERD
MON AT 6:22AM



PHOTO: Tegan Hillier says keeping her home free of dust is a full-time job.
ABC TROPICAL NORTH SOPHIE MEIXNER

Residents in a central Queensland mining town that has seen elevated levels of dust say more needs to be done to ensure it is not coming from nearby mining operations.

Key points:

- High levels of microscopic dust particles were recorded in the town of Moranbah in 2018
- It was due to lower-than-average rainfall leading to more frequent dust storms and

Dust impacts on vegetable production (cont.)

There are no national air quality guideline values for the nuisance dust effect that can be used to assess the impact of dust on the receiving environment. A dust deposition limit of 120 mg/m² per day, averaged over 1 month, is often used. Guideline (Qld) Environmental Protection Act 1994, Application requirements for activities with impacts to air.

A standard for dust deposition on vegetables does not exist.

Katestone Environmental Pty Ltd. 2020 concluded:

Dust deposition rates are expected to be below the limit of 120 mg/m² or 0.12 g/m² per day.

An addition to my statement is shown below: Criteria used internationally for dust deposition nuisance and harm to vegetation.

Annual Mean Deposition Rate	Effect
< 350 mg/m ² /day	Damage to plants unlikely to occur
350 - 650 mg/m ² /day	Damage to plants possible
650 - 950 mg/m ² /day	Damage to plants probable
950 - 1,190 mg/m ² /day	Damage to plants highly probable
< 1,190 mg/m ² /day	Severe damage to plants

SOURCE: (Rio Tinto, 2012)

The above table has been copied from: APPENDIX J- Air Quality Impact Assessment (SLR Consulting Pty Ltd) 2018;
SIX MILE CREEK DAM Safety Upgrade Project Air Quality Impact Assessment, prepared for: SMEC



Baby leaf lettuce growing within the horticulture area of the Lindenow Valley

Horticulture production in the Study Area

- Approximately ~4,700 hectares of vegetable production (2016 Land Use data) – mainly conventional and also organic, vine grape production of about 40 ha.

- Markets:

- ~ 80% Interstate, ~1% exported, remainder Victoria
- Food chain value addition a key feature of the region:
 - Bagged, ready-to-eat, washed salad greens; 6 of the top 10 processors have a footprint in East Gippsland.
 - Regional food initiatives including Food & Fibre Gippsland, Gippsland Food Plan Vision and Strategic Framework.
 - Established food processors – e.g. Vegco / One Harvest, Patties Food.
 - Food safety QA, voluntary environmental management systems (e.g. EnviroVeg) .



Production Areas

Available ABS data on land use and production areas in the Local Agriculture Region are summarised in Table 2. This highlights that most of the area is under grazing, particularly unimproved pasture. More intensive land uses such as improved pastures, horticulture and cropping represent a minority of the total Area. Livestock numbers in the Local Agriculture Region are provided in Table 3.

Table 2: Production Areas from the Local Agriculture Region

Land Use	Hectares	Proportion
Vegetables	1,608	0.5%
Broadacre and Other Crops	4,563	1.4%
Improved Pastures	108,315	33.4%
Unimproved Pastures	179,598	55.3%
Conservation	16,518	5.0%
Other Non-Agricultural Use	12,975	4.0%
Other	1,114	0.3%
Total Holding	324,691	100%

Source: Australian Bureau of Statistics 2011-12 (most recent available data for these specific categories).

Table 3: Livestock Numbers in the Local Agriculture Region

Livestock category	Number
Total Sheep and Lambs	190,674
Total Milk Cattle	4,522
Total Meat Cattle	78,781

Source: Australian Bureau of Statistics 2015-16 (most recent available data).

2.5. Agriculture in the Project Area

2.5.1. Landholdings and Land Use

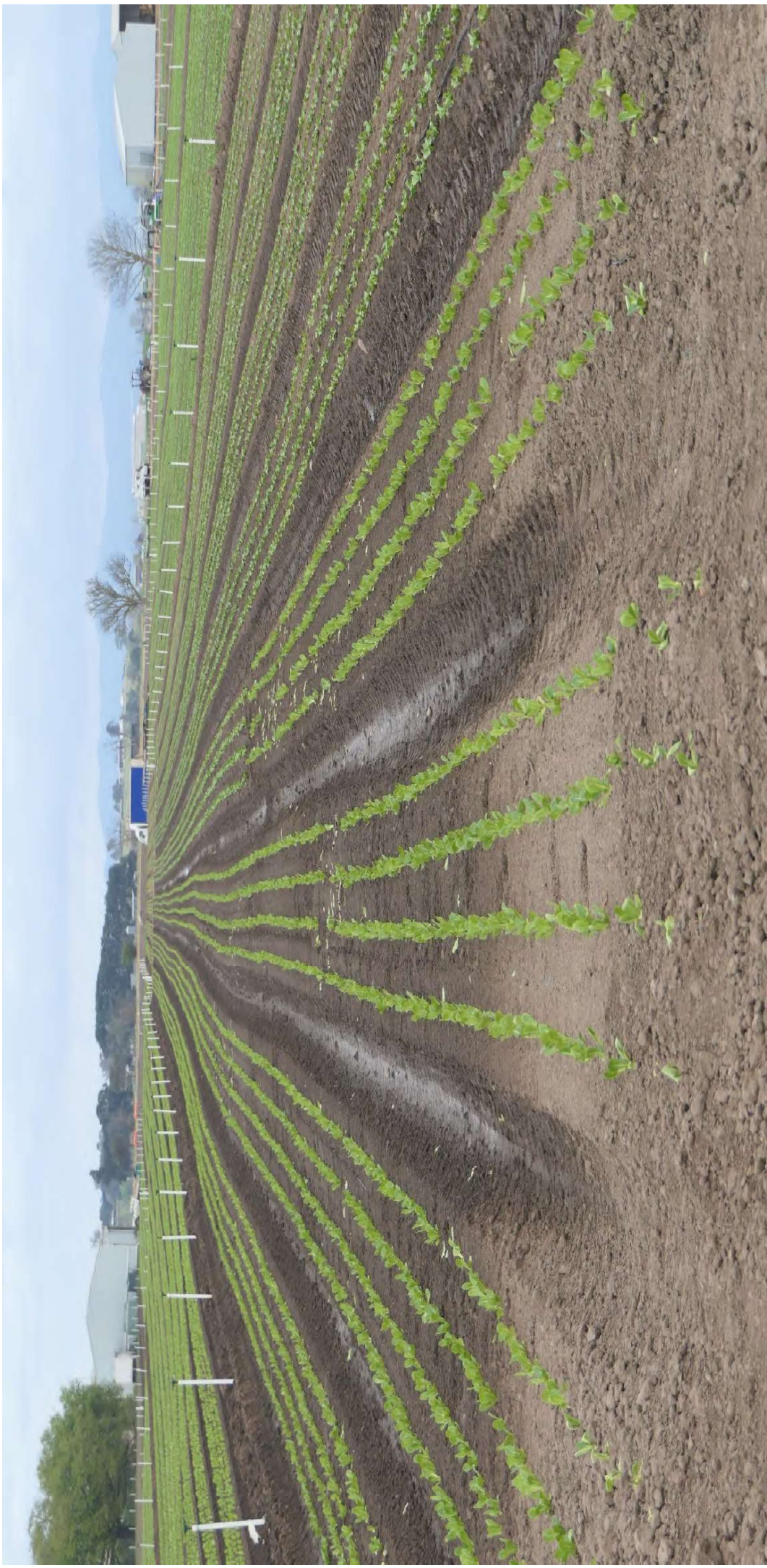
There are 19 landholders in the Project area, as described in Table 4. Some Project Area land is operated as agricultural enterprises on a full-time basis by owner-occupiers while other land is used for part-time agricultural operations and lifestyle properties. Data on the proportion of each landholders' total landholding inside the Project Area is not available. However at least two landholders have most of their land inside the Project Area.



Horticulture in the Lindenow Valley



Typical development of a cauliflower, ready for harvest clearly showing that the curd is not protected by covering leaves.



Vegetable growing in the Lindenow Valley



Dairying in the Lindenow Valley



White blister on Broccoli head caused by unnecessary wetting



White blister Spores on leaf which has the potential to further contaminate all brassica crops in the area

8 Concluding comments

8.1 CONSULTATION WITH INDUSTRY

Consultation with horticultural producers in the Lindenow Valley through the course of this study identified varying levels of concern relating to the potential impacts that the proposed Fingerboards Mineral Sands Project may have on their individual businesses and the broader horticulture production environment.

At one end of the scale, some producers close to the proposed project and/or organic producers expressed strong opposition to the Project proceeding. Regardless of the mitigation measures proposed and the regulations to adhere to (as part of license conditions), they expressed a general lack of trust in Kalbar's ability or care to avoid damage to the surrounding landscape, their reputation and their livelihoods. Producers located in the vicinity of the proposed project who rely heavily on the local market are especially concerned about potential impacts on their ability to sell their produce.

A greater majority of horticultural producers consulted through this study are supportive of the project on the proviso of one important condition: "as long as everything is done right". In essence, these producers trust that the mine operator will need to abide by stringent environmental regulations (including access to water), which will mitigate any potential adverse impacts on horticulture in the region.

Consultation with primary producers farming near sand mines in other regions provided no specific positive or negative evidence or insight into the potential impacts or reputational issues of sand mining in close proximity to horticultural production. There is no clear evidence to draw conclusions around consumer purchasing habits in relation to fresh commodity produce provenance to confirm the likelihood of a common risk to all horticultural producers.

It is recommended that producer engagement, through one-one consultation as required and a dedicated landholder working group (refer to Section 6.8.5), be ongoing to reduce misconceptions and create trust. Consideration for continued engagement with industry should include:

- Using evidence and data to inform producers, and deal with perceptions on an ongoing basis
- Sharing monitoring data, as appropriate, to mitigate perceptions of risk and adapt risk management as required
- Developing mitigation strategies or landscape amenity solutions with input from producers
- Support producers in achieving environmental certification for their businesses
- Support a regional event with the community that draws visitors to the region
- Working together to attract, train and retain labour using a range of approaches.

8.2 RISK AND IMPACT ASSESSMENT

The risk and impact assessment conducted to meet the requirements of the EES Assessment Guidelines focused on the Project's potential risks to identified horticultural values, potential hazards, foreseeable risks and mitigation measures. It thus assessed the in principle compatibility of the Project and horticultural production in the region. The following values and hazards were identified and assessed:

Jobs per megalitre of water - Mining vs Horticulture

Based on my assessment using available data, the overall direct employment opportunities in both industries (mining and vegetable production) are comparable when looking at jobs per ML of water. *(Using peak employment numbers for the vegetable industry and an average water use of 4 ML/ha each year for vegetable crops)*

0.04 – 0.07 jobs/ML in vegetable production

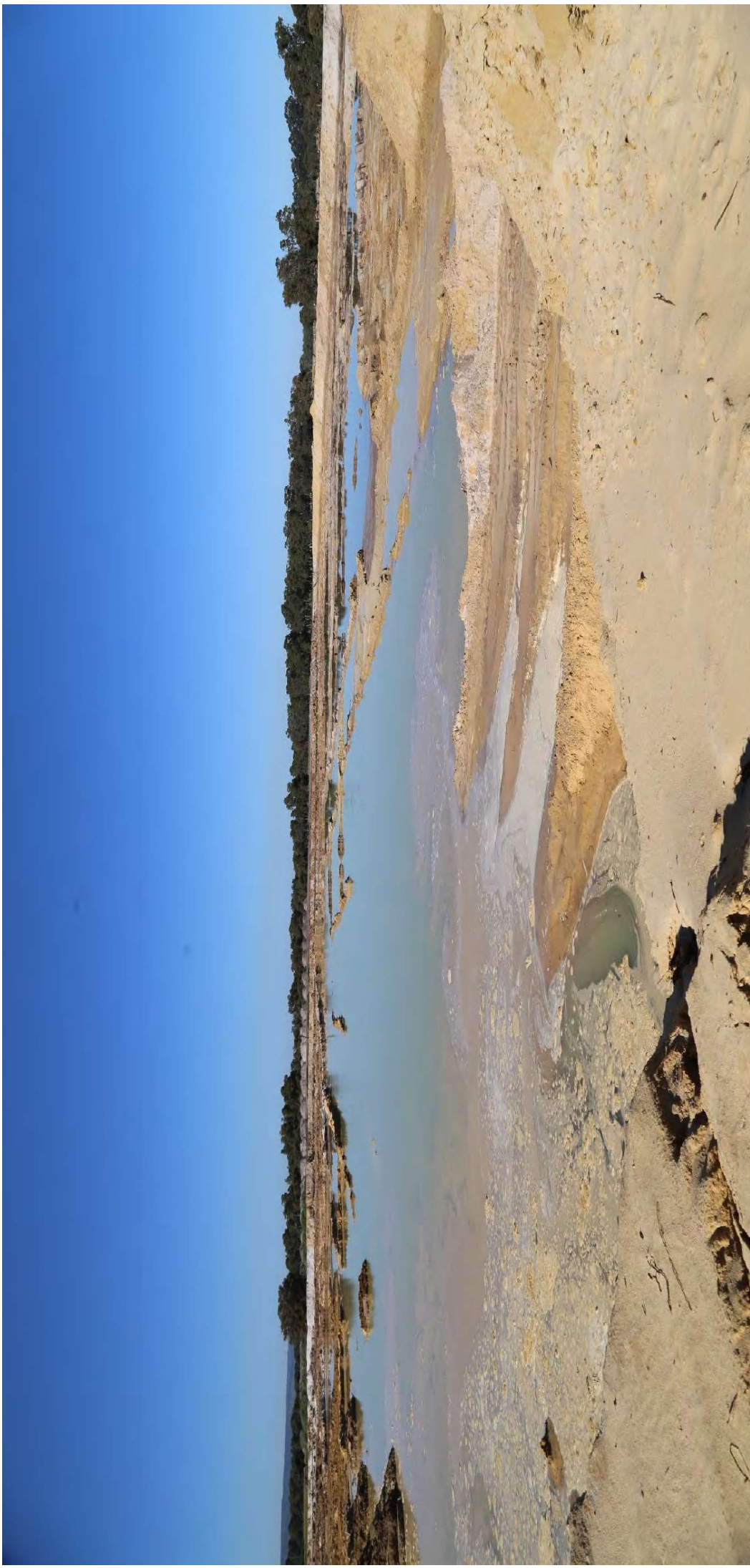


0.067 jobs/ML – mineral sands mine

14

1 mine worker 3,000 mgs divided by 200 workers = 15 mgs

1 farm worker 9,000mgs divided by 1500 workers = 6mgs



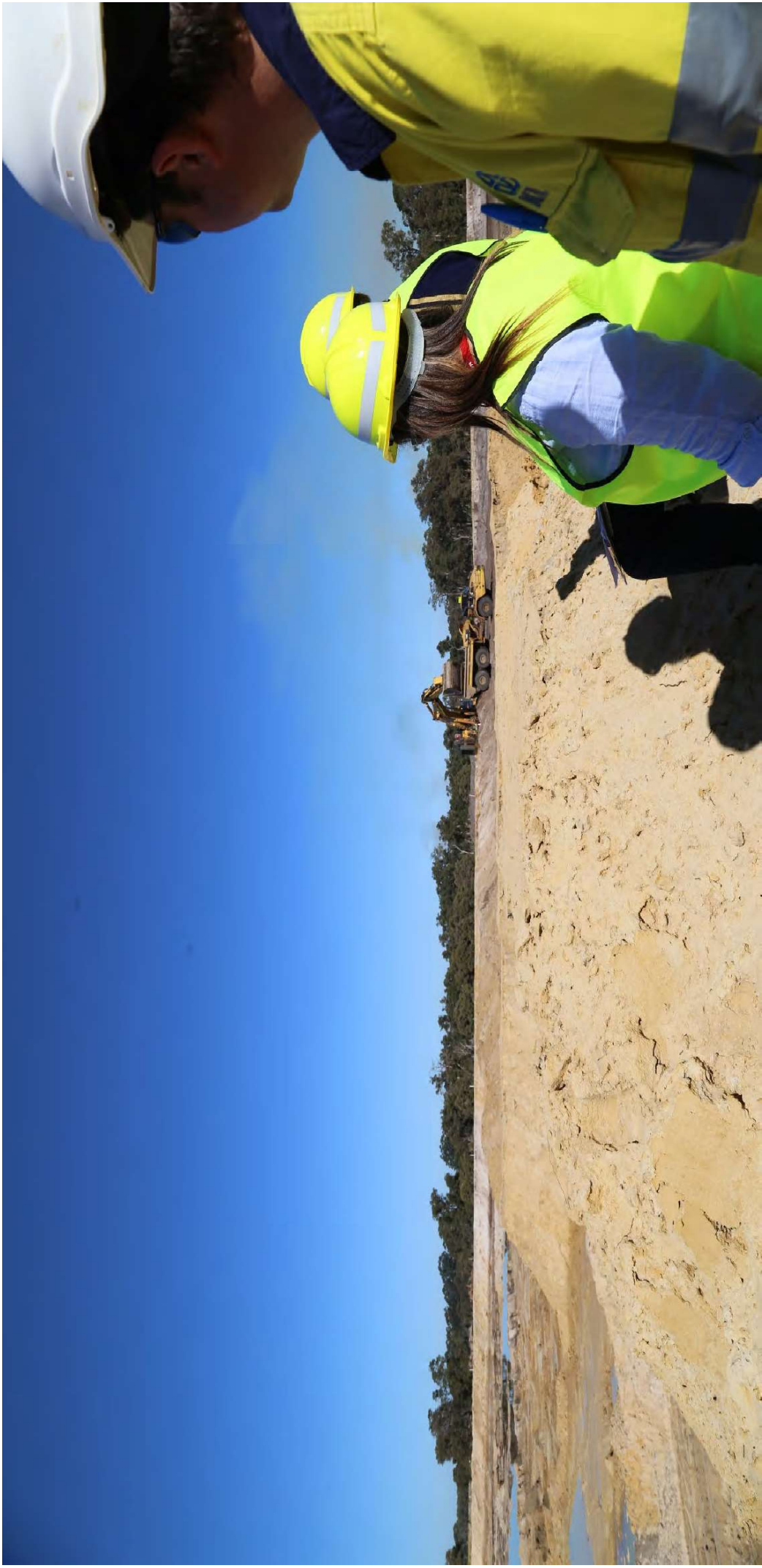
A mineral sands mine in Western Australia



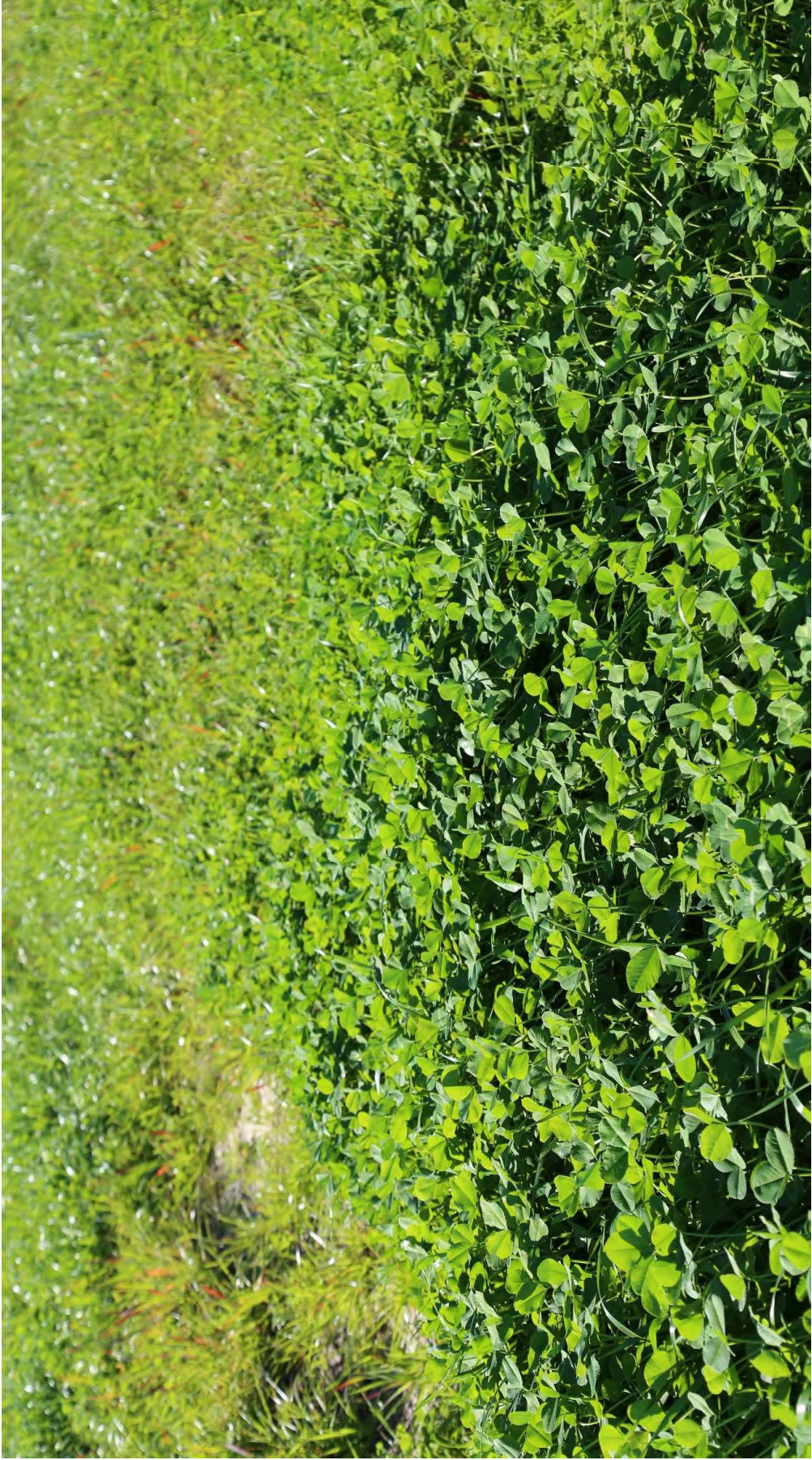
Mineral sands mining in Western Australia



Western Australia Mineral Sands Mine

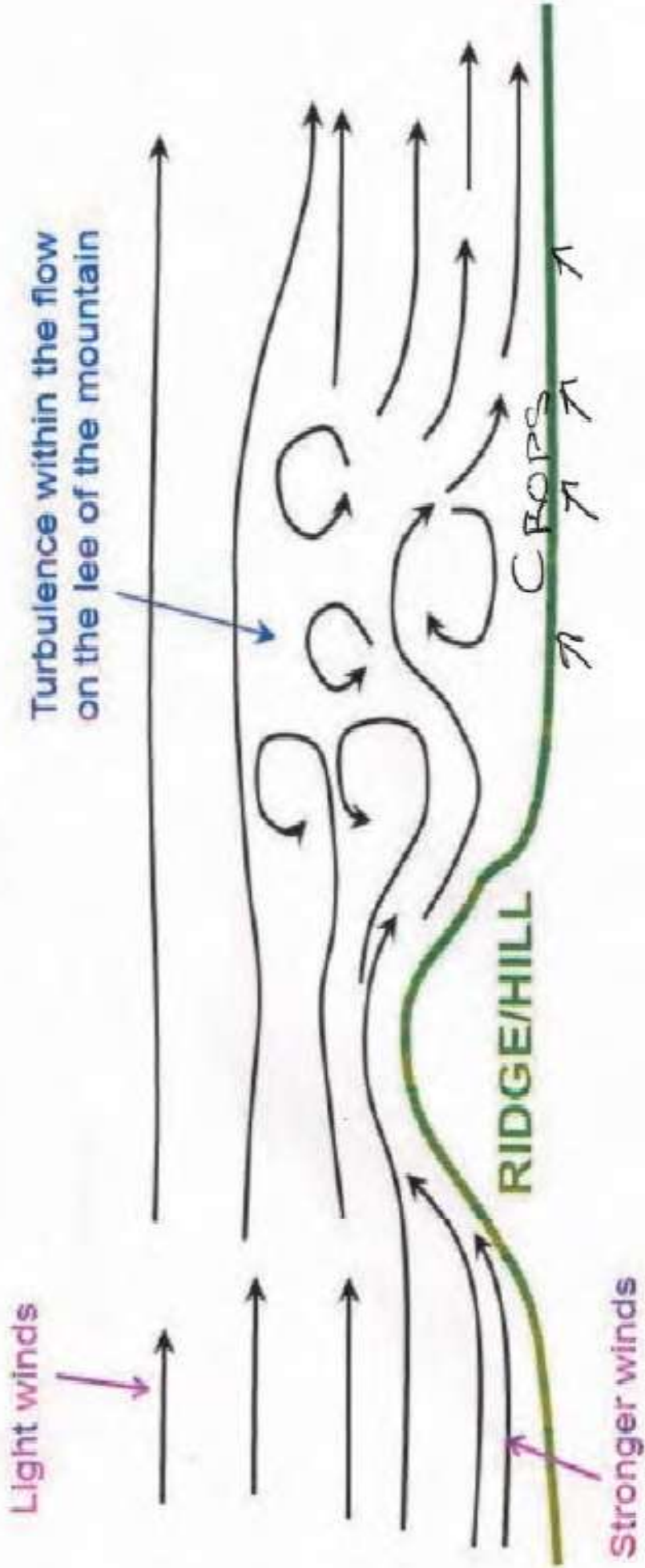


Mineral sands mining Western Australia



Western Australia

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Mineral sands mine in Western Australia



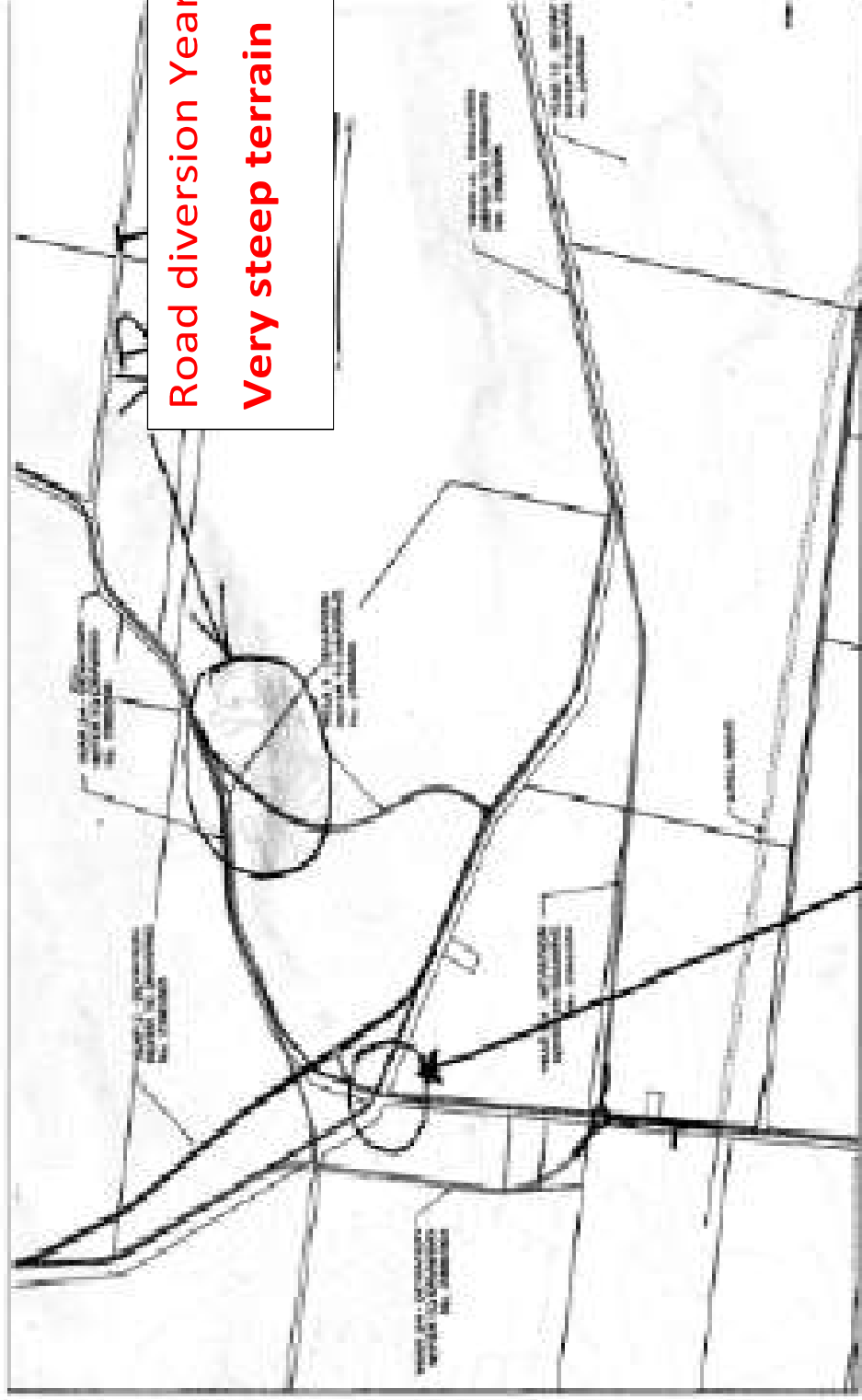
Mineral sands stockpile exposed to wind



Stockpile at a Mineral Sands mine in Western Australia



Wind impact on stockpiles



Road diversion Year 1
Very steep terrain

Fingerboards.

Fingerboards
Intersection

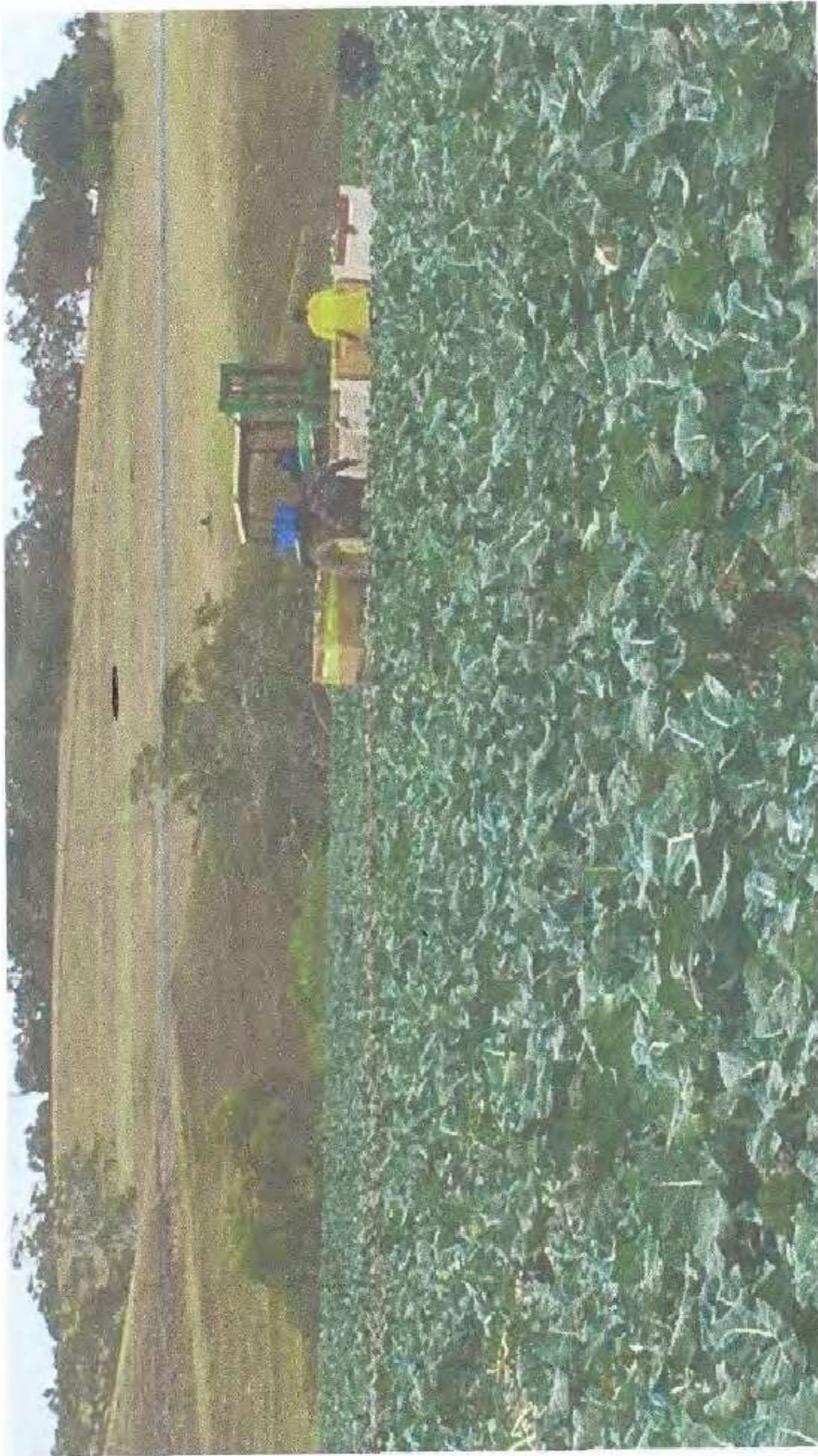


Figure - 4 Vegetable fields below proposed mine that will be near the row of trees on the upper ridge

November



"There is always something that could be done. Some days we only get milking and feeding done, but that's OK!"



BEN & EMMA PENDER - GLENALDALE

