



11 ASSESSMENT OF OTHER ENVIRONMENTAL FACTORS

11.1 Amenity

11.1.1 Introduction

This section assesses the potential impacts on amenity during both construction and operation of the Proposal. Mitigation and management measures are identified to avoid or reduce potential impacts with the objective *to 'ensure that impacts to amenity are reduced as low as reasonable practicable'* in accordance with the EPA's Environmental Assessment Guideline No. 8 (2015a).

The assessment has also been prepared with reference to the applicable standards, guidelines and procedures listed in Chapter 4, Table 4-3 and in accordance with the requirements set out in the ESD which is presented in Appendix A.1.

11.1.2 Methodology

The methodology for assessing impacts on amenity included a review of the potential environmental impacts documented in other sections of this chapter and a reinterpretation of these impacts from a community-focused perspective.

11.1.3 Assessment of potential impacts and risks

Impacts on amenity during construction and operation of the Proposal include noise, dust and other issues such as the visibility of the Proposal. These impacts are discussed below.

Noise emissions

Construction and operation of the Proposal would generate noise during day time hours only. Noise generated during construction would include that from earthmoving and from truck movements and the use of construction equipment and machinery. Noise generated during operation would include that from mining (e.g. blasting and processing of ore) and subsequent waste disposal activities, and from truck movements and the use of operational equipment and machinery. At night, the only noise is likely to be associated with onsite power generation, but this plant would be noise attenuated to limit occupational noise impacts.

The nearest sensitive receptor to the Proposal is the IWDF, which is located approximately 5.5 km east of the proposed development envelope (refer to Figure 1-4). The IWDF operates infrequently on a campaign style basis during day time operating hours, with the most recent operation being conducted in 2008. This site has permanent camp facilities to accommodate five personnel, however, no permanent workforce is located there. Given the distance from the proposed development envelope to the camp facilities at the IWDF, the infrequent operations at the IWDF,



similar operating hours (during a campaign) to the Proposal (i.e. day time) and the low numbers of temporary workers, noise impacts are highly unlikely to impact people at the IWDF.

Other sensitive receptors located in the vicinity to the proposed development envelope include the Jaurdi Homestead (approximately 51 km away), the Carina Iron Ore Mine Accommodation Village (approximately 52 km away), and Koolyanobbing (approximately 75 km away). Given the significant distance from the proposed development envelope to these sensitive receptors, noise impacts would be negligible.

Impacts on workers at the Carina Iron Ore Mine (approximately 13 km away) and J4 Iron Ore Mine (approximately 63 km away), both of which are industrial premises, are also predicted to be negligible due to distance (refer to Figure 11-1).

Impacts from noise on workers within the onsite accommodation camp have also been considered; however, as site operations would occur during day time hours only, no impacts on workers within the accommodation camp would occur.

Dust

Concerns about amenity from dust often relate to ‘visibility’ of dust plumes and dust sources. Visible dust usually has a particle size larger than 10 µm and at high levels may reduce visibility and amenity. Visible dust is usually due to short-term episodes of high emissions, such as from blasting, however, other activities such as vegetation stripping, topsoil and subsoil stripping, excavation of cells, truck movements and processing may also generate visible dust. The impact of dust on local amenity mainly depends on the distance from the source to nearby receptors.

As discussed above, the nearest permanent sensitive receptors to the proposed development envelope are tourists staying at the Jaurdi Homestead (approximately 51 km away) and residents of the Carina Iron Ore Mine Accommodation Village (approximately 52 km away). Blasting would only be undertaken for a matter of seconds once per year with the other mining activities not likely to generate substantial volumes of dust due to the small area of disturbance at any one time.

Given the distance to these receptors, the remote location of the proposed development envelope, the short timeframes for dust generation from blasting and other mining activities, and the adoption of standard dust control practices (including the processing of ore in an enclosed building), dust emissions would not reduce the amenity in the vicinity of these receptors.

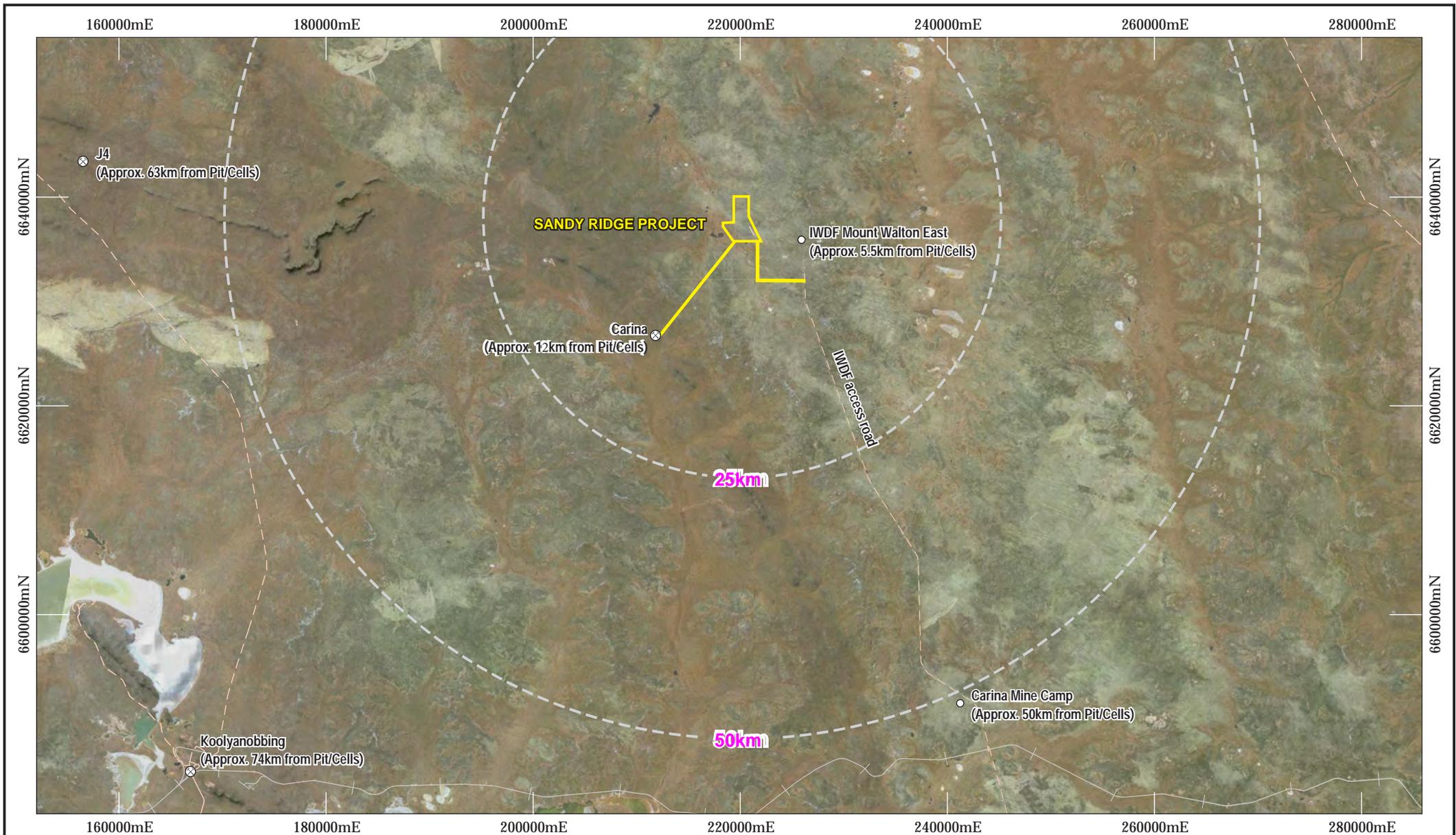
Visual amenity

The impacts on the visual amenity of people (identified as tourists and scientists) using the Mount Manning Range Nature Reserve, Mount Manning – Helena and Aurora Ranges Conservation Park and the former Jaurdi Pastoral Lease have been considered in terms of travel routes/access tracks and the use of public view points. It should be noted that impacts on visual amenity are considered to be subjective with the level of perceived impact likely to vary between stakeholders.



Access would not be restricted to the Mount Manning Range Nature Reserve, Mount Manning – Helena and Aurora Ranges Conservation Park or the former Jaurdi Pastoral Lease. Access to these areas is primarily made via Koolyanobbing, approximately 75 km south-west of the proposed development envelope.

The Proposal would also not be visible from the nearest boundary of the Mount Manning Range Nature Reserve, Mount Manning – Helena and Aurora Ranges Conservation Park or the former Jaurdi Pastoral Lease. It would also not be visible from the public viewpoint located at the highest point of the Mount Manning – Helena and Aurora Ranges Conservation Park. Photo simulations reflecting the viewpoints from each of these locations have been generated and are shown in Figure 11-2 to Figure 11-5.



Legend:
⊗ Iron Ore Mine
— Development Envelope
++ Rail
— Major Road
- - - Minor Road



0	10km
Scale 1:500,000	
MGA94 (Zone 51)	
CAD Ref: g2294_PER_09_08.dgn	
Date: Nov 2016	Rev: C
	A4

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Sandy Ridge Facility
Nearest receptors
Public Environmental Review

Figure:
11-1



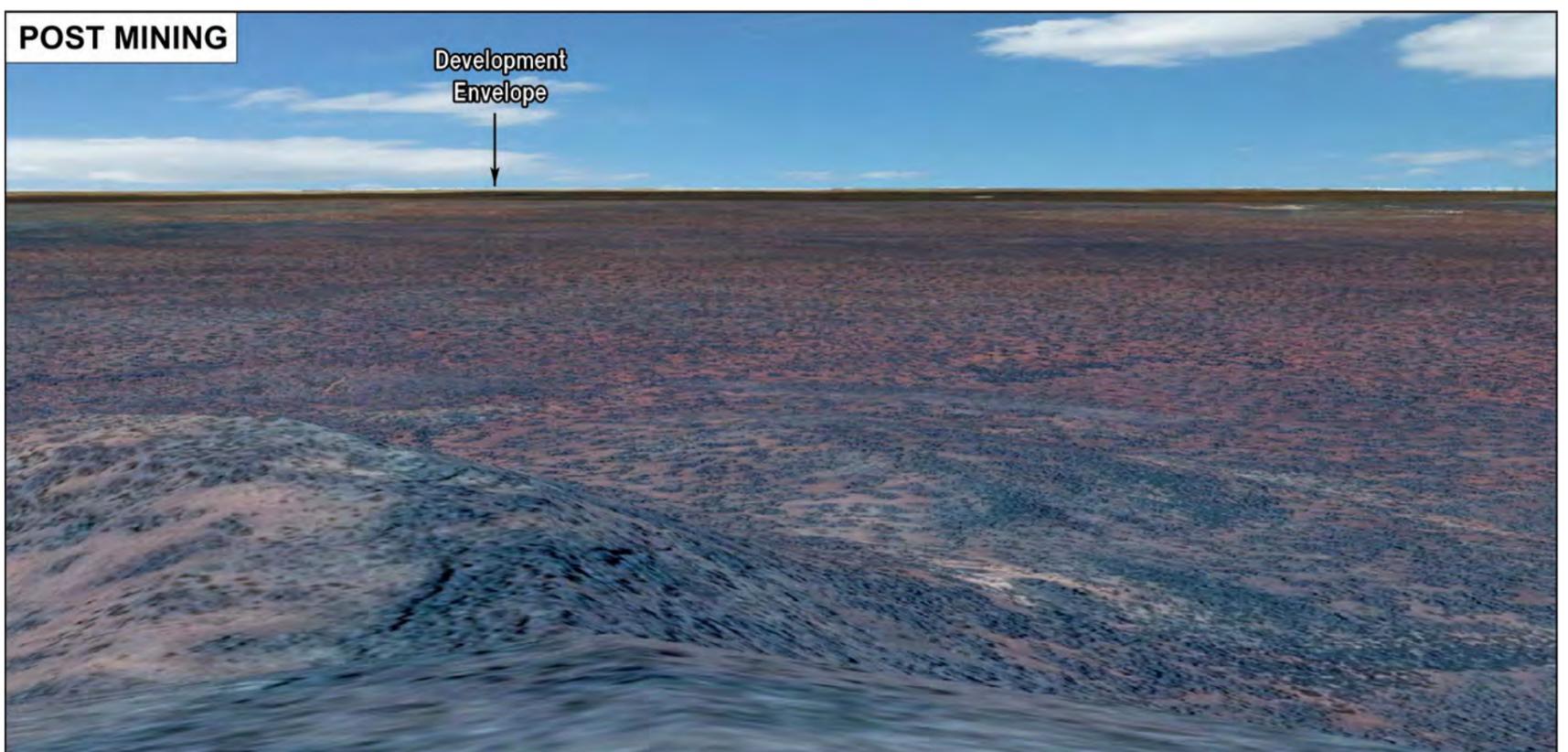
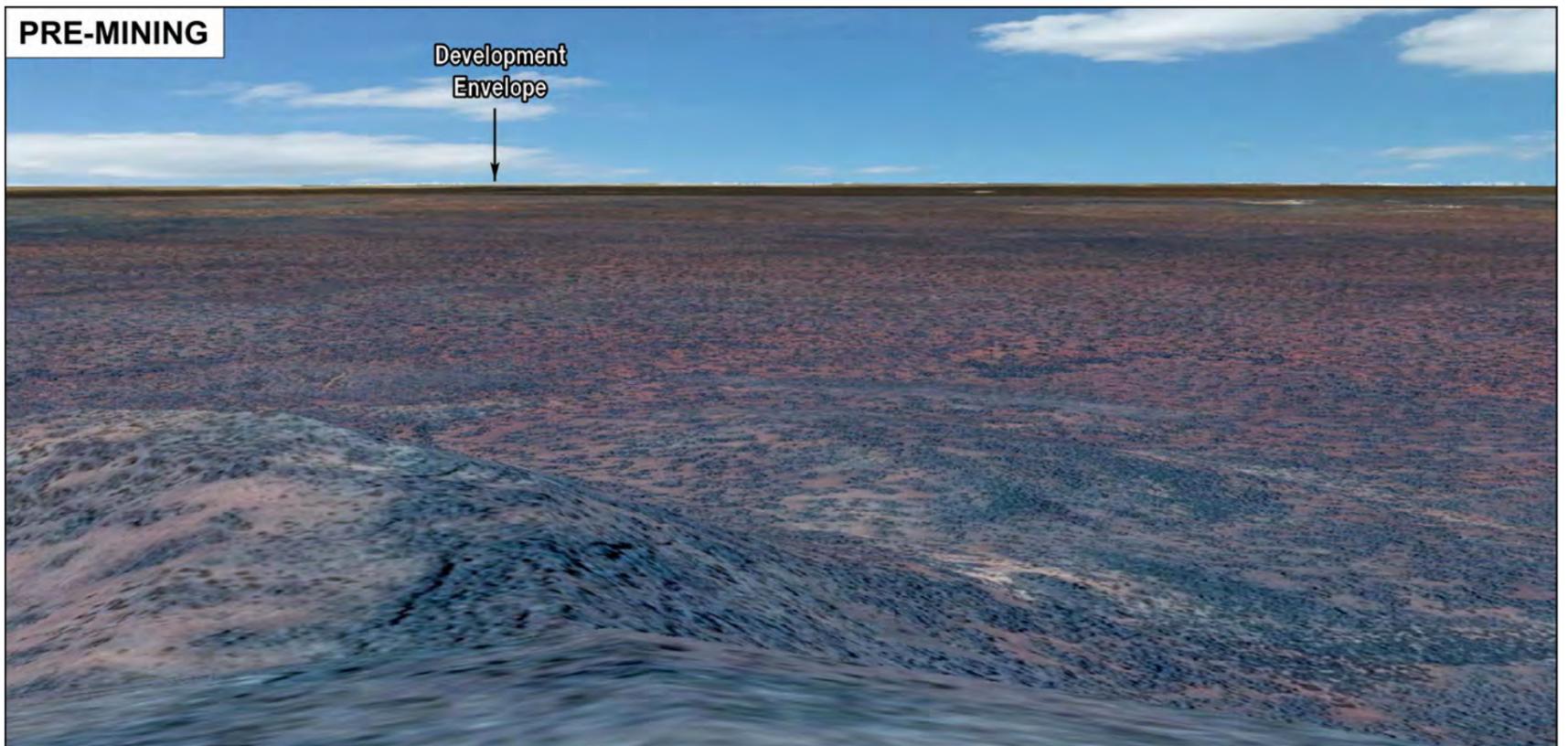
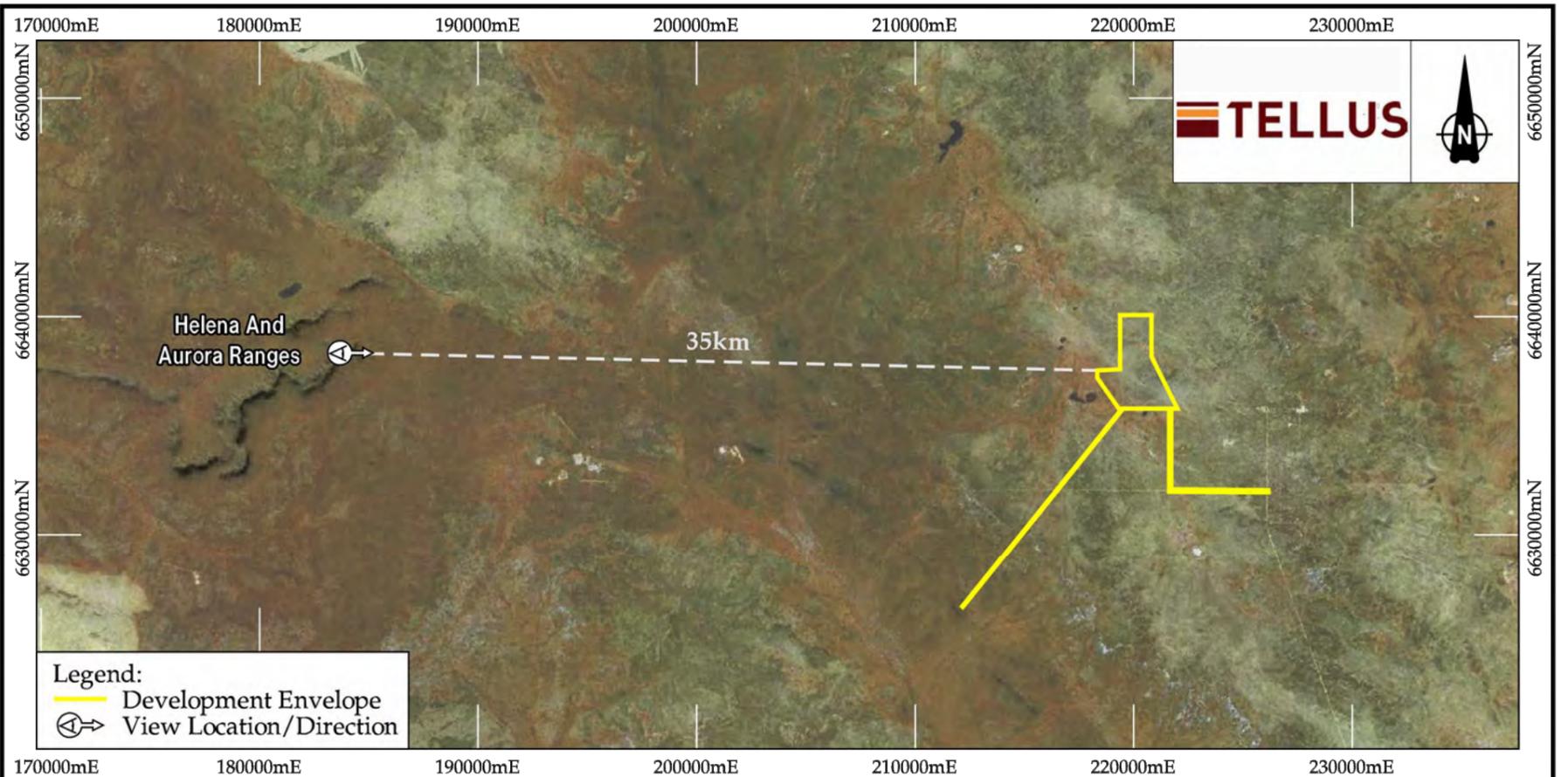
11.1.4 Proposed mitigation and management measures

Although there would be no reduction in amenity as a result of noise, dust or visual impacts, the following mitigation and management measures would be implemented during construction and operation of the Proposal:

- Dust suppression and management measures would be implemented to minimise dust impacts where possible. This would include:
 - Application of dust suppression methods along internal access roads and hard stand areas using watercarts during dry, dusty periods.
 - Weather conditions would be monitored prior to mining activities most likely to generate dust (i.e. vegetation removal, topsoil and subsoil stripping, and blasting).
 - Dust deposition gauges would be installed on the proposed development envelope boundaries nearest to the IWDF and the former Jaurdi Pastoral Lease and monitored quarterly for the initial 12 months. The final locations of dust deposition gauges would be identified in consultation with the DER.
- Best practice noise management would be implemented during operation of the mine to ensure compliance is achieved with the Environmental Protection (Noise) Regulations 1997.
- Disposal cells would be rehabilitated on completion of subsidence monitoring with the objective of producing a surface slightly mounded above the existing natural surface that is vegetated.
- Following closure of the mine, all mining related infrastructure would be removed and disturbed areas would be rehabilitated.

11.1.5 Predicted environmental outcome

There would be no reduction in amenity as a result of noise or dust within the local area, or impacts on visual amenity for people using the Mount Manning Range Nature Reserve, Mount Manning – Helena and Aurora Ranges Conservation Park or the former Jaurdi Pastoral Lease. Mitigation and management measures would also further reduce amenity impacts (e.g. best practice noise and dust suppression mitigation measures and rehabilitation of the proposed development envelope upon closure). As such, the EPA's objective to ensure that impacts on amenity are reduced as low as reasonable practicable would be achieved.



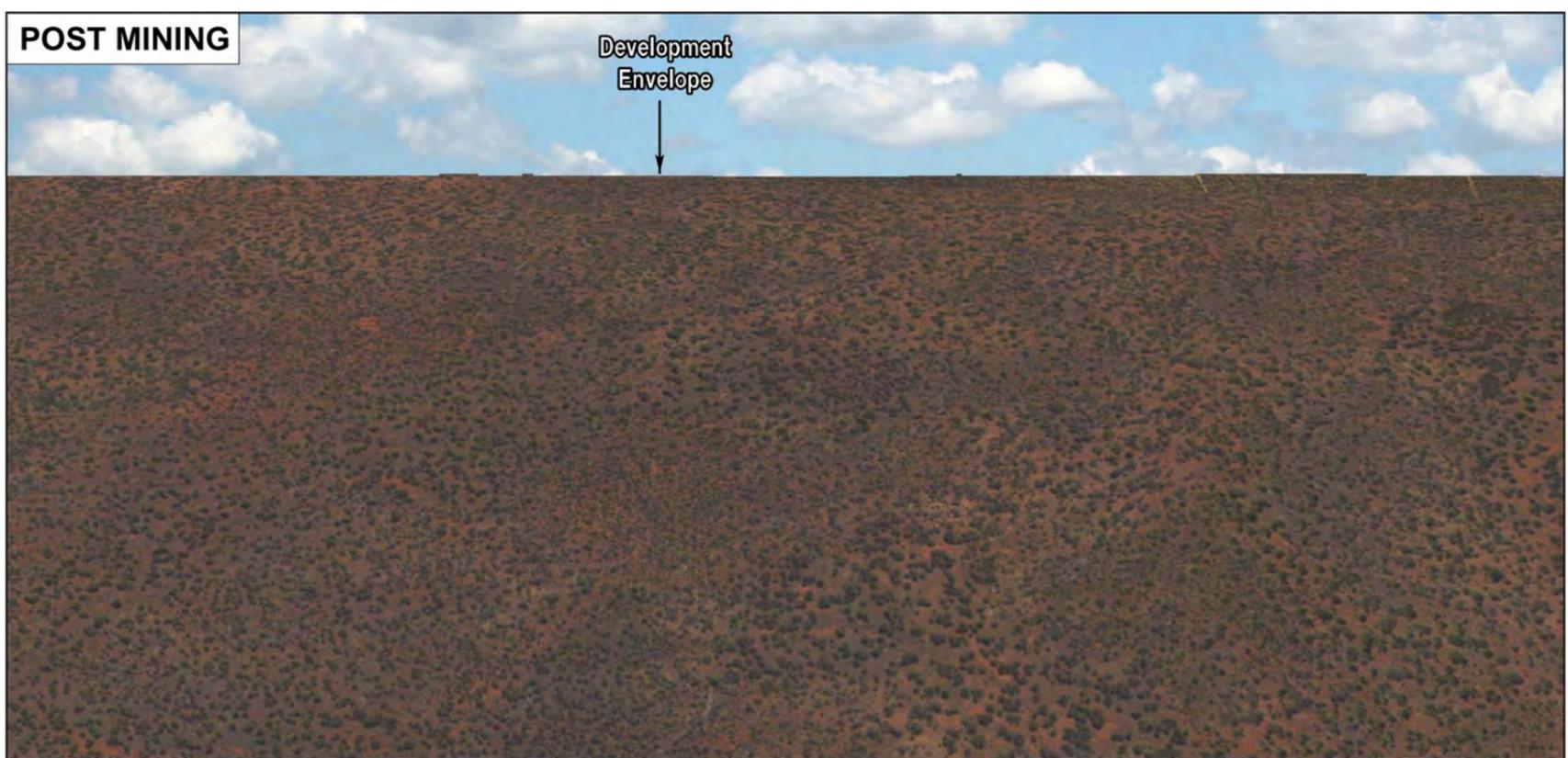
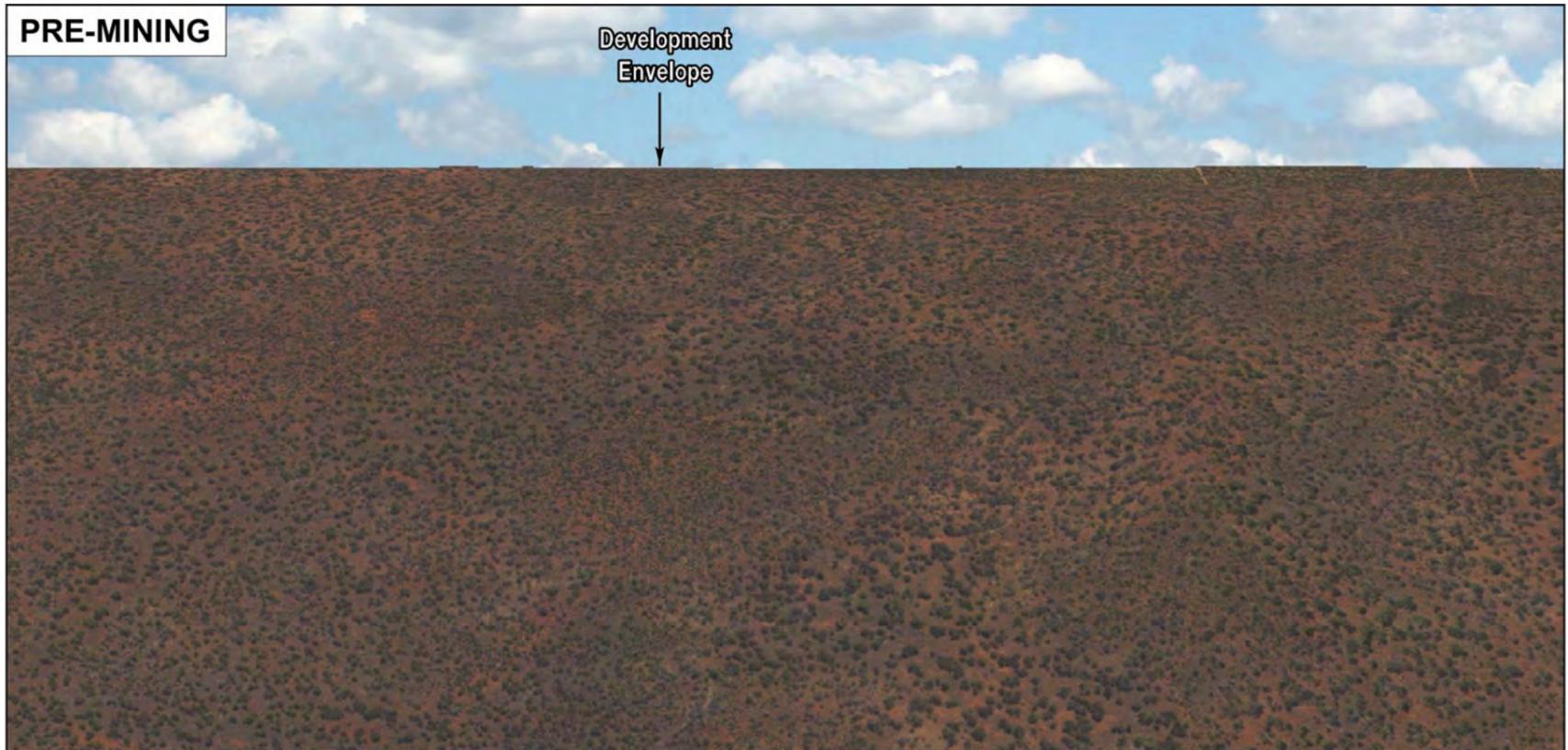
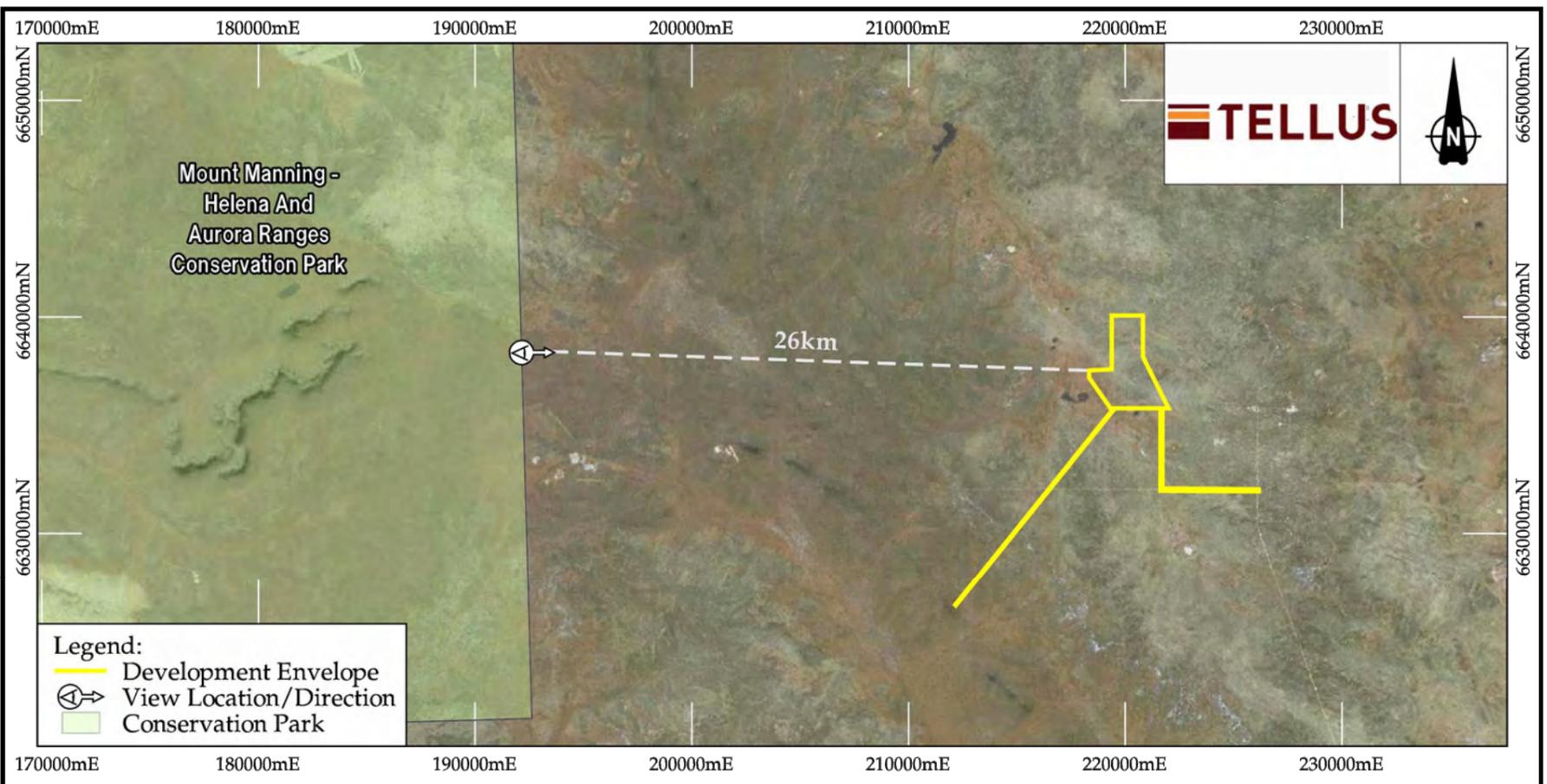
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 Scale 1:400,000
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 Date: November 2016 Rev: B A4

Aurora
 environmental

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Sandy Ridge Facility
**Top of Helena and Aurora Ranges
 Conservation Park**
 Public Environmental Review

Figure:
11-2



0 5km

Scale 1:400,000
MGA94 (Zone 51)

CAD Ref: g2294_PER_09_07.dgn

Date: November 2016 Rev: B **A4**

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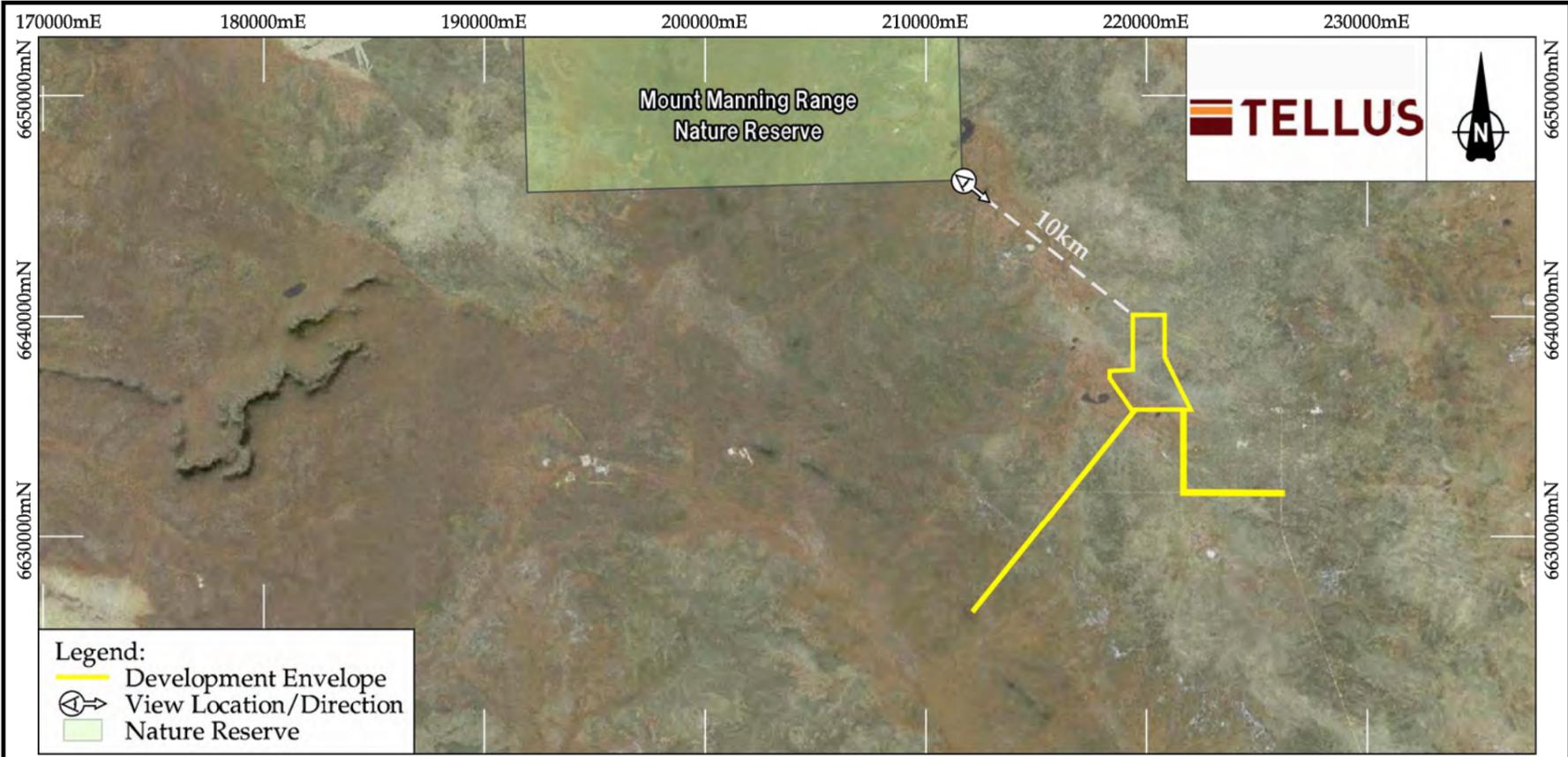
Sandy Ridge Facility

Top of Mount Manning - Helena and Aurora Ranges Conservation Park

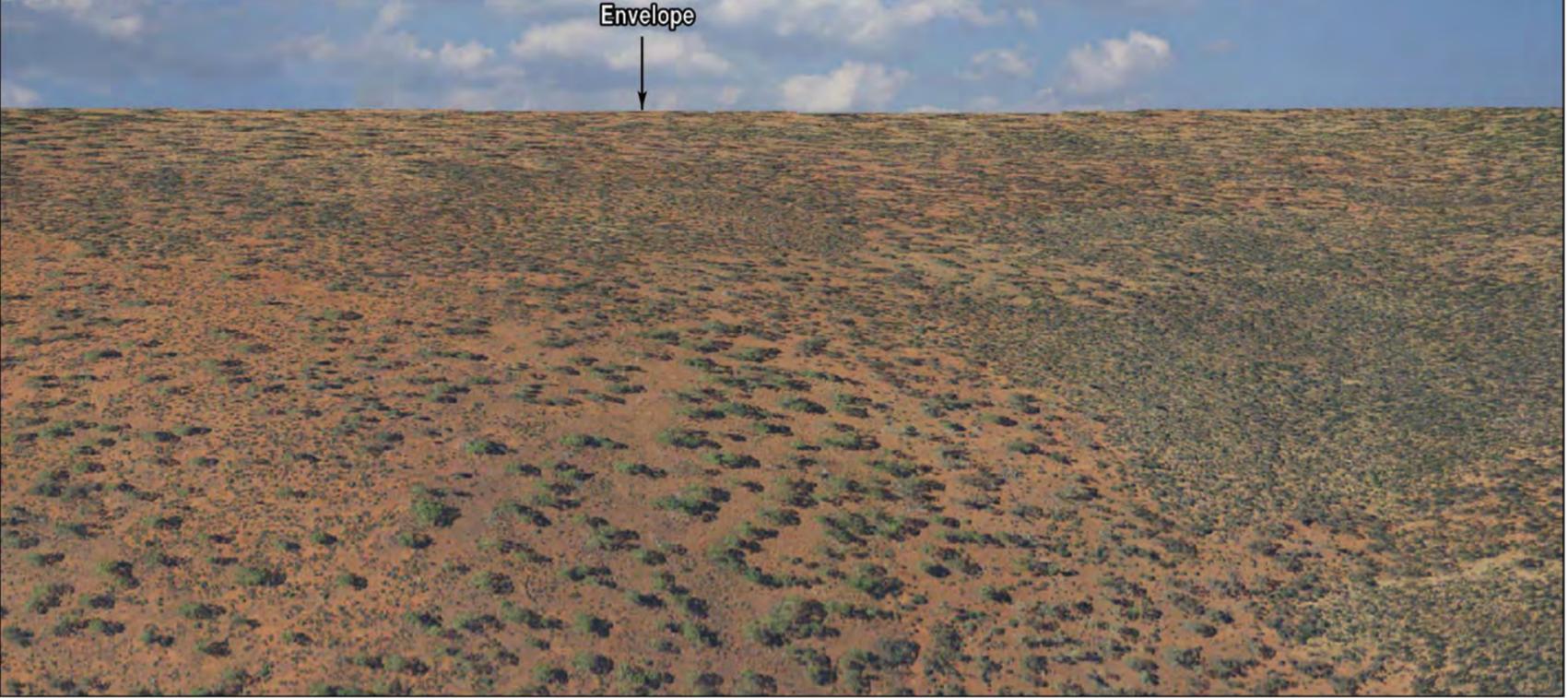
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Figure:

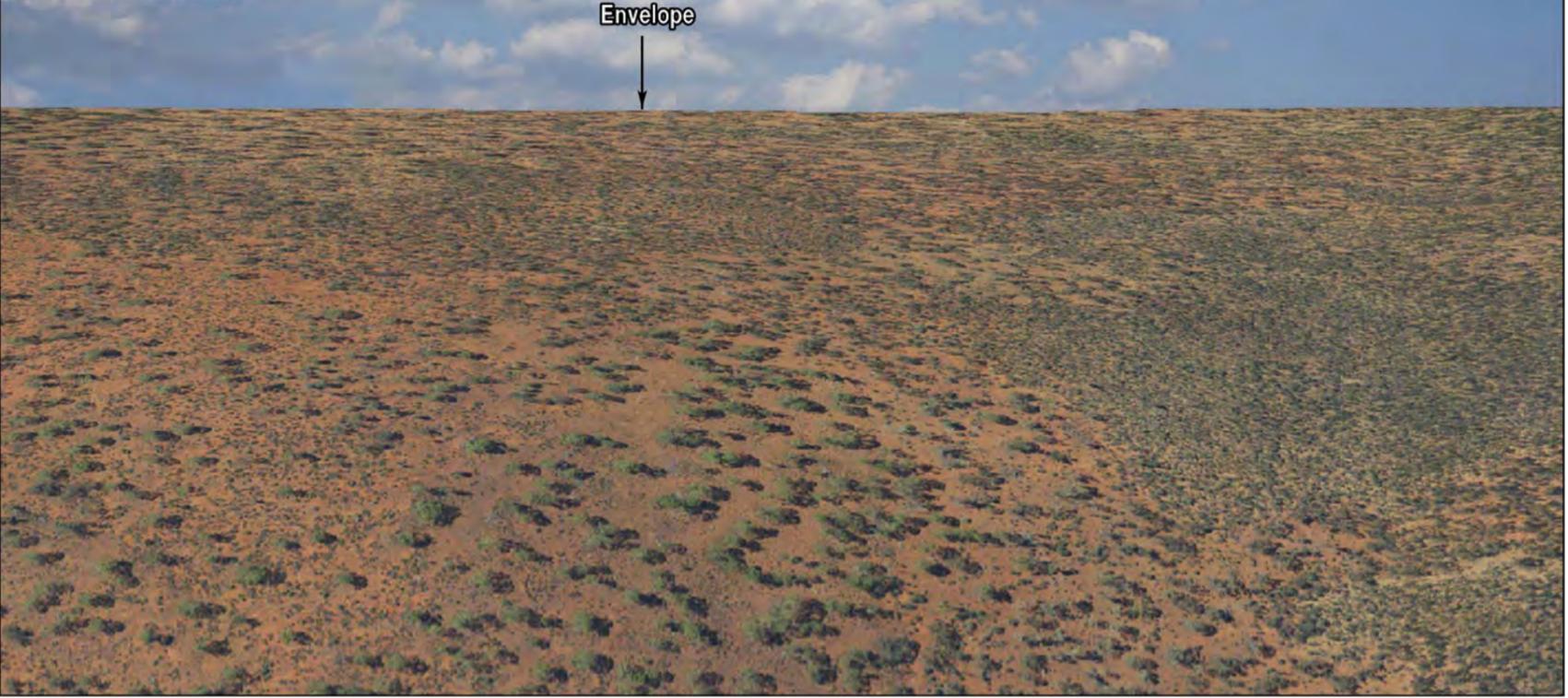
11-3



PRE-MINING



POST MINING

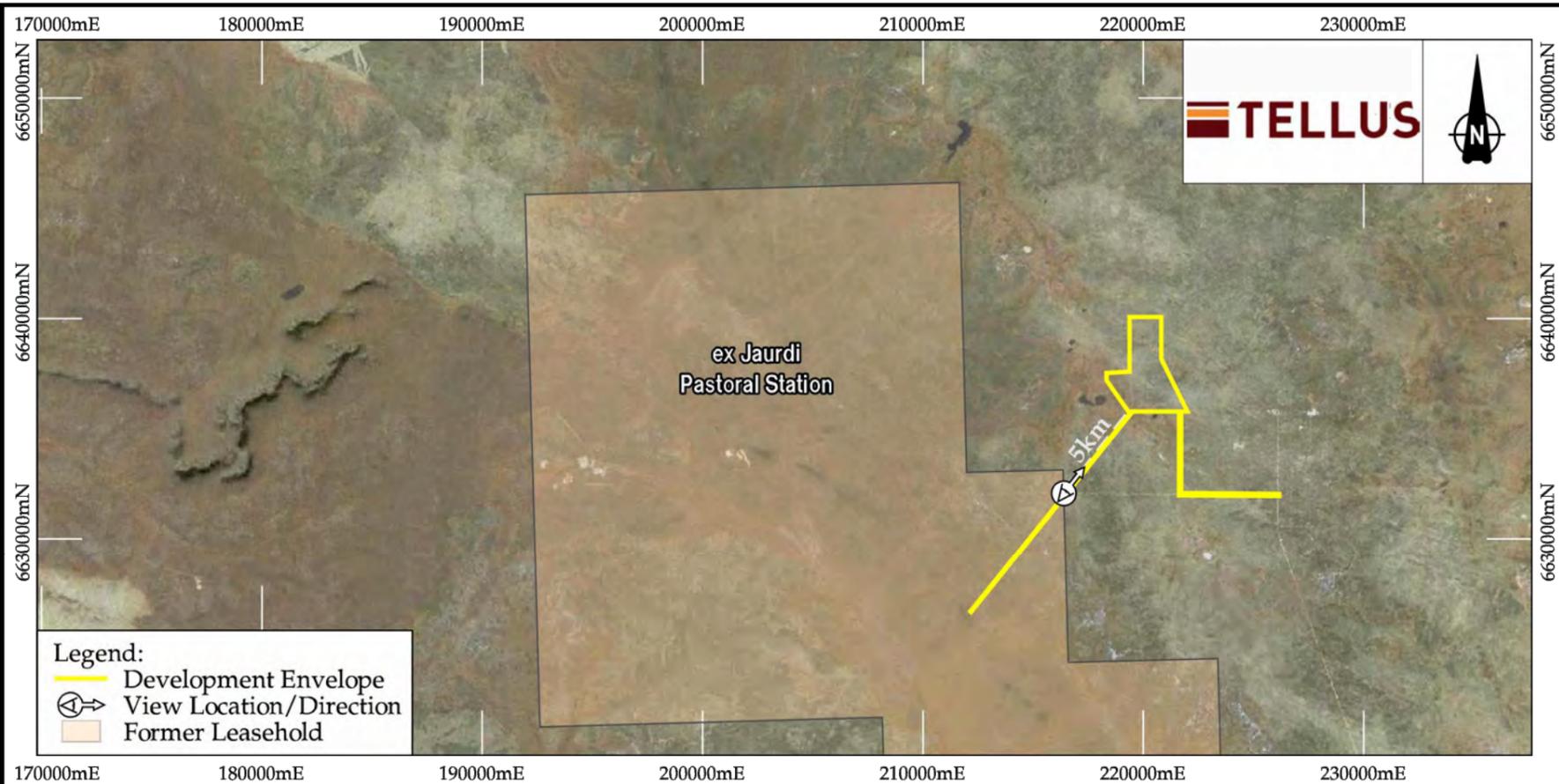


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 MGA94 (Zone 51)
 CAD Ref: g2294_PER_09_08.dgn
 Date: November 2016 Rev: B A4

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Sandy Ridge Facility
**Mount Manning Range
 National Reserve**
 Public Environmental Review

Figure:
11-4



PRE-MINING



POST MINING



0 5km
Scale 1:400,000
MGA94 (Zone 51)
CAD Ref: g2294_PER_09_09.dgn
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Sandy Ridge Facility
Previous Jaurdi pastoral station
Former Leasehold
Public Environmental Review

Figure:
11-5



11.2 Controlled nuclear action

11.2.1 Nuclear action

Under the EPBC Act, the environment is afforded protection from nuclear actions as a matter of national environmental significance. It is proposed that the Facility would accept the materials listed below that may meet or exceed the threshold concentrations and activities prescribed in Schedule 2 Part 2 of the Australian Radiation Protection and Nuclear Safety Regulations 1999 (Cth):

- Materials containing NORMs generated by industries such as the oil and gas, mining, agricultural, government and industrial sectors. For further clarification, NORMS are radionuclides that are found in the natural environment in a variety of bulk commodities, process wastes and commercial items, sands, clay and soils, rocks, coal, groundwater, oil and gas, metal ores and non-metal ores including fertiliser raw materials such as rock phosphate and apatite (Radiation Health and Safety Advisory Committee, 2005). Processing can modify the NORMS concentrations in the products, by-products and wastes (residues).
- Medical radioisotopes (e.g. X-rays used by doctors, dentists and medical researchers). Radioisotopes are used in the medical profession to provide diagnostic information, treat some medical conditions (e.g. radiotherapy is used in cancer treatment) and to sterilise medical equipment (World Nuclear Association, 2015). Medical isotopes that would be accepted at the Facility would be associated with spent medical equipment, paper, rags, tools, clothing and filters mostly with short-lived radioactivity.
- Commercial and domestic radioactive equipment such as grain moisture metres, disused smoke alarms and gauges.

Accordingly, the Proposed Action may be defined as a ‘nuclear action’ as it involves:

- Establishing a nuclear installation pursuant to Section 22(a) of the EPBC Act. A ‘nuclear installation’ means ‘a nuclear waste storage or disposal facility with an activity that is greater than the activity prescribed by regulations made for the purposes of this section’.
- Establishing a large-scaled disposal facility for radioactive waste pursuant to Section 22(e) of the EPBC Act. ‘Radioactive waste’ means radioactive material for which no further use is foreseen. ‘Large-scale disposal facility’ for radioactive waste means, if regulations are made for the purposes of this definition, a facility prescribed by the regulations. For the definition of large-scale disposal facility in subsection 22(2) of the Act, a facility used for the disposal of radioactive materials at or above the activity level mentioned in regulation 2.02 is prescribed (Environment Protection and Biodiversity Conservation Regulations 2000 – Regulation 2.03).
- An action prescribed by the regulations pursuant to Section 22(g) of the EPBC Act. A nuclear action includes establishing a facility where radioactive materials at or beyond the activity level mentioned in regulation 2.02 are, were, or are proposed to be stored (Environment Protection and Biodiversity Conservation Regulations 2000 – Regulation 2.01).

The Proposal is therefore, a nuclear action.



11.2.2 Assessment of significant impacts on the whole environment

For Proposals that are considered to be nuclear actions, the proponent must describe the nature and extent of likely impacts (both direct and indirect) on the whole environment. This PER document (specifically Chapters 7 to 9) describes the:

- Existing environment in which the Proposal would be located.
- Potential impacts of the Proposal on the whole environment.
- Proposed impact avoidance, mitigation and management measures.

To determine if a proposal's impacts are considered 'significant', the general test for significance applies – that is, whether an impact is: *'important, notable or of consequence, having regard to its context or intensity'*.

In terms of the Proposal's context, the quantity of radioactive waste that would be permanently isolated at Sandy Ridge would be small in the context of the total volume of all wastes proposed to be accepted each year (up to 100,000 tonnes). Approximately 5% of the annual acceptance volume would likely be LLW, but this depends entirely on the volume of waste in the market. Once legacy wastes (which are currently stockpiled around the country) are accepted, the volume of LLW accepted at the Facility would likely decrease.

It is highly unlikely the disposal of LLW would affect:

- People or a community, given the nearest permanent residents are located over 50 km from the proposed Facility. The nearest permanent settlement (Koolyanobbing) is 75 km away. The area surrounding the proposed development envelope is not currently utilised for any specific purpose by the community.
- Water resources, as there are none in the proposed development envelope.
- Landscape, soils, plants or animals, as radioactive material would be isolated sub-surface and revegetation undertaken to rehabilitate the surface of the cells.
- Heritage values or features, as the proposed development envelope has no special environmental features and no special cultural or historical significance.

Therefore, the post management impacts on the environment and people from the handling and storage of LLW are considered to be insignificant. The assessment of significance is summarised in Table 11-1.

Monitoring of the environment and human exposure plays a significant part in ensuring compliance with regulatory standards and minimising any impact on the environment. The proponent's approach to radiation monitoring is set out in Section 5.20 and presented in more detail in Section 10 of Appendix A.14 RMP.



Table 11-1 Assessment of significance of potential residual impacts

Significance of impact	Environmental factor						
	Vegetation and flora			Terrestrial fauna			
Significant residual impacts that would require an offset	Impact on or removal of buffers or other areas necessary to maintain ecological processes and functions for species declared as rare flora under the WC Act or listed as threatened under the EPBC Act.	Impact on or removal of habitat necessary to maintain ecological communities declared as environmentally sensitive areas under the EP Act or listed as threatened ecological communities under the EPBC Act.	Impacts where the existing vegetation is highly cleared (such as complexes with <30% of its pre-clearing extent remaining in a bioregion.	Impact on or removal of buffers necessary to maintain conservation significant wetlands (such as Environmental Protection Policy wetlands, Ramsar wetlands, Conservation Category Wetlands.	Impact on areas reserved under statute or managed for the purpose of conservation e.g. National Parks, Marine Parks, Bush Forever Sites, and Conservation Covenants.	Significant impact on areas recognised as having high biological value (e.g. nationally or internationally recognised biodiversity hotspots) or habitat supporting listed migratory species (such as JAMBA, CAMBA, ROKAMBA).	Impact on or removal of habitat necessary to maintain species declared as specially protected under WC Act or listed as threatened species under the EPBC Act.
Significant residual impacts that may require an offset	Impact likely to result in a species being listed as rare under the WC Act or listed as threatened under the EPBC Act.	Impact likely to result in an ecological community being declared as environmentally sensitive under EP Act or listed as threatened ecological community under EPBC Act.	Impacts in landscapes where the existing vegetation is required to maintain ecosystem services, impact causes a high degree of fragmentation.	Clearing of native vegetation that is watercourse or wetland dependent (such as damplands and floodplains).	Impacts on ecological linkages between conservation areas, contributing to the maintenance or restorability of one or more key ecological processes required to sustain the conservation	Impacts on communities or species that are representative of high biodiversity, have a higher diversity than other examples of an ecological community in a bioregion, or is in 'degraded' condition yet is in better condition	Impact likely to result in a species being listed as specially protected under WC Act or listed as threatened under EPBC Act or impact affects significant



Significance of impact	Environmental factor						
	Vegetation and flora				Terrestrial fauna		
					areas or expanding the functional size of an existing conservation area or partially compensating for less than ideal shape.	than other vegetation of the same ecological community in the local area.	habitat for a species.
Assessment of Proposal	No species listed as Threatened under the WC Act or EPBC Act are within the proposed development envelope.	No Environmentally Sensitive Areas listed under the EP Act or listed as TECs under the EPBC Act are within the proposed development envelope.	Clearing for the Proposal would affect Beard vegetation associations 141, 437, 538 and 435. The area to be cleared represents <1% of their current remaining extent. These Beard vegetation associations have greater than 97% of their pre-European extent remaining and are well represented within the Southern Cross IBRA subregion.	No conservation significant wetlands or native vegetation that is associated with a watercourse or wetland dependent (such as damplands and floodplains) is within the proposed development envelope.	Clearing for the water pipeline would disturb 13.32 ha of vegetation within the former Jaurdi Pastoral Lease, which includes 6.44 ha of vegetation within the proposed Conservation and Mining Reserve. This represents <1% of vegetation within the former Jaurdi Pastoral Lease and <1% of vegetation within the Proposed Conservation and Mining Reserve. No conservation	No significant impacts on areas recognised as having high biological value or habitat supporting listed migratory species would occur as a result of implementing the Proposal. The high biodiversity conservation values of the Mount Manning Region are predominantly associated with BIF ranges (EPA, 2007). The proposed development	Clearing for the Proposal would not impact habitat necessary to maintain species declared as specially protected under WC Act or listed as threatened species under the EPBC Act. Malleefowl are likely to occur in the proposed development envelope but only as an occasional visitor. The Malleefowl



Significance of impact	Environmental factor						
	Vegetation and flora				Terrestrial fauna		
					significant flora or vegetation would be cleared for the water pipeline.	envelope does not contain BIF or conservation significant flora or vegetation. Although the sandy soils within the proposed development envelope would potentially be suitable breeding habitat for the Rainbow Bee-eater, no recently used burrows were observed within the proposed development envelope. Therefore, Rainbow Bee-eaters may be present transiting across the proposed development envelope only.	favours gravelly soils for mound construction and these lie mostly outside the proposed development envelope (BCE, 2016). Clearing for the proposal would not result in any species being listed as specially protected under WC Act or listed as threatened under EPBC Act. Abundant similar habitat is located immediately adjacent to the development and clearing impacts would not affect significant habitat for any species.



Significance of impact	Environmental factor						
	Vegetation and flora				Terrestrial fauna		
Does the Proposal meet the EPA's objective for this environmental factor (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes