

Appendix 60 Landscape and Visual Impact Assessment – O’Neil East



Landscape and Visual Impact Assessment

O'Neil East

Alcoa of Australia Limited

30 October 2024



The Power of Commitment



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Executive Summary

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.3 and the assumptions and qualifications contained throughout the Report.

Alcoa engaged GHD Pty Ltd to prepare a Landscape and Visual Impact Assessment (LVIA) for the Holyoake Mine Study Area, part of the Huntly Mine. This report assesses potential landscape and visual impacts of mining within the O'Neil East region Study Area. The assessment area for this report is generally confined to the likely extent of visibility of the O'Neil East Study Area within the surrounding context (approximately 10 km around the O'Neil East Study Area).

Method

This assessment is informed by a desktop review, a site inspection (from 21-23 August 2022), identified landscape character units and values, and a review of previous studies within a similar landscape context. The LVIA assesses potential landscape and visual impacts from five viewpoints (sensitive receptor locations) and includes three photomontages of the proposed works. The findings of the assessment, including mitigation and management measures to reduce negative impacts, are related to both the landscape character units and viewpoints.

Due to the Darling Plateau's valued natural setting and the quality seen throughout the surrounding forest and landscape, multiple sensitive receptors of varying levels of significance were identified within the LVIA, including residents, track and trail users, recreational users, campers, tourists, and road users. Community and stakeholder engagement included concerns regarding visual impact on the nearby communities, State Forests, tracks, trails, camps, and roads.

O'Neil East Study Area Summary

The O'Neil East Study Area includes potential mining earthworks (e.g., mine pits and haul roads), infrastructure (e.g., conveyor belts, haul roads, buildings, vehicle wash bays, maintenance and storage sheds, crushers), construction machinery and activity, and vegetation clearing and rehabilitation.

LVIA Findings

A variety of established vegetation is present within the assessment area's State Forest, which are predominantly native forest with some old growth Jarrah Forest, replanted native forest and pine and blue gum plantations. The vegetated landscape is cut by steep river valleys and studded with granite outcrops.

Two Landscape Character Units within the assessment area were identified and assessed:

- **LCU1 Darling Plateau Forest** - the magnitude of change and overall significance of impact from the O'Neil East Study Area was assessed as high, due to the valued forest area and high sensitivity and susceptibility to change.
- **LCU2 Previous and Existing Mining** - generally low significance of impact on key features of the existing landscape character due to the low sensitivity to change and magnitude of change. Anticipated changes associated with the O'Neil East Study Area would not be out of character within LCU2.

Of the five viewpoint locations chosen for visual assessment, the most significant impacts would be experienced from VP02 (Boonering Hill), due to the highly sensitive receptors on the Bibbulmun Track, valued views within the State Forest, and the moderate magnitude of proposed change associated with the construction and operation of the O'Neil East Study Area.

Moderate impacts would be afforded from VP01 (Mount Wells) and (VP05 Mount Cooke), due to the distance of sensitive receptors from the proposed activity which would reduce the impacts on these views. Moderate impacts would also be afforded from VP03 (North East Road 1) and VP04 (North East Road 2), as the magnitude of change would be high from these receptors, however they have a low sensitivity as local unsealed roads with limited users.

The visual impacts associated with construction would be considered to have a short-term impact and the duration of the operational impacts would be medium-term. Progressive rehabilitation would occur concurrent to mining operations, on closure of first mine pits, Rehabilitation would be permanent once the vegetation is established.

Photomontages were created for VP01 (Mount Wells), VP02 (Boonering Hill) and VP05 (Mount Cooke) to illustrate the proposed views from sensitive receptor locations.

Mitigation and Management Measures

Visual management objectives defined for the assessment area include:

- Best practice siting and design of the O’Neil East Study Area away from sensitive locations, including the Bibbulmun Track
- Protection and maintenance of existing landscape character, such as the valued views of the dense forest
- Restoration or enhancement of degraded landscape character, seeking opportunities for planned rehabilitation of the original landform or vegetation.

Key landscape character recommendations include minimising vegetation removal through consolidation of O’Neil East Study Area haul roads and mine pits throughout the Dwellingup State Forest.

Key visual recommendations include:

- Minimising the location of proposed haul roads and mine pits away from existing road corridors such as the Albany Highway and establishing distances and requirements for the retention of existing vegetation between public road corridors and proposed haul roads and mine pits
- Where possible minimising landscape and visual impacts to recreational facilities including trails, track and campsites and their access routes through the provision of screening corridors suitable to the area.

Conclusion

By implementing the recommended mitigation and management measures, in addition to the proposed rehabilitation of key sites, there is potential to further reduce the landscape and visual impacts of the O’Neil East Study Area.

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Appendix A	Photomontages
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1. Introduction

1.1 Overview of the Proposal

Alcoa of Australia Limited (Alcoa) is proposing to progressively transition to the Holyoake Mine Study Area (the Proposal), within the Huntly Mine. Alcoa is currently operating the Huntly Mine in the Myara region and propose to transition mining into the Myara North region from about 2023 to 2030 then into the Holyoake Stage 1 region from about 2030 to 2035.

1.1.1 Holyoake Mine Study Area

The Holyoake Mine Study Area comprises prospective mine regions of the Huntly Mine that may be developed for future mining. The mine regions differ substantially in size and have differing environmental, social and economic context. The eastern regions lie further from the sensitive receptors of Dwellingup, Lane Poole Reserve and South Dandalup Dam, whereas the western regions lie close to existing mining operations.

This report will assess potential landscape and visual impacts of mining development within the O'Neil region (the O'Neil East Study Area).

1.1.2 Purpose and scope of this report

The purpose of this report is to conduct a landscape and visual impact assessment (LVIA) for before, during and after the proposed mining activities of the Huntly Mine within the O'Neil East region. The report will assess the potential impacts on landscape character and visual amenity in accordance with the Western Australian Planning Commission (2007) Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design, and in consultation with the Department of Biodiversity, Conservation and Attractions (DBCA).

1.2 Report structure

This report comprises of the following sections:

Section 1 – Introduction: provides background information and an overview of the O'Neil East Study Area and assessment.

Section 2 – Methodology: describes the methodology used for the purposes of this report.

Section 3 – Context analysis: provides an analysis of the existing conditions in the context of the O'Neil East Study Area, as well as the legislation and policy context.

Section 4 – Landscape character and visual analysis: Landscape character units are defined and described. A visual analysis is provided.

Section 5 – Visual management objectives: identifies general and O'Neil East Study Area-specific visual management objectives.

Section 6 – O'Neil East Study Area description: provides a description of key O'Neil East Study Area

components relevant to this assessment.

Section 7 – Landscape impact assessment: an assessment is provided for impacts to landscape character.

Section 8 - Visual impact assessment: An assessment is provided from representative viewpoint locations, and an assessment provided.

Section 9 – Mitigation and management measures: mitigation and management measures are recommended in response to issues arising in the assessment during construction and operation phases of the O'Neil East Study Area.

Section 10– Conclusion: presents a summary of the LVIA.

1.3 Limitations

This report: has been prepared by GHD for Alcoa of Australia Limited and may only be used and relied on by Alcoa of Australia Limited for the purpose agreed between GHD and the Alcoa of Australia Limited as set out in Section 1.1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Alcoa of Australia Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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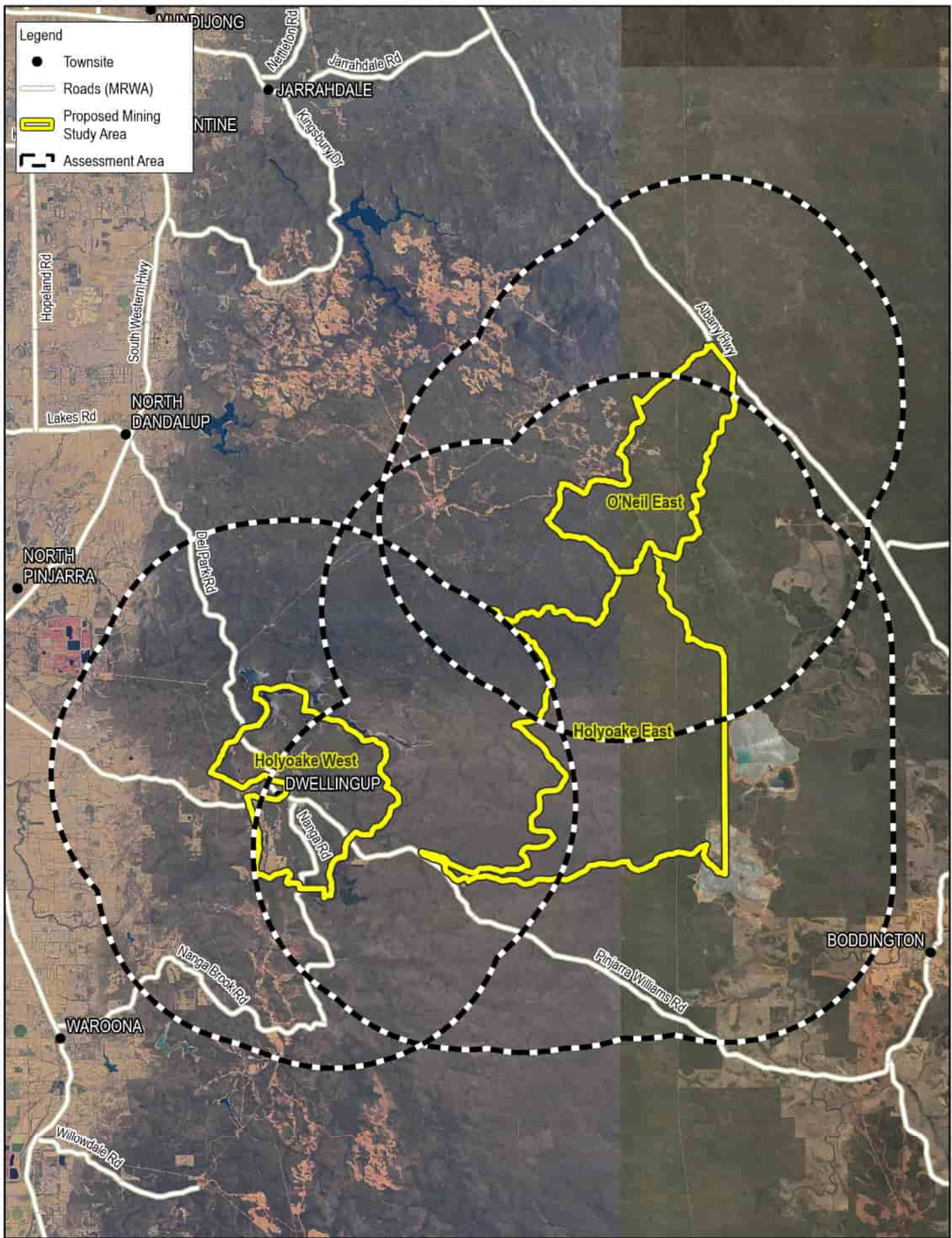
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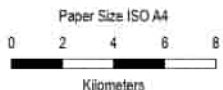
1.4 Assumptions

- There is no national guidance on the assessment of landscape and visual impacts specific to Australia. However, in Western Australia, the industry typically refers to *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design* (Western Australia Planning Commission, 2007). This assessment methodology has also referred to *Guidelines for Landscape and Visual Impact Assessment, Third Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013).
- As the O’Neil East Study Area design, extent and location is unknown, the assessment provided is based on an assumed worse-case scenario.
- The assessment aims to be objective and describe any changes factually. While potential changes resulting from the O’Neil East Study Area are defined, the significance of these changes requires qualitative (subjective) judgements. The conclusion in this assessment therefore combines objective measurement and professional interpretation. While this assessment aims to be objective, it is recognised that landscape and visual impact assessment can be subjective, and individuals are likely to associate different visual experiences to the assessment area.
- The scope of this assessment does not include consideration of landscape and visual impacts from lighting or during night-time conditions.
- This assessment does not include assessment of visual impact from dust.



Legend

- Townsite
- Roads (MRWA)
- ▭ Proposed Mining Study Area
- ⬜ Assessment Area



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Landscape and Visual Impact Assessment -

Project No. 12565572
Revision No. 1
Date 6/22/2023

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

Proposed Mine Regions

FIGURE 1-1

2. Methodology

The following section outlines the methodology for this assessment.

2.1 Standards and guidance

Where practicable, the landscape and visual impacts associated with the project have been assessed in accordance with the advice provided in national and state recognised resource documents and in accordance with all relevant legislation. These include but are not limited to the following:

- *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design* (Western Australia Planning Commission, 2007)
- *Environmental Factor Guideline: Social Surroundings* (Environmental Protection Authority, 2016)
- *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013).

2.2 Methodology Process

The following assessment process, outlined in , has been followed for this assessment.

Steps	Description / Outcomes
<p>1 Define the scope of the assessment / set the context</p>	<p>Define the study area boundary and set the context of the project. Review background information including:</p> <ul style="list-style-type: none"> • Legislation and policy context. • Existing landscape context including: topography and hydrology data, land use zoning and cadastral data, vegetation maps and CALM landscape character types.
<p>2 Describe the visual landscape character</p>	<p>Identify and describe the landscape character units based on uniform patterns of vegetation, topography, water form, and land use. Determine the value associated with each landscape character unit.</p>
<p>3 Evaluate the way the visual landscape character is viewed, experienced and valued</p>	<p>Undertake visual analysis including identifying and describing:</p> <ul style="list-style-type: none"> • Key views • Viewing locations and their significance • Visual character preferences
<p>4 Determine visual management objectives</p>	<p>Determine objectives for managing visual landscape character, including annotated maps and photographs as required, identifying the location of any priority areas or sites.</p>
<p>5 Describe proposed development</p>	<p>Analyse, describe and illustrate the main visual components of the Proposal.</p>
<p>6 Describe the potential landscape and visual impacts</p>	<p>Identify and describe likely changes to visual landscape character and views including:</p> <ul style="list-style-type: none"> • List likely changes in landscape character for the Proposal, based on the outcome of Step 2 • Identify the extent of the area likely to be affected by the Proposal • Identify key views that may be affected by the Proposal • Identify main views to and from the Proposal • Outline the likely changes to the visual landscape character and views throughout the staging of the project. <p>Evaluate likely changes and/or impacts of the Proposal including:</p> <ul style="list-style-type: none"> • Assess the magnitude and duration of each specific visual and landscape impact • Assess the landscapes susceptibility to change • Assess the sensitivity of the landscape and views to the change • Establish how much natural screening exists in the landscape and whether the site is capable of sustaining more screening • Determine if an impact will be temporary or permanent and whether the effect will be beneficial, neutral or adverse • Identify uniqueness or rarity of the affected landscapes • Determine the significance of impacts (ranging from minimal to significant) by considering both magnitude of change and sensitivity of the viewer or landscape. <p>Impacts can be illustrated by annotated maps and photographs as required, identifying the location of any priority areas or sites.</p>
<p>7 Develop visual management measures</p>	<p>Determine whether visual management objectives can be achieved</p> <p>Identify measures that reduce negative impacts; and facilitate positive impacts</p>
<p>8 Prepare final recommendations</p>	<p>Summarise the findings and describe any mitigation measures</p>

Figure 2-1 Visual Landscape Planning process

2.3 Assessment area

The assessment area for this report is generally confined to the likely extent of visibility of the O'Neil East Study Area within the surrounding context. This has resulted in an indicative assessment area which extends to approximately 10 km around the Holyoake East mining region. The assessment area was informed by a desktop review and site inspection of the existing landscape context, and previous studies of a similar type and/or within a similar landscape context. Refer to Figure 2-2 for the assessment area extent.

2.4 Context analysis

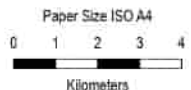
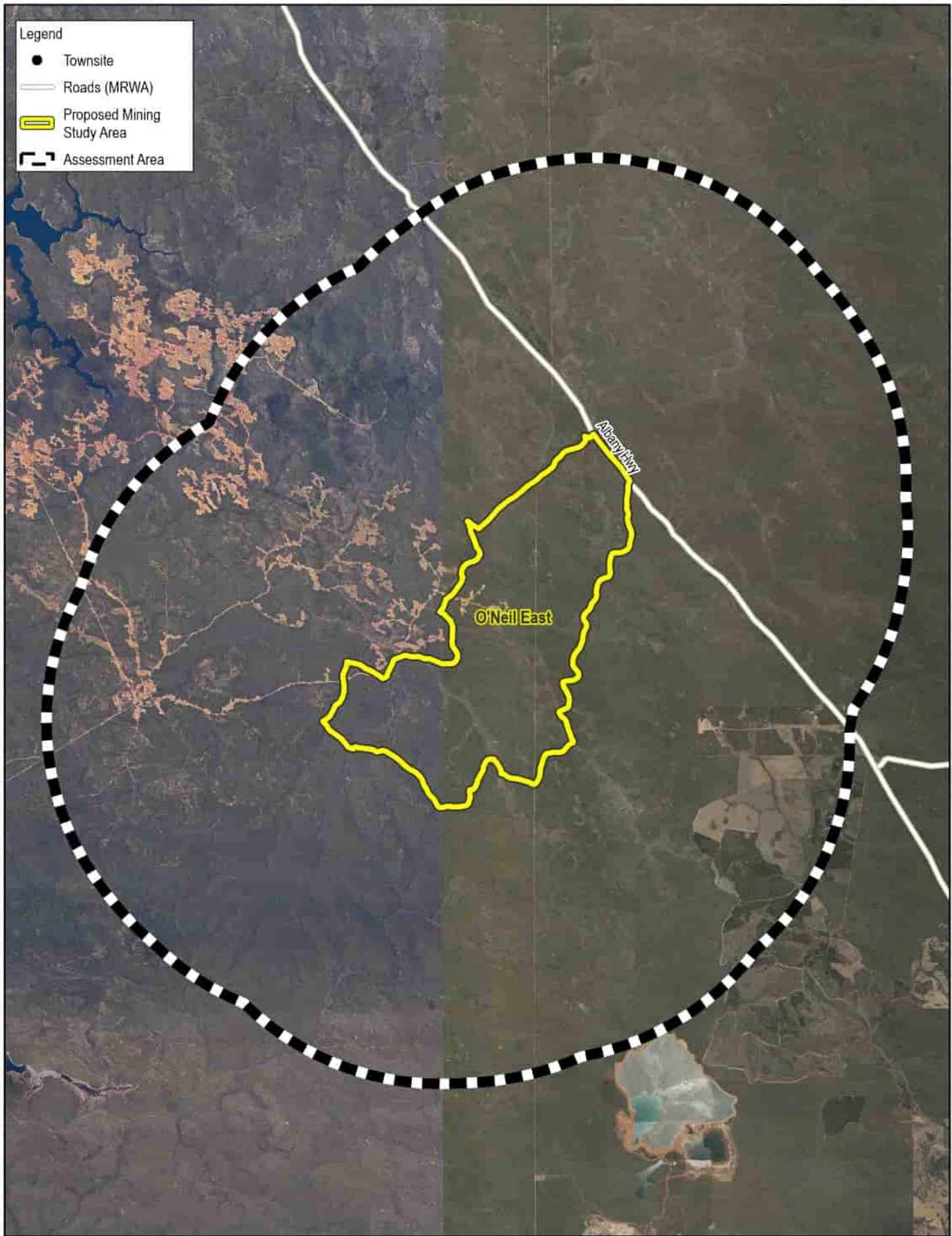
2.4.1 Legislation and policy context

A review of key planning designations, policies and guidance was undertaken in relation to landscape and visual amenity. The emphasis of the review was to identify designations, protections, values, and objectives relevant to the landscape and visual environment of the assessment area, including scenic amenity values, refer to Section 3.1.

2.4.2 Landscape context

Relevant background information relating to the O'Neil East Study Area and the assessment area was reviewed and summarised, refer to Section 3.2. This included existing landscape and visual environment information such as:

- Topography and hydrology data
- land use zoning and cadastral data
- vegetation maps
- *Reading the Remote - Landscape Characters of Western Australia* study. (Department of Conservation and Land Management, 1994)
- Google aerial and street view imagery
- stakeholder and community feedback on valued landscapes and views.



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Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 50

Assessment Area

FIGURE 2-2

2.5 Landscape character and visual analysis

2.5.1 Site inspection

A site inspection was undertaken by two Landscape Architects from 21st to 23rd August 2022 with clear weather conditions and good visibility. During the site inspection, the Landscape Architects drove and walked the assessment area to gain representative views of the O'Neil East Study Area site from publicly accessible viewpoints. The purpose of the inspection was to:

- Inspect the assessment area and appreciate views to / from the O'Neil East Study Area site.
- Inspect publicly accessible locations identified in the desktop analysis as likely to provide views of the O'Neil East Study Area.
- Identify sensitive visual receptor locations.
- Assess the landscape character of the assessment area and identify landscape sensitivities.
- Undertake site photography for the visual assessment and for the preparation of photomontages.

The coordinates of each viewpoint were recorded during the site inspection. At each location, a photographic record of landscape features, key views and receptors was obtained along with field notes and sketches.

2.5.2 Landscape Character Units

Landscape Character Units generally comprise homogenous patterns of characteristics such as landform, vegetation, water form and land use as well as individual features, as identified during the context analysis, stakeholder and community feedback, and site inspection.

This approach has been used to establish the existing landscape character around the O'Neil East Study Area site and to provide a framework for measuring the impact of the O'Neil East Study Area. This assists in:

- Defining landscape elements that contribute to defining character.
- Defining landscape character attributes.
- Identifying landscape value.

The assessment of the existing environment also considers factors which have influenced landscape change in the past and those that are likely to do so in the future. The landscape character units are defined in Section 4.

Values associated with the landscape have also been identified for each Landscape Character Unit. Landscape value considers designated and undesignated landscapes and all elements such as the environmental, cultural, historical and visual elements that form the landscape. When defining landscape value, considerations include landscape quality, scenic quality, rarity, representativeness, conservation value, recreation value, and associations.

Refer to Table 2-1 for the criteria used to determine the landscape value.

Table 2-1 Landscape value criteria

Landscape Value	Criteria
High	Landscape character elements in good or above average condition and/or that make a strong positive contribution to landscape character. May include nationally important features.
Medium	Landscape character elements in reasonably good condition and/or that make an average contribution to the local character, which may include locally important landscape features.
Low	Landscape character elements in below average condition and/or that are not particularly distinctive local features.

2.5.3 Visual analysis

How a landscape is viewed is of critical importance in understanding changes in the landscape and how people perceive them. Visual landscapes are related to peoples' sense of place and quality of life. How people view, perceive, experience and interact with landscape can be varied and diverse.

Visual analysis of the existing conditions involves identifying existing viewing locations, identifying who viewers are and how they experience the landscape, identifying key views, and determining visibility. This assists in the understanding as to how the proposed changes may impact the existing viewing experience and values. Stakeholder and Community feedback (refer to Section 3.2.5) has been reviewed to aid the identification of these valued locations and visual elements within the assessment area.

A visual analysis of the assessment area was mapped, including identification of viewing locations. Sensitive visual receptors (sensitive receptors) were identified, and their level of significance given, in line with guidance provided within the *Visual Landscape Planning in Western Australia* guidelines (Western Australia Planning Commission, 2007) (refer to Table 2-2 for criteria). Level of significance generally increases with the importance of the view, the degree of sensitivity of the viewers, the degree to which experiencing the landscape is integral to the enjoyment of a travel route or site, and the length of duration of a view. These criteria were used to assist in determining which sensitive receptor locations to consider for assessment. Refer to Section 4.2 for the visual analysis of the assessment area.

Table 2-2 Sensitive receptor level of significance

Rating	Criteria
Level 1: national / state significance	State highways and other main roads (sealed or unsealed) with high levels of vehicle usage; designated tourist routes, scenic drives; recreation, conservation, cultural or scenic sites, areas, viewpoints and lookouts of state or national significance, including their access routes; walking, cycle or bridle tracks of national or state significance; towns, settlements or residential areas; passenger rail lines; navigable waterways of national or state recreation importance; ocean sites of national or state recreation importance, e.g. surf breaks; and views of national or state importance.
Level 2: regional significance	Main roads with moderate levels of vehicle usage (sealed or unsealed); recreation, conservation, cultural or scenic sites, areas, viewpoint, and lookouts of regional or high local significance (including their access routes); navigable waterways of regional recreation significance; walking, cycle or bridle paths of regional significance; and views of regional importance.
Level 3: local significance	All remaining roads with low levels of vehicle usage; locally significant roads or tracks; recreation and other use areas of local significance; navigable waterways of local recreational significance; walking, cycle or bridle paths of local significance; and views of local importance.

2.6 Visual management objectives

The purpose of visual management objectives is to manage the visual character of the landscape within the assessment area. The legislation and policy review, context analysis, landscape character units and visual analysis form a basis for the development of appropriate management objectives and strategies, refer to Section 5.

Visual management objectives were developed for each landscape character unit and are generally categorised as follows:

- Best practice siting and design
- Protection and maintenance of visual landscape character
- Restoration of degraded character or enhancement of opportunities, for example, for viewing

2.7 O’Neil East Study Area description

The main visual components of the O’Neil East Study Area are identified and described, for both construction and operation phases of the O’Neil East Study Area, in Section 6.

2.8 Landscape and visual impact assessment

This section includes an assessment of impacts to landscape character, with an assessment provided for each landscape character unit defined within the assessment area. Following this, an assessment of visual impacts was undertaken from key viewpoint locations.

2.8.1 Assessment of impacts to landscape character

Assessment of impacts to landscape character deals with the effect of change and development on landscape as a resource. The assessment focuses on how the development would affect the elements that make up the landscape, including the aesthetic and perceptual aspects of the landscape and its distinctive characteristics. The consideration of potential impacts to landscape character is determined based on the sensitivity of the existing landscape to the proposed change, and the magnitude of change that is likely to occur.

The sensitivity and magnitude of landscape effects address the following specific criteria:

- Sensitivity of landscape to proposed change is judged on a combination of the landscape value, and the landscapes susceptibility to change, from the type of development proposed (refer to Table 2-1 and Table 2-3, respectively) A judgement on the level of sensitivity is made and a rating of high, moderate or low applied.
- Magnitude of change to landscape character is based on the size, scale of change, the geographical extent of effects, and the duration and reversibility of effects (refer to Table 2-4). It also depends on the loss, change or addition of any feature to the existing landscape. It is based on the part of the landscape character zone which is likely to be impacted to the greatest extent by the O’Neil East Study Area.

An assessment is made on the overall level of significance of landscape impacts in relation to the existing conditions (refer to Section 7

Table 2-3 Susceptibility to change (landscape character)

Landscape susceptibility	Definition
High susceptibility to change	The type of development proposed could have a detrimental effect on the landscape character, condition or value. Mitigation measures are unlikely to reduce the impacts of the change.
Moderate susceptibility to change	Any change caused by the type of development would be unlikely to have a significant adverse effect on the landscape character, condition or value that could not be mitigated.
Low susceptibility to change	Development of this type is unlikely to have an adverse effect on the landscape character, condition or value. Mitigation measures would be effective in neutralising adverse effects.

Table 2-4 Magnitude of change criteria (landscape character)

Rating	Criteria
High	A substantial/obvious change to the landscape character due to total loss of, or change to, elements, features or characteristics of the landscape. Would cause a landscape to be permanently changed and its quality diminished. Mitigation measures are unlikely to reduce the impacts of the change.
Moderate	Discernible changes in the landscape character due to partial loss of, or change to elements, features or characteristics of the landscape, however, has potential to be partly mitigated. The change would be out of scale with the landscape character, and at odds with the local pattern and landform, and would leave an adverse impact on the landscape character.
Low	Minor loss or alteration to one or more key landscape character elements, features or characteristics, or the introduction of components that may be new but may not be uncharacteristic within the existing landscape character. Mitigation measures would be effective in neutralising adverse effects.
Negligible	Almost imperceptible or no change in the landscape character as there is little or no loss of/or change to the elements, features or characteristics of the landscape. Mitigation measures would be effective in neutralising adverse effects and/or improve the landscape character.

2.8.2 Zone of Theoretical Visibility assessment

Zone of Theoretical Visibility (ZTV) mapping is a computer-generated analysis which identifies land from which it is theoretically possible to view the components of the O’Neil East Study Area. These have been used primarily to guide the area of site analysis and representative viewpoint selection. ZTV mapping was undertaken with reference to processes outlined in the following guidelines:

- *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013).
- *Visual Representation of Wind Farms Guidance, version 2.2* (Scottish Natural Heritage, 2017)

ESRI ArcGIS software was used to model the ZTV of the O’Neil East Study Area. A digital elevation model with 25 m resolution was used. The ZTV was mapped using the following parameters:

- A viewing height of 1.7 m, which is the average within the typical viewing level range of an adult.
- Excavator height (maximum): 15 m.

The GIS software then digitally determines the likely extent over which the feature would be visible or not visible. In interpreting the ZTV, the following issues must be considered:

- The ZTV only takes into account the landform and does not include land cover factors such as the presence of buildings and trees, therefore it represents the worst-case scenario of potential visual impact.
- The ZTV does not take into account the effect of distance. The greater the distance from the Project, the lower the impact, as the development will take up a smaller portion of the view, and atmospheric conditions may reduce the visual prominence of the Project.
- The ZTV is only accurate to the resolution of the elevation model.

2.8.3 Assessment of visual impacts

The assessment of visual impact involves an understanding of the sensitivity of viewing locations, the likely changes to the views, and an evaluation of the significance of the likely changes. Visual receptors have been considered in terms of the view they are likely to obtain from within the assessment area including consideration of any key vantage points such as lookouts, where there is particular interest in the view. Visual receptors are identified based on proximity of the receptor to the O’Neil East Study Area, as the most affected visual receptors are anticipated to be located closest to the O’Neil East Study Area unless located at an elevated vantage point. The type of receptor is also considered, as different viewer types would have different perceptions of the change.

A series of five representative viewpoint locations were selected for assessment based on the visual analysis of the assessment area and understanding of the O’Neil East Study Area (refer to Figure 8-2). Existing views were represented using a panorama technique (refer Section 2.8.6). An assessment of each viewpoint is provided which includes assessment of the sensitivity of the viewpoint to change, identification and description of the likely changes to the view, assessment of the magnitude of change that is likely to occur, and overall level of significance of the visual effect.

The sensitivity of each viewpoint is considered to be dependent on the importance of the view, its existing scenic qualities, the presence of other existing built elements in the view, and the type of visual receptor and their likely interest in the view. The magnitude of change to views and visual amenity depends on the nature, scale and duration of the change that is expected to occur. This depends on the loss, change or addition of any feature in the field of view of the receptor including an assessment of the level to which the change contrasts with the existing view or expected view of the landscape.

The assessment considers the likely impacts of the O’Neil East Study Area, refer to Section 6 . The level of effect on a view depends on factors such as the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle and duration of the view, and the distance from the O’Neil East Study Area.

The sensitivity and magnitude of visual effects address the following specific criteria:

- Sensitivity of visual receptor to proposed change, based on susceptibility of visual receptors to change, and value attached to the view (refer to Table 2-5)
- Magnitude of change, based on the size or scale of the change, geographical extent of effects, and duration and reversibility of effect (refer to Table 2-6).

Table 2-5 Sensitivity criteria (visual)

Rating	Criteria
High	Occupiers of residential properties, at home or going to or from, with long viewing periods, within close proximity to the proposed development; Communities that place value upon the landscape and enjoyment of views of their setting.
Moderate	Outdoor workers who have a key focus on their work who may also have intermittent views of the assessment area; Viewers at schools, or similar, when outdoor play and recreation areas are located within close proximity but viewing periods are limited; Occupiers of residential properties with long viewing periods, at a distance from or screened from the assessment area.
Low	Road users in motor vehicles, trains or on transport routes that are passing through or adjacent to the assessment area and therefore have short term views; Viewers indoor at their place of work, schools or similar.
Negligible	Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short; Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the assessment area and have partially screened views and short viewing times.

Table 2-6 Magnitude of change criteria (visual)

Rating	Criteria
High	A substantial/obvious change to the existing view due to total loss of, or change to, elements, features or characteristics of the view. Would cause a view to be permanently changed and its quality diminished.
Moderate	Discernible changes in the existing view due to partial loss of, or change to elements, features or characteristics of the view, however, has potential to be partly mitigated. The change would be out of scale with the existing view and would leave an adverse impact on the view.
Low	Minor loss or alteration to one or more key view elements, features or characteristics, or the introduction of components that may be visible but may not be uncharacteristic within the existing view.
Negligible	Almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view.

2.8.4 Duration of impact

Landscape and visual impacts can be temporary or permanent in nature. The duration of impacts, as shown in Table 2-7, was used to assist in assessing the landscape and visual impacts associated with the construction and operation phase of the Project.

Table 2-7 Duration of impact

Temporary	Impacts lasting 1 year or less
Short term	Impacts lasting 1 to 5 years
Medium term	Impacts lasting 5 to 10 years
Long term	Impacts lasting 10 to 25 years
Permanent	Impacts lasting over 25 years

2.8.5 Significance of impacts

The combination of sensitivity and magnitude determines the significance of impact on the visual environment or representative viewpoint. Refer to Table 2-8 which illustrates the matrix used to determine the significance of impacts.

Table 2-8 Significance of impact matrix

		Magnitude of impact			
		High	Moderate	Low	Negligible
Sensitivity	High	High	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible
		Negligible	Negligible	Negligible	Negligible

2.8.6 Panorama and photomontages

All photographic images were captured using a 50 mm fixed focal length lens on a 35 mm full frame format camera at a camera height of 1.6 m. All photograph GPS locations were recorded and mapped.

A series of viewpoint locations were chosen, and existing views were represented using a panorama technique. This technique involves the stitching together of a number of adjoining images using the Adobe Photoshop software program representing an 80 degree horizontal field of view.

Three viewpoints were selected for the production of project overlay images to represent proposed project extent within views following the completion of the O'Neil East Study Area (at this point project overlay images are the most appropriate for this assessment as a detailed project design is not available to create an accurate photomontage image of the proposed design). The software used to model and render the images was Autodesk 3D Studio Max. In order to achieve an accurate project overlay of the O'Neil East Study Area and surrounding landscape, a digital terrain model to a resolution of 5 m was used to model the surrounding landform.

Once the 3D model incorporating both the landscape and new O'Neil East Study Area overlay was created, a virtual camera was placed in the software at the same location the photographs were taken. The film, focal lens and height of the virtual camera matches the real camera utilised to take the photographs. The photographs of the O'Neil East Study Area site were used in 3D Studio Max as a background to accurately match the 3D model with the O'Neil East Study Area Extent overlay to the perspective of the photographs. From the camera view, rendered images of the O'Neil East Study Area were produced to match the daylight exposure of the photographs. The rendered images were imported into Adobe Photoshop for post-production editing and collation of the project overlay images. The final result is a redline overlay of the O'Neil East Study Area shown in the correct 3D location in the photographs. The final images were produced to a high resolution, suitable for printing. It should be noted that the overlay does not show the removal of trees.

The panorama and photomontage methodology is guided by industry accepted techniques recommended in the following:

- *Visual Representation of Development Proposals: Technical Guidance Note 06/19* (Landscape Institute, 2019)

2.9 Cumulative impacts

This report does not consider potential cumulative visual and landscape character impacts that may result from mining operations occurring in multiple regions concurrently. Cumulative impacts should be considered when finalising the construction and operation detailed designs including the design and location of mine pits, infrastructure areas, conveyors, haul roads, and haul road crossings in each mine region. Cumulative impacts

should be assessed from sensitive receptors identified in this report particularly the elevated viewpoints on the Bibbulmun Track.

2.10 Mitigation and management measures

The mitigation and management measures aim to achieve the visual management objectives identified in Section 5, and were developed in response to negative impacts identified within Sections 7 and 8. The mitigation and management measures relate to both the landscape character units as well as views and typically include the following:

- adopting sensitive siting and design of earthworks and construction activities to minimise visual impacts during the construction phase.
- the use of visual screening vegetation near sensitive receptor locations including residential properties and walking tracks limiting vegetation clearance to the necessary areas.
- rehabilitation of the mine pits in keeping with the surrounding native forest and undulating landform.

3. Context analysis

3.1 Legislation and policy context

3.1.1 State legislation and policy

Statement of Planning Policy: Environment and Natural Resources Policy (2003)

This policy applies throughout the state of Western Australia, and it includes specific objectives regarding the protection of landscapes.

Policy measures within the document include measure 5.9 *Landscape* highlighting Western Australia's diversity of high value landscapes and scenic areas. It recognises that as the State grows, it will be increasingly important to ensure that landscapes valued by the community are protected. To do this, it is necessary to identify the landscape types and features requiring special attention and develop appropriate management and planning policies that can positively contribute to their maintenance and enhancement. To achieve this, planning strategies, schemes and decision-making should:

- i. Identify and safeguard landscapes with high geological, geomorphological or ecological values, as well as those of aesthetic, cultural or historical value to the community, and encourage the restoration of those that are degraded.
- ii. In areas identified in 5.9 (i) above, consider the level or capacity of the landscape to absorb new activities and incorporate appropriate planning and building design and siting criteria to ensure that new development is consistent and sensitive to the character and quality of the landscape.
- iii. Consider the need for a landscape, cultural or visual impact assessment for land use or development proposals that may have a significant impact on sensitive landscapes.

3.1.2 Region and sub-region legislation and policy

Peel Region Scheme (May 2013)

The purpose of the *Peel Region Scheme* includes protection of land for conservation, recreation, cultural and other public uses.

The *Peel Region Scheme* applies the O'Neil East Study Area. The purpose of the *Peel Region Scheme* includes:

- *Provide for the reservation and protection of land for regional transport, conservation, recreation, cultural and other public uses.*
- *Identify and protect land having strategic importance for industrial and future urban use.*

The *Peel Region Scheme* aims to promote sustainable development, protect areas of regional conservation significance and provide for the extraction of minerals and rehabilitation of the affected land. The majority the assessment area covered by the *Peel Region Scheme* is comprised of State Forest with pockets of Regional Open Space and some land zoned as Rural. The *Peel Region Scheme* outlines the purpose for each reserve and zone within the assessment area, as follows:

- *Regional Open Space - to protect the natural environment, provide recreational and cultural opportunities, safeguard important landscapes and sites of cultural or historical significance and provide for public access.*
- *State Forests - reserved lands to recognise State Forests.*
- *Rural - to provide for the sustainable use of land for agriculture, assist in the conservation and wise use of natural resources including water, flora, fauna and minerals, provide a distinctive rural landscape setting for the urban areas and accommodate carefully planned rural living developments.*
- *Urban - to provide for residential development and associated local employment, recreation and open space, shopping, schools and other community facilities.*
- *Waterway - to recognise coastal and inland waterways and lakes, provide for navigation in, and public access to, those waterways and lakes where appropriate and to protect environmental, landscape and cultural values.*

3.1.3 Local legislation and policy

Shire of Boddington Town Planning Scheme No. 2 (2012)

The eastern portion of the assessment area is within the Shire of Boddington and is subject to the *Shire of Boddington Town Planning Scheme No. 2*. The Scheme establishes the Shire's objectives and purposes for land use within the Shire.

The scheme outlines a number of strategies and actions, grouped under themes.

Relating to **tourism**, relevant strategies include:

- (a) Support tourism based on the Shire of Boddington's natural and cultural assets.
- (c) Encourage development which is sympathetic with the area's architectural style.

Relating to **environment and conservation**, relevant strategies include:

- (a) Encourage the protection of the Shire of Boddington's landscape and scenic qualities by protecting high conservation values areas from proposals to clear vegetation.
- (b) Encourage development that reflects and enhances the Shire of Boddington's natural, cultural, visual and built character.
- (c) Support the protection of landscapes and their visual amenity, as well as the character of 'view-sheds' associated with major roads and tourist routes.
- (d) Avoid and minimise development on ridges and skylines in areas where the landscape should be protected.
- (e) Promote the rehabilitation, revegetation and restoration of denuded areas.

Shire of Murray Town Planning Scheme No. 4 (2020)

The south-western portion of the assessment area is within the Shire of Murray and is subject to the *Shire of Murray Town Planning Scheme No. 4*. The Scheme establishes the Shire's objectives and purposes for land use within the Shire. The rural townships of Dwellingup and Inglehope and the Dwellingup State Forest are located within the Shire of Murray.

Relevant objectives include:

- *to preserve and consolidate the individual identity of the urban settlements (villages) within the Scheme Area; and*
- *to preserve the special environment associated with the lakes and waterways within the Scheme Area.*

Shire of Serpentine-Jarrahdale Local Planning Policy 4.3: Landscape Protection Area Policy

The north-western portion of the assessment area is subject to *Local Planning Policy 4.3: Landscape Protection Area Policy* within the Shire of Serpentine-Jarrahdale's planning scheme. The purpose of the *Landscape Protection Area Policy* is to:

- *Protect and enhance the landscape characteristics of the Darling Scarp; and*
- *To preserve the visual amenity of the Darling Scarp from the coastal plain.*
- *Key development considerations and guidelines include relevant to this assessment include:*
- *The 'seen area' of the development from the coastal plain, major roads and tourist routes, and major recreation areas;*
- *The visual intrusiveness of the development within the 'seen area';*
- *The colour schemes and materials of the proposed development; and*
- *The preservation and enhancement of the natural features and vegetation of the area.*
- *Development should not occur:*
 - *On ridge lines or spurs, bluffs or knolls, escarpments, hill tops or visually exposed areas. Buildings are to be located below the skyline.*
 - *In areas having a generalised slope greater than 25 percent.*

Shire of Serpentine - Jarrahdale Local Planning Strategy – Draft (2019)

The *Shire of Serpentine - Jarrahdale Local Planning Strategy* outlines the vision and a 10-year framework for the Shire. The Strategy identifies key challenges of the Shire and outlines key Strategic objectives in response to the challenges. Key Strategic objectives relevant to this assessment include:

- *Unique Character – Ensure the diversity of natural and cultural landscape in the Shire continue to offer an array of unique experiences to visitors and communities, enhancing social cohesion and a shared sense of place.*
- *Environment and Water - Maintain access to the natural environment and preservation of our high value natural assets for future generations to come.*

The Strategy outlines a Strategic Plan with land use categories and category specific objectives, strategies and actions. Key category specific objectives and strategies relevant to this assessment include:

3.3.3 Protecting the rural landscape.

- *Preserve and enhance the existing rural character and amenity within rural areas.*
- *Protect the rural landscape, environmental values and connections to nature.*
- *Protect areas of significant landscape value and encourage the retention of vegetation and trees.*

5.4.1 Natural landscape and bushfire risk

- *Protect important landscape features and landforms.*
- *Preserve the amenity and views of the Darling Scarp.*
- *Recognise important landscapes and ensure that future development does not impact on land-scape values.*

5.4.4 Basic raw materials, industrial and rural land use buffers

- *Preserve the amenity of sensitive land uses and protect environmental values from any adverse off-site impacts of resource extraction or other land uses or development.*
- *Shire of Serpentine - Jarrahdale Rural Strategy 2013 Review (2017)*
- *The Shire of Serpentine - Jarrahdale in conjunction with Land Insights prepared a review and update of the of the 2013 Rural Strategy which guides development in the Shire. The purpose of the Rural Strategy is ‘to preserve and enhance the Shire’s rural character and its role as an important economic contributor to the Shire and boarder region’.*

Shire of Wandering Local Planning Strategy (2007)

The north-eastern portion of the assessment area including Mount Cooke, the Monadnocks Conservation Park and the Youraling State Forest is within the Shire of Wandering and is subject to the *Shire of Wandering Local Planning Strategy*. The Local Planning Strategy outlines the Shire’s strategic vision, aims and objectives. Relevant aims and objectives include:

- *Protect and enhance the environment values and natural resources of the Shire and to promote ecologically sustainable land use and development.*
- *Safeguard and enhance the character and amenity of the Shire’s natural and built environment.*
- *Recognise and protect places of natural beauty and of historic and scientific interest which are considered important to the heritage of the Shire.*

A heritage-listed water well (P07052) sits within the Shire of Wandering, along the Albany Highway.

3.1.4 Other guiding documents

Conservation Commission of Western Australia, *Forest management plan 2014-2023*

The State Forests within the assessment area are subject to the Conservation Commission of Western Australia’s *Forest management plan 2014-2023 (2013)*. The plan outlines goals, values and threats, proposed operations, and key performance indicators for the management of lands vested in the Conservation Commission.

Under the theme of visual amenity, the plan notes that the ‘*natural landscapes covered by this plan are valuable for their intrinsic qualities, for the quality of life and enjoyment of people, and for the economic benefits they bring.*’

The plan identifies scenic quality, visual amenity and sense of place as key values and presents a series of management activities *for the purpose of seeking to protect visual landscapes* (Conservation Commission of Western Australia, 2013).

The current Forest Management Plan 2014-2023 will end on 31 December 2023, and the next plan (Forest Management Plan 2024-2033) is expected to commence on 1 January 2024.

Visual resource management on Land and Waters (CALM) Policy statement No. 34

The visual resource management system is for land and water management by the Department of Conservation and Land Management (Now the Department of Biodiversity, Conservation and Attractions, DBCA). The objective of the policy statement is *to ensure all uses and waters managed by CALM are planned and carried out in ways that sustain the beauty of the natural environment*. This includes the appearance or visual quality of an area as determined by its geology, soils, landforms, vegetation, water features and land use history. The visual resource management is based on the premise that the visual quality of a landscape is a resource in its own right.

Western Australia Comprehensive Regional Assessment: National Estate Aesthetic Value Identification and Assessment Project- Visual Assessment (1998)

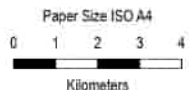
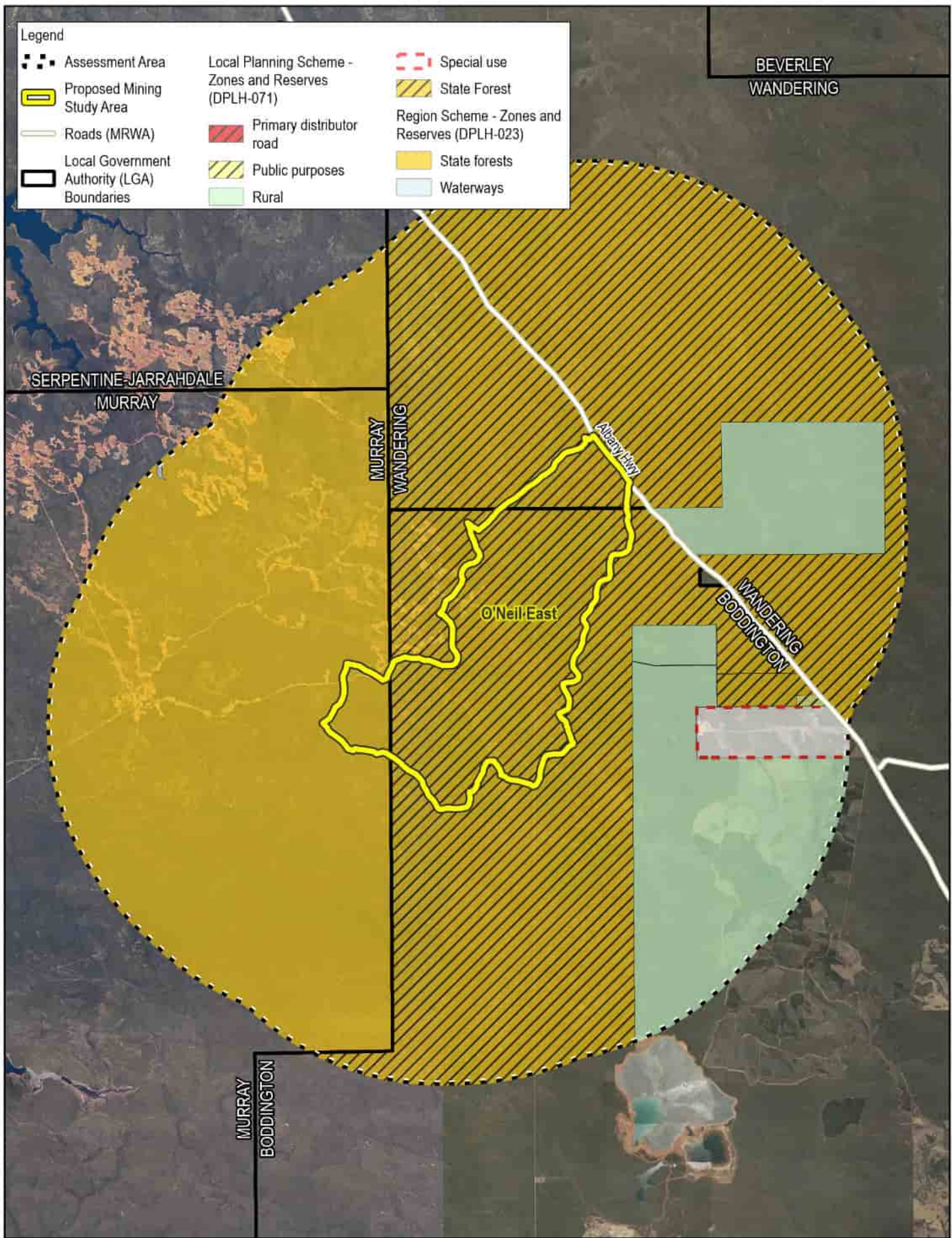
The Western Australia National Estate Aesthetic Value Identification is to ensure forest-related places of National Estate aesthetic value are appropriately protected and managed. Assessment considers the aesthetic values of the Regional Forest Agreement of the South-West Forest Region and the *Australian Heritage Commission* criteria of aesthetic significance. The assessment identifies the importance of visual amenity, maintaining value and protecting aesthetic qualities. The Identified sites within the assessment area that have been included within the register for having a National Estate aesthetic value include:

- Bibbulmun Track

Local Recreational Trails Plans

Recreational areas, trails and facilities have been identified and classified in accordance with published State and regional planning documents, including:

- WA Strategic Trails Blueprint (TRC Tourism 2017)
- The Blueprint expresses the aspirations of the trails community to achieve improved and sustainable outcomes for trail supply, experiences, community development and the local, regional, and state visitor economies. The ability to create “Trail Towns”, “Trail Centres” and “Trail Networks” which embrace and benefit communities on an economic, tourism and social level. The Blueprint lists the long distance Bibbulmun Track and the Munda Biddi Trail as key trail experiences. Peel Regional Trails Strategy (Common Ground Trails 2019) incorporating:
 - Shire of Murray Local Trail Plan
 - Shire of Boddington Local Trail Plan
 - Shire of Serpentine-Jarrahdale Local Trail Plan
- Perth and Peel Mountain Bike Master Plan (Common Ground Trails 2017)
 - Details plans for the development of Jarrahdale as a regionally significant mountain bike trail town with at least 30km of mountain bike trails, to attract the recreation and tourism markets from the nearby nationally significant locations. The Master Plan also describes the addition of 80 km of all mountain, cross country, gravity and touring trails, transforming Dwellingup into a trail town.



Alcoa of Australia Ltd
Landscape and Visual Impact Assessment -
O'Neil East

Project No. 12565572
Revision No. 4
Date 6/22/2023

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

Planning Zones

FIGURE 3-1

3.2 Landscape context

The following section provides an overview of the existing landscape context for the assessment area.

3.2.1 Land use and built form

The assessment area is situated on the Darling Plateau and comprises a forested, undulating landscape within the Dwellingup State Forest, Jarrahdale State Forest, Youraling State Forest and Mundaring State Forest. The Study Area is bordered by the Monadhocks Conservation Park to the north-west, Albany Highway to the north-east, State Forest to the south, and the Myara mining region to the west.

Two timber plantations sit within the assessment area: a large blue gum plantation in the south-east, and a smaller pine plantation in the north. Further infrastructure and cleared areas of forest are associated with the North Bannister Resource Recovery Park, located north of the blue gum plantation.

The Study Area is potentially visible from public roads (primarily the Albany Highway) and recreational trails and facilities, including the Bibbulmun Track. The Bibbulmun Track traverses the forested landscape in the north, east and south-east of the assessment area, connecting Mount Cooke, elevated lookouts within the Monadhocks Conservation Park, Boonering Hill and Kimberling Hill.

Four campsites are located within the assessment area, along the Bibbulmun Track. No formal recreational trails are located within the O'Neil East DE.

A linear corridor of cleared vegetation crosses the assessment area from north to south associated with an overhead transmission line. A number of informal gravel roads and tracks meander through the undulating landscape.

Refer to Figure 3-1 for planning zones within the assessment area and locations of the Bibbulmun Track and Mundi Bididi Trail.

3.2.2 Topography and hydrology

The topography throughout the assessment area is undulating, with rolling hills, steep valleys and elevations of granite outcrops. A number of ridgelines are present running in a north-west to south-east alignment, with high points towards the north and east of the assessment area. The highest point within the assessment area is Mount Cooke, with an elevation of 582 m, closely followed by Mount Solus with an elevation of 572 m. Boonering Hill and Kimberling Hill also reach elevations of over 500 m.

Key hydrological features are the Serpentine River and O'Neil East Brook which traverse the centre of the assessment area from east to west, feeding the Serpentine Dam which is north-west of the assessment area. Figure 3-2 shows the topographical and hydrological features within the assessment area.

3.2.3 Vegetation

A variety of established vegetation is present within the assessment area. The State Forests are predominantly dense Jarrah Forest with a predominantly Banksia understory. Species include *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), *Eucalyptus patens* (Blackbutt), *Eucalyptus wandoo* (Wandoo) with an understory of *Banksia grandis* (Bull Banksia), *Xanthorrhoea preissii* (Grass Tree), *Hakea trifurcate* (Two-leaf Hakea) and *Dryandras sessilis* (Parrot Bush).

The assessment area is dominated by the established forests, with small pockets of old growth forest, revegetated native forest in past mining areas, pine and blue gum plantations, and cleared areas associated with the plantations. Roads throughout the assessment area are generally enclosed by dense vegetation, causing views out to the wider landscape to be limited.

Figure 3-4 shows the distribution of pre-1750 vegetation complexes within the assessment area (DBCA, 2018). Refer to Figure 3-3 for locations of State Forests and Reserves.

The forest vegetation within the assessment area includes the pre-European vegetation complexes, as identified in the Swan Coastal Plain Vegetation Complexes (Department of Parks and Wildlife, 2016). The region is comprised of a combination of Uplands and Valleys vegetation complexes, reflecting the undulating landform. These include:

- **Dwellingup 1 Complex**
Dominantly open forest of *Eucalyptus marginata* subsp. *marginata* – *Corymbialcalophylla* on lateritic uplands in mainly humid and subhumid zones.
- **Dwellingup 4 Complex**
Open forest of *Eucalyptus marginata* subsp. *thalassica*– *Corymbialcalophylla* on lateritic uplands in semiarid and arid zones.
- **Cooke Complex**
Dominantly an open forest of *Eucalyptus marginata* and *Corymbia calophylla* on deeper soils within many visually prominent outcrops. Some closed heath's with *Myrtaceae* and *Proteaceae* species on granite rocks and some soil areas with *Eucalyptus laeliae*, and *Allocasuarina huegeliana* and *Eucalyptus wandoo*.
- **Pindalup Complex**
An open forest of *Eucalyptus marginata* subsp. *thalassica* and *Corymbia calophylla* on slopes and open woodland of *Eucalyptus wandoo* with some *Eucalyptus patens* on lower slopes.
- **Swamp Complex**
Comprised of a low open woodland of *Melaleuca preissiana* and *Banksia littoralis*, closed scrub of *Myrtaceae* spp., a closed heath of *Myrtaceae* spp. and sedgelands of *Baumea* and *Leptocarpus* spp. Located within seasonally wet or moist sand, peat, and clay soils within valleys.
- **Yarragil 1 Complex**
Open forest of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* within valleys.
- **Yarragil 2 complex**
An open forest of *Eucalyptus marginata* subsp. *thalassica* and *Corymbia calophylla* on slopes, woodland of *Eucalyptus patens* and *Eucalyptus rudis* with *Hakea prostrata* and *Melaleuca viminea* within valleys.

3.2.4 Landscape Character Types of Western Australia

The Western Australian landscapes have been classified into Landscape Character Types as part of the *Reading the Remote - Landscape Characters of Western Australia* study (Department of Conservation and Land Management, 1994). This study classifies the landscapes of Western Australia into broad landscape character types in terms of *common distinguishing visual landform, vegetation, water form and land-use characteristics*. The following landscape character type is relevant to the assessment area for this assessment and will help inform the landscape character units for the assessment area:

- **Darling Plateau (4) Landscape character type – Sub-type 4.1 Darling Uplands**

The Darling Uplands Sub Type is an undulating, dissected land surface with the rubbly, pale orange lateritic soils and pea gravels cloaked by extensive areas of tall forest. It is an ancient erosional plateau cut by deep, steeply sided valleys, and studded with impressive domed granite outcrops (monadnocks) and boulders which protrude from the surrounding landscape, most notably Monadnock National Park.

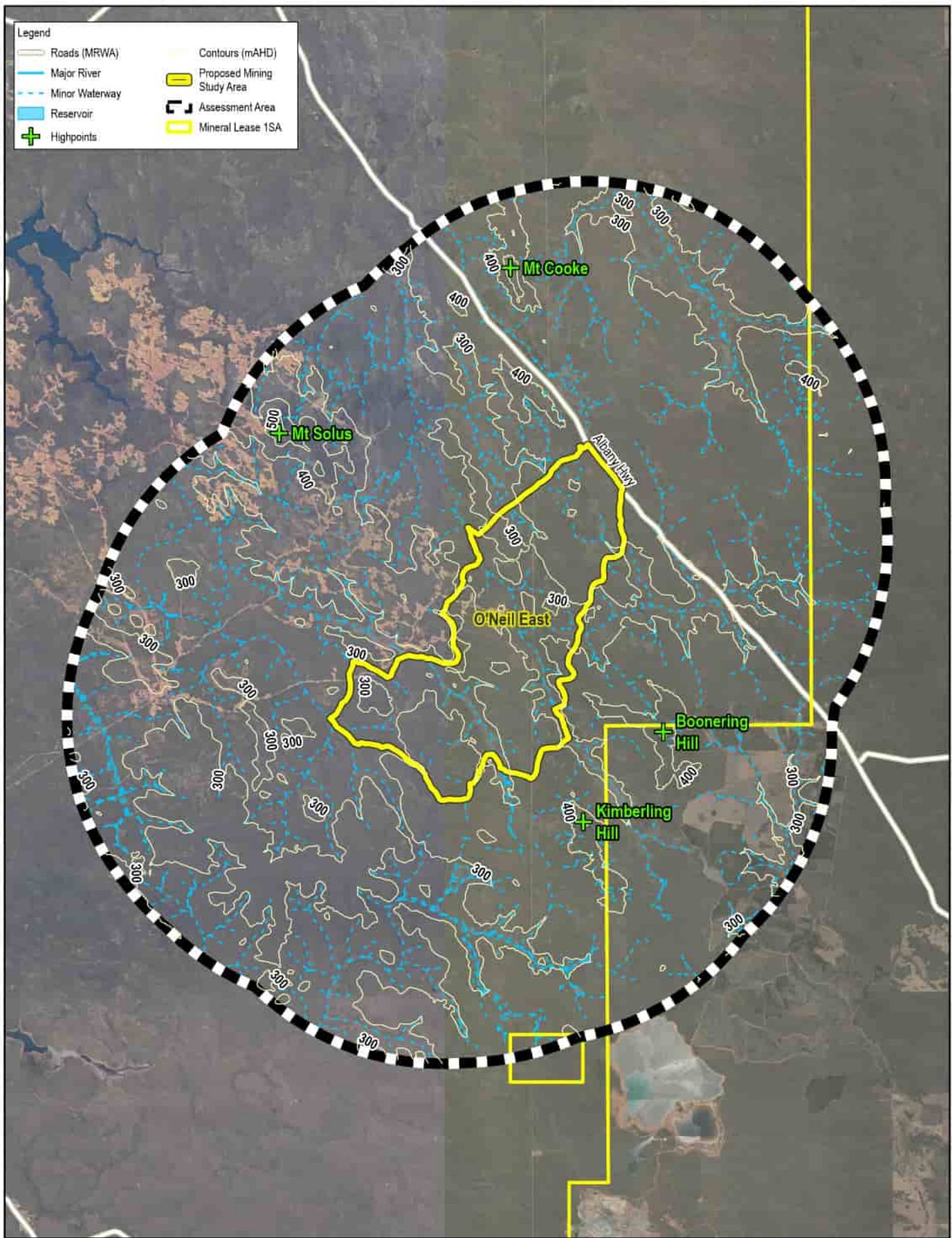
This rugged and rocky landscape rises abruptly from the Swan Coastal Plain Landscape Character Type to a height of approximately 300m ASL and is clearly revealed between Muchea and Dardanup.

The eastern region of the Darling Uplands develops into a landscape of gentler slopes with fewer distinct dissections.

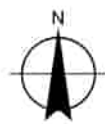
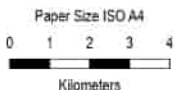
*This Sub Type is dominated by forests of the gnarled trees of the tall, grey fibrous barked Jarrah (*Eucalyptus marginata*).*

*The rough, grey, red-stained trunks of Marri (*E. calophylla*) are associated with the Jarrah forest (..) more common, even dominant on the loamy soils of the lower valley slopes and gullies and towards the eastern and northern perimeters of the Sub Type.*

*The valley floors of the Darling Uplands offer a diverse mixture of mottled, dark Blackbutt (*E. patens*), creamy, smooth barked Wandoo (*E. wandoo*) and more notably in the southern parts, pale, Bullich (*E. megacarpa*).*



- Legend**
- Roads (MRWA)
 - Major River
 - Minor Waterway
 - Reservoir
 - Highpoints
 - Contours (mAHD)
 - Proposed Mining Study Area
 - Assessment Area
 - Mineral Lease 1SA



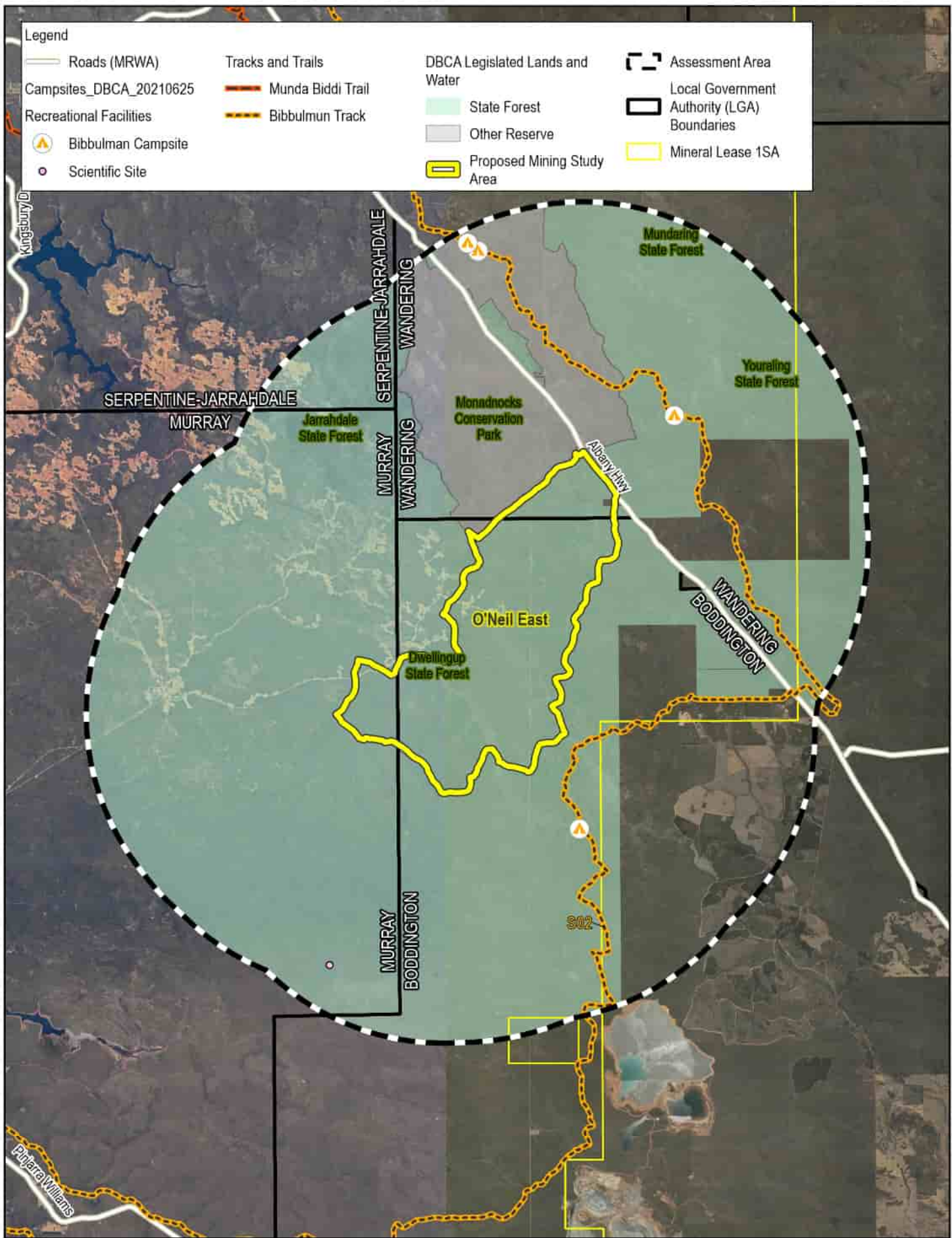
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Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1984
 Grid: GDA 1994 MGA Zone 50

Existing topography and hydrology

FIGURE 3-2



Legend			
Roads (MRWA)	Tracks and Trails	DBCA Legislated Lands and Water	Assessment Area
Campsites_DBCA_20210625	Munda Biddi Trail	State Forest	Local Government Authority (LGA) Boundaries
Recreational Facilities	Bibbulmun Track	Other Reserve	Mineral Lease 1SA
Bibbulman Campsite		Proposed Mining Study Area	
Scientific Site			

Paper Size ISO A4

0 1.5 3 4.5 6

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

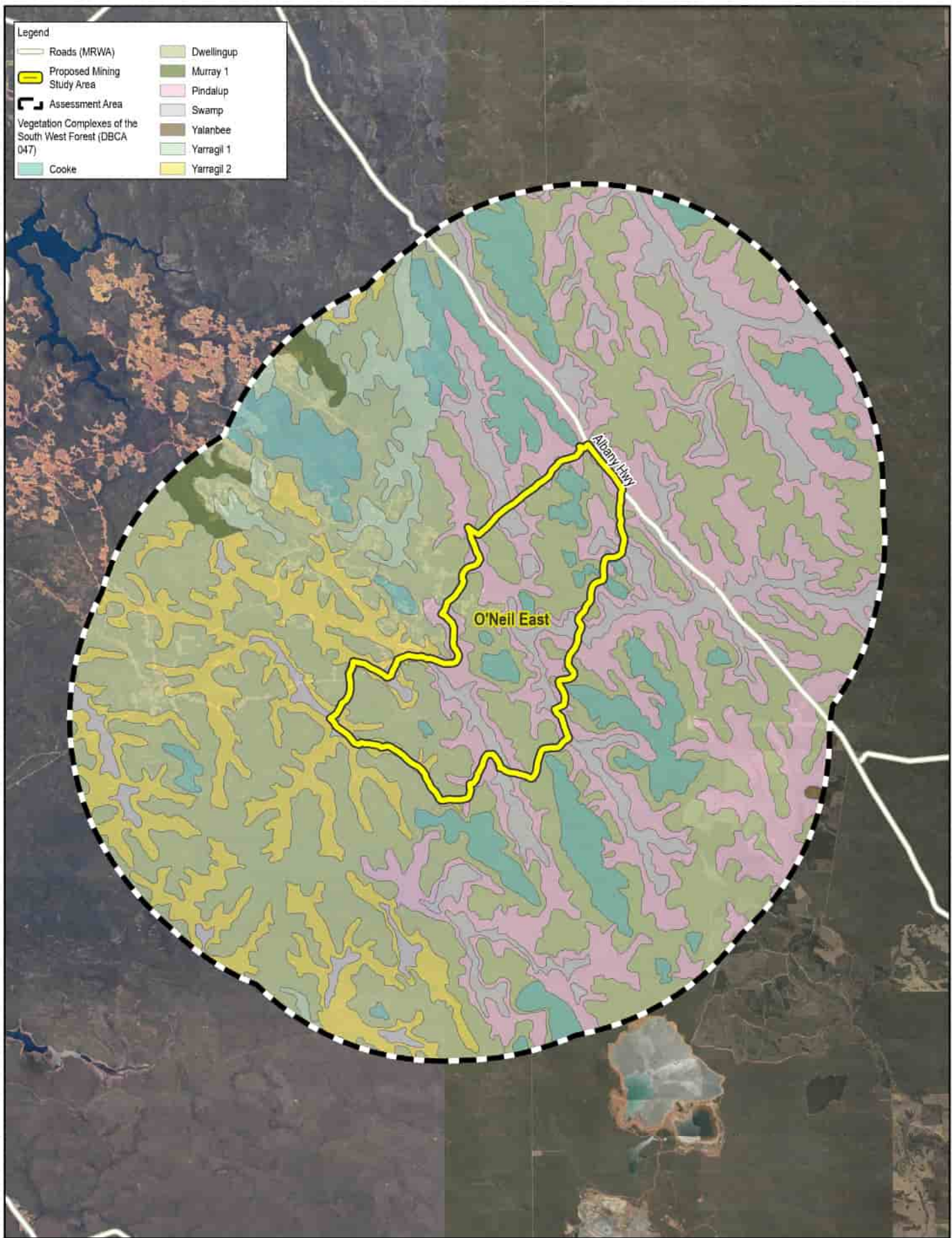


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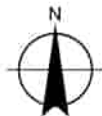
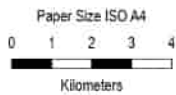
Existing reserves and infrastructure

FIGURE 3-3



Legend	
	Roads (MRWA)
	Proposed Mining Study Area
	Assessment Area
	Dwellingup
	Murray 1
	Pindalup
	Swamp
	Yalanbee
	Yarragil 1
	Yarragil 2
	Cooke

Vegetation Complexes of the South West Forest (DBCA 047)



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Existing vegetation complex

FIGURE 3-4

3.2.5 Community and stakeholder engagement

Alcoa has been engaged with a broad range of stakeholders regarding mining in the Huntly Bauxite Mine for several years.

This section provides a summary of the key stakeholders engaged and the key feedback collected by Alcoa on landscape and visual amenity for the proposed Myara North and Holyoake mine regions. Engagement has not yet been undertaken regarding the Holyoake Mine Study Area. The below stakeholder concerns have been used to predict likely community concerns for these sites. An extensive array of engagement methods were deployed to provide opportunities for meaningful consultation. Alcoa actively listened to stakeholders and community members, considering their feedback in commissioning studies like this and in preparing the Environmental Review Document.

Refer to Section 3.2.5 of the *Landscape and Visual Impact Assessment for Huntly Mine – Myara North and Holyoake* (GHD, 2021) for community and stakeholder engagement regarding the Holyoake and Myara North mine regions.

Key stakeholders engaged with are:

- Commonwealth Government
- State Government
- Local Government
- Recreation and tourism groups
- Environmental groups
- Business and industry groups
- Community groups

Key feedback raised by stakeholders impacts a range of values, including:

- Recreation and ecotourism
- Local communities and their forest setting
- Private properties
- Transport routes
- Clearing
- Rehabilitation
- Cumulative impacts

4. Landscape character and visual analysis

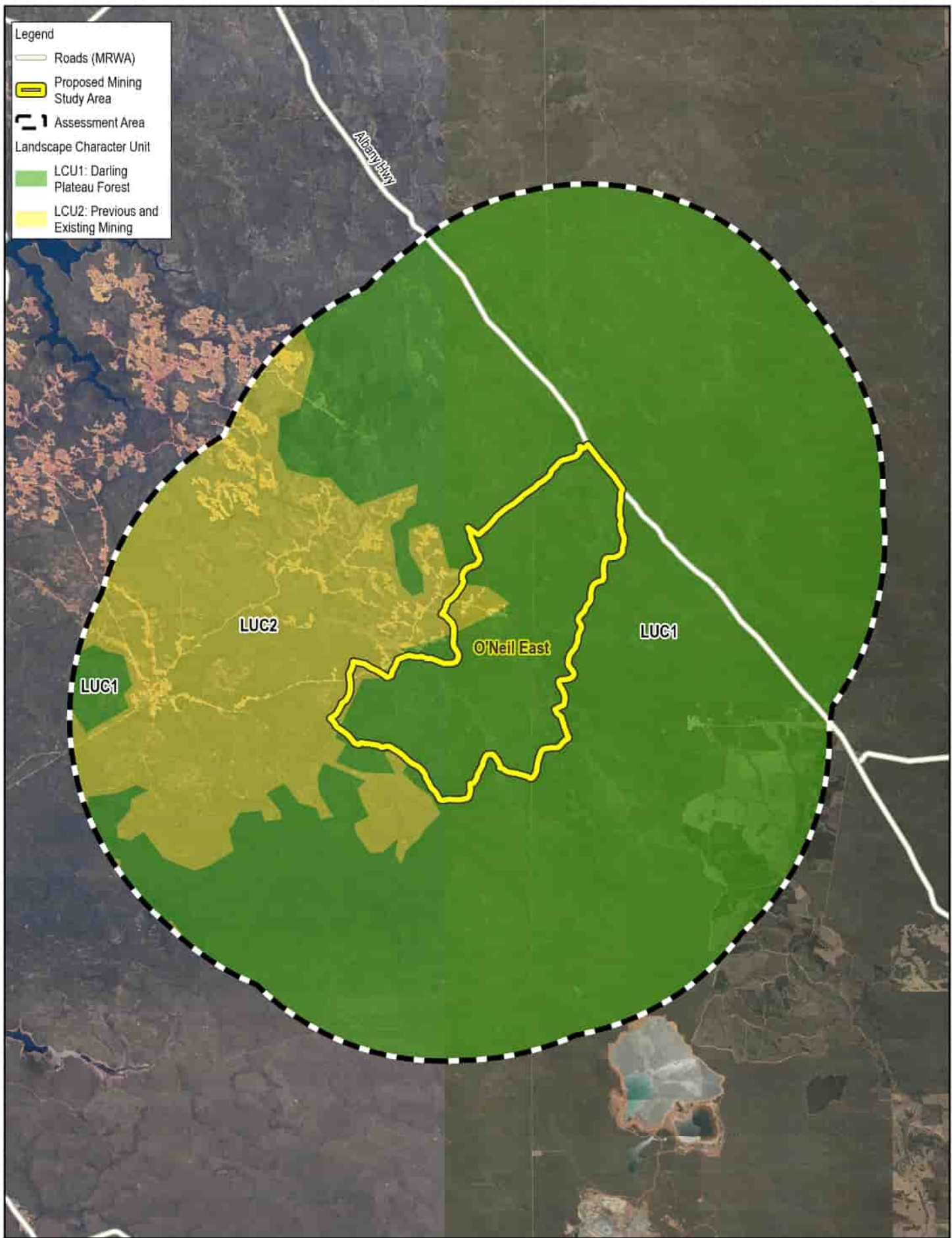
4.1 Landscape Character Units

Based on the review of the existing landscape context, and the Landscape Character Types of Western Australia (Department of Conservation and Land Management, 1994), the landscape character units (LCU's) were defined for the assessment area, as follows:


- Landscape Character Unit 1 (LCU1): Darling Plateau Forest
- Landscape Character Unit 2 (LCU2): Previous and Existing Mining

Refer to Figure 4-1 for the locations of the LCUs.

It is recognised there is Aboriginal heritage within these LCUs however these have not been considered with this report.

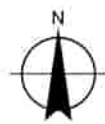
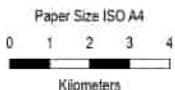


Legend

-  Roads (MRWA)
-  Proposed Mining Study Area
-  Assessment Area

Landscape Character Unit

-  LCU1: Darling Plateau Forest
-  LCU2: Previous and Existing Mining



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Landscape Character Units (LCU)

FIGURE 4-1

4.1.1 Landscape Character Unit 1: Darling Plateau Forest



Photo 4-1 North East Road



Photo 4-2 Monadnocks Conservation Park



Photo 4-3 Mount Cooke camping grounds



Photo 4-4 Pine plantation near Albany Highway



Photo 4-5 Granite outcrop on peak of Boonering Hill



Photo 4-6 View from Boonering Hill

Description

Landscape Character Unit 1 (LCU1) is comprised predominantly of State Forests, including a pine plantation and blue gum plantation.

The topography of the landscape typically consists of rolling hills and mountains with waterways cutting valleys throughout. The landscape is studded by large rough granite outcrops. The Monadnocks Conservation Park and Dwellingup, Jarrahdale, Mundaring and Youraling State Forests are popular tourist destinations, known for its areas of old growth Jarrah forest, scenic drives, campgrounds, walking tracks, cycling trails and panoramic views. The hills and mountains within LCU1 are noted for their high scenic quality, including Mount Cooke, Mount Wells and Boonering Hill.

There are two plantations within LCU1: a small pine plantation in the north of the assessment area and a larger blue gum plantation in the south-east. Within the plantations, cleared areas and formalised planting is in contrast with the surrounding native vegetation. The pine and blue gum plantations are a sign of the area's timber history that has been operating in the region for over a century.

In the north-east of the assessment area, further cleared areas and infrastructure are associated with the North Bannister Resource Recovery Park.

LCU1 forms a large part of the assessment area and provides a visual backdrop to the roads and mining areas throughout.

Table 4-1 Key Characteristics of LCU1

Character element	Description
Landform	The undulating landform is characterised by rolling hills, mountains, gullies and valleys. Granite outcrops, escarpments and depressed basins are also key features of this LCU.
Vegetation	The Jarrahdale State Forest, Dwellingup State Forest, Youraling State Forest and Mundaring State Forest are all within LCU1. Native vegetation includes dense Jarrah forest with a predominantly Banksia understory. Species include: <i>Eucalyptus marginata</i> (Jarrah), <i>Corymbia calophylla</i> (Marri), <i>Eucalyptus patens</i> (Blackbutt), <i>Eucalyptus wandoo</i> (Wandoo) with an understory of <i>Banksia grandis</i> (Bull Banksia), <i>Xanthorrhoea preissii</i> (Grass Tree), <i>Hakea trifurcate</i> (Two-leaf Hakea) and <i>Dryandras sessilis</i> (Parrot Bush). Pine and blue gum plantations and associated cleared areas of forest also sit within LCU1. The region is comprised of a combination of Uplands and Valleys pre-European vegetation complexes, reflecting the undulating landform.
Waterways/Reserves	Key waterways include the Serpentine River, the Canning River, and O'Neil East Brook. Monadnocks Conservation Park is a key reserve within LCU1 due to its scenic qualities, ecological values and recreational opportunities.
Land use	The majority of the assessment area is zoned as 'State Forest', which includes the Jarrahdale, Dwellingup, Youraling and Mundaring State Forests, as well as the Monadnocks Conservation Park. Much of this zone supports tourism uses such as camping and walking/cycling trails, as well as a pine plantation. An area zoned as special use is occupied by the North Bannister Resource Recovery Park. Areas zoned as rural in the south-east of the assessment area are occupied by a large glue gum plantation and more State Forest.
Infrastructure	The Albany Highway runs south-east through the assessment area. Gravel roads, 4WD tracks and walking and cycling trails are also located throughout the assessment area. Campgrounds are located along the Bibbulmun Track. Buildings and other infrastructure are also associated with the North Bannister Resource Recovery Park and the pine and blue gum plantations. A transmission line runs directly north to south through the region.
Cultural and characteristics	Recreational value is associated with the multiple State Forests, the Monadnocks Conservation Park, and Bibbulmun Track. Cultural value is associated with the long-running timber industry and the workforce this industry supports. The Serpentine River is an Aboriginal site.
Spatial qualities	Tall, dense forest within an undulating landscape. Varying densities within the understorey depending on the tree species and surrounding conditions. Views are typically enclosed apart from elevated areas along the Bibbulmun Track which allow for long, panoramic views and filtered views. Within the blue gum and pine plantations, the vegetation is more uniform, with straight, dense, narrow trees interspersed with large, cleared areas.

Landscape character values

Values associated with LCU1 include the dense vegetation of high ecological value within State Forests and reserves. The State Forests and reserves also have high scenic value associated with the undulating topography, granite outcrops and vegetation communities, and offer opportunities for active and passive recreation. LCU1 therefore has a **high** landscape character value.

4.1.2 Landscape Character Unit 2: Previous and Existing Mining



Photo 4-7 Mount Vincent view towards Myara mine

Example only. Image from nearby area showing similar landscape condition.



Image: Supplied by Alcoa

Photo 4-8 Existing mining site



Photo 4-9 Existing Myara mine site, new pit area



Image: Supplied by Alcoa

Photo 4-10 Rehabilitated vegetation, Myara mine site

Description

Landscape Character Unit 2 (LCU2) is comprised of the existing Myara mining site in the north-west of the assessment area.

LCU2 is dominated by gravel road networks and cleared vegetation, which allow for open views through the landscape and across the mining sites. Existing dense forest is retained on the edges and in patches throughout LCU2. Within the Myara mining site there are sections of revegetation occurring in the closed mining areas.

Table 4-2 Key Characteristics of LCU2

Character element	Description
Landform	The landform within this LCU is undulating with steep ridges running north-west through the LCU, reaching a high point at Mount Solus. Mount Solus features distinctive granite outcrops and large boulders. The existing McCoy and Myara mine pits are relatively shallow.
Vegetation	The vegetation coverage is limited due to mining activity. There are large areas of cleared vegetation with some remnant vegetation of the local State Forest. Refer to Table 4-1 for vegetation species within the State Forest. There are some areas of young, rehabilitated vegetation within the closed Myara and McCoy mining areas.
Waterways/Reserves	O'Neil East Brook is a key waterway within LCU2, which feeds into the Serpentine Dam east of the assessment area. There are no reserves within LCU2.
Land use	LCU2 is zoned as State Forest and is used for bauxite mining, including active mining and rehabilitation. LCU2 falls within the bauxite mining lease area 'Mineral Lease 1SA'.
Infrastructure	Infrastructure in LCU2 is associated with the Alcoa O'Neil and McCoy mine regions, including the McCoy corporate office. Infrastructure includes mine pits, haul road networks, conveyors, and infrastructure areas containing vehicle wash bays, offices, sheds, parking areas, and ore crushers.
Cultural and characteristics	This LCU is associated with the mining industry and the workforce this industry supports. It is a key place of work and income for people in the local and wider region. Recreational value is associated with the State Forests, including the Mount Solus walk, although visitors are recommended against undertaking the walk at this time due to the encroachment of bauxite mining.
Spatial qualities	Open views across cleared vegetation within the mined landscape. Some semi-enclosed areas in patches of retained vegetation between bauxite mines. Long views can be achieved from the top of Mount Solus.

Landscape character values

Remnant vegetation occurs in small, fragmented patches within the mining areas; and would therefore have a limited contribution to the local character. Areas of revegetated forest are immature, not significantly contributing to the landscape character. There is value associated with the distinct landform features on Mount Solus, however the closure of walking tracks due to mining restricts recreation value and exposure to scenic value. LCU2 therefore has a **low** character value.

4.2 Visual analysis

4.2.1 Sensitive receptors

Key sensitive receptors within the assessment area are outlined in Table 4-3. The sensitive receptors level of significance has been determined in accordance with the *Visual Landscape Planning in Western Australia* guidelines (Western Australia Planning Commission, 2007). The sensitive receptor levels of significance will be taken into consideration when assessing the sensitivity of the viewpoint locations.

Table 4-3 Sensitive receptors and level of significance

Sensitive receptor	Level of significance
Visitors to Monadnocks Conservation Park	Level 1: national / state significance
Users of Bibbulmun Track	Level 1: national / state significance
Road users of scenic and tourist drives along Albany Highway	Level 1: national / state significance
Users of local tracks and trails	Level 3: local significance
Local road users including but not limited to North East Road.	Level 3: local significance

4.2.2 Visual features and experiences

Regional reserves

The Monadnocks Conservation Park is a regional reserve to the north of the O'Neil East Study Area. The reserve appears to be within a natural state and provides campgrounds and walking trails for visitors. Campgrounds within the Monadnocks Conservation Park are the Mount Cooke Campsite and the Mount Cooke Group Campsite.

Key viewpoints

Long ranging views are afforded across the assessment area particularly from elevated viewpoints within the State Forest and along the tracks and trails. Key viewpoints include Boonering Hill and Mount Wells.

Bibbulmun Track

The Bibbulmun Track is a long-distance walking track, stretching 1000 km from Kalamunda in the Perth Hills to Albany on the south coast, winding through the south-west of Western Australia.

The Bibbulmun Track traverses through undulating terrain and along ridgelines of dense native vegetation. It passes over Mount Cooke in the north of the assessment area, before meandering in a south-easterly direction. In the south-east of the assessment area the track passes over Boonering Hill and Kimberling Hill before exiting the assessment area in the south. Views of the local vegetation and surrounding State Forests are a key experience of the Bibbulmun Track, most significantly from Mount Cooke and Boonering Hill.

Campsites

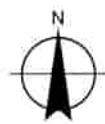
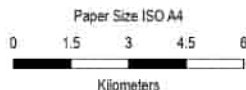
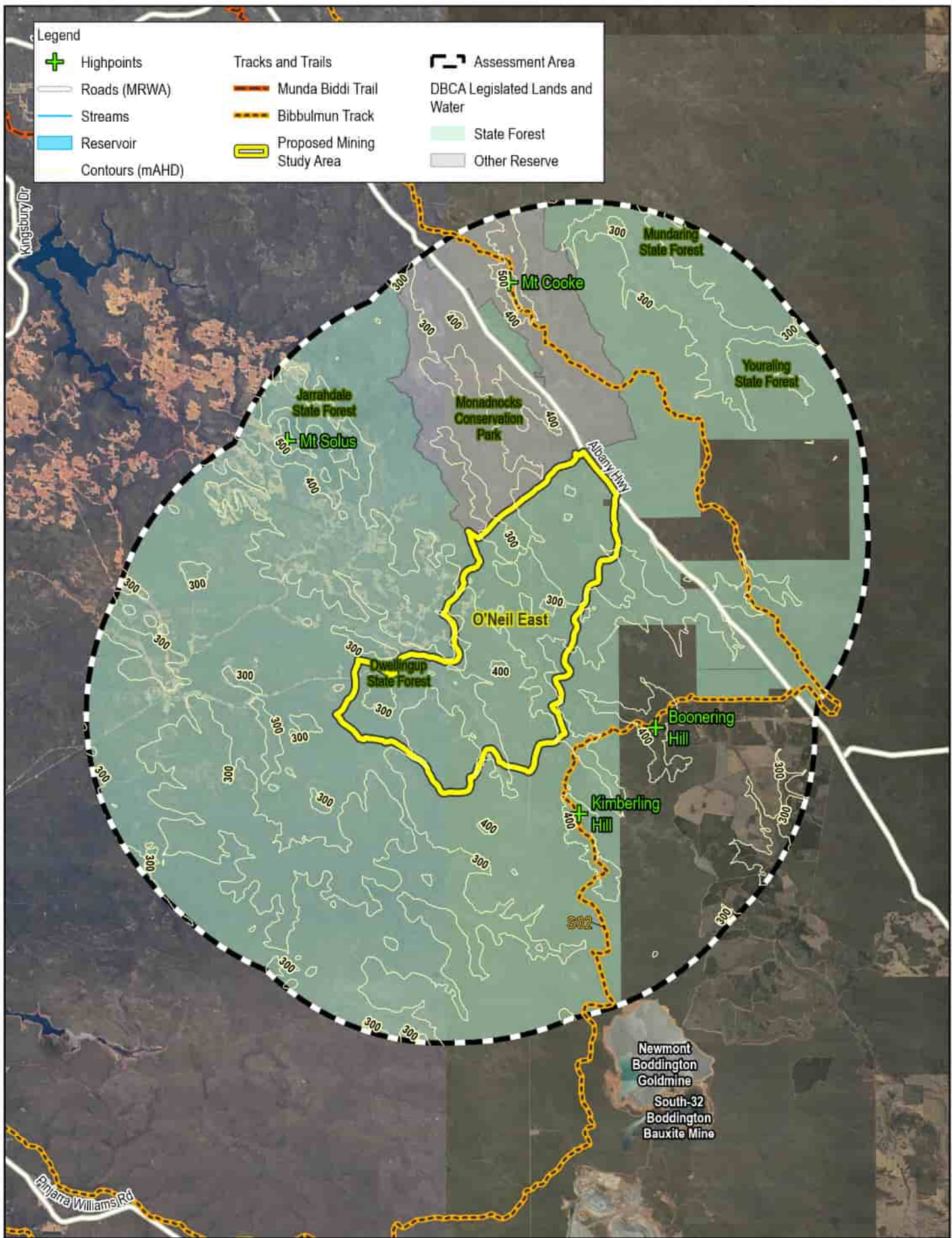
Outside of the Monadnocks Conservation Park there are two more campsites within the assessment area; the Nerang Campsite and the White Horse Hills Campsite.

Both campsites are located on the Bibbulmun Track. The Nerang Campsite is in the north-east section of the assessment area, and the White Horse Hills Campsite is located in the south-east of the assessment area.

Scenic drives

Locals and tourists to the region value the area's picturesque scenery and embrace tourist drives and road trips. The Albany Highway is a popular tourist route for travellers heading south of Perth. The Dwellingup State Forest is noted as a scenic element to the journey along the Albany Highway.

Views from the highway are typically short-term views and generally include the dense native forest and undulating topography surrounding the highway.



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Visual Analysis

FIGURE 4-2

5. Visual management objectives

This section contains visual management objectives relevant to the assessment area and O'Neil East Study Area. This section supplements the objectives identified in Section 3.1 legislation and policy context. The context analysis, landscape character units and visual baseline have been used to form the basis for establishing appropriate management objectives and strategies to manage the visual character of the landscape within the assessment area.

5.1 Best practice siting and design

To protect the existing landscape character, mine pit locations, infrastructure areas, haul road networks and haul road crossing points should be sited within the natural topographic context of the landscape. Where possible the proposed infrastructure and vegetation clearing should be sited away from high points and ridgelines. This siting of proposed works and vegetation clearing in low-lying areas will provide natural screening by the surrounding topography. Natural drainage patterns should also be retained to reduce impact on vegetation and soils beyond the mining areas. Vegetation clearance should be kept to a minimum and should be carefully sited to minimise impact to areas of remnant native forest and retain connected areas of forest where possible.

5.2 Protection and maintenance of landscape character

The valued elements that define the existing landscape character are recommended to be protected. This includes the distinct forested areas, rural settlements and the natural undulating hills of the Darling Plateau. All rehabilitated vegetation should be in keeping with the existing vegetation complexes and the existing composition of vegetation. The vegetation and terrain near sensitive receptors and along roads should be retained to screen views of the proposed mining works.

5.3 Restoration of degraded character or enhancement of opportunities

The character of the landscape appears to be in good condition within the forested areas. All vegetation clearing should be rehabilitated in keeping with the existing vegetation complexes and the existing composition of vegetation. The vegetation health across the entire site should be monitored for the long term to ensure that screening and rehabilitation are effective. Re-contouring a mined site should also be considered in the re-establishment of the original landform character and the natural vegetation diversity wherever it is feasible.

6. O’Neil East Study Area description

6.1 Summary of the O’Neil East Study Area

The following section provides a summary of the O’Neil East Study Area and includes detail relating to the main visual components that have potential to affect the landscape character and visual amenity of the assessment area. The design, extent and precise location of the following components is unknown at the time of assessment and will be determined following further assessments and investigation by Alcoa.

The following section describes the main visual components of the O’Neil East Study Area in relation to earthworks, vegetation, and mining infrastructure.

6.2 Infrastructure area

The Holyoake Mine development would contain an infrastructure area. This area would include structures such as vehicle wash bays, a site office, vehicle storage sheds, vehicle parking, maintenance sheds and ore crushers. Photo 6-1 to Photo 6-4 show examples of the infrastructure that is likely to be within the infrastructure area.



Image: Supplied by Alcoa

Photo 6-1 Existing Myara infrastructure area



Image: Supplied by Alcoa

Photo 6-2 Vehicle fuel bay

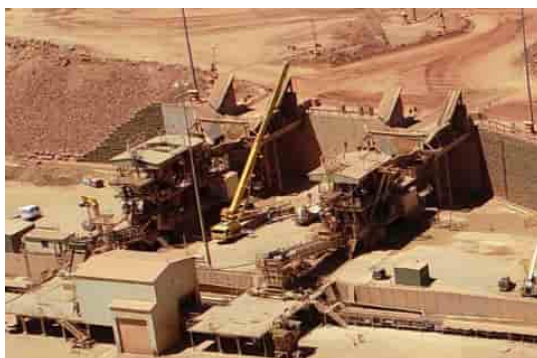


Image: Supplied by Alcoa

Photo 6-3 Crusher



Image: Supplied by Alcoa

Photo 6-4 Vehicle wash bay

6.3 Mine pits

The mine pits would require the clearance of vegetation within the proposed project areas. It is anticipated that mine pits would be in operation for eight years, from 2028 to 2036. shows an example of what a mine pit area would look like during mining operations.



Image: Supplied by Alcoa

Photo 6-5 Example of mine pit area within existing Myara Region

6.4 Haul roads

Once the ore has been extracted from the mine pits, it would be transported by trucks to the infrastructure areas along haul roads. The haul roads would require the clearance of vegetation for a width of approximately 50 – 70 m. shows an example of a typical haul road. Trucks, excavators and other mine vehicles would frequent the haul roads within each mine region throughout the mining operation period.

Haul roads may be required to cross existing roads within the proposed project areas. The location of haul road crossings will depend on an investigation by Alcoa into what, if any, options are feasible to transport ore from these areas back to the proposed infrastructure areas.



Image: Supplied by Alcoa

Photo 6-6 Example of haul roads within the existing Myara Region)

6.5 Conveyors

The Holyoake Mine Study Area may require new conveyors, haul roads and facilities in each mine region. The conveyors would require the clearance of vegetation within a corridor with a width of approximately 30 – 50 m. Whilst a conveyor may be constructed in each of the regions, there is also the potential to utilise long haul trucking for the duration of the mine region life rather than installation of the conveyor and associated infrastructure. The final decision will be subject to engineering studies to commence in the detailed design phase of the O'Neil East Study Area. Photo 6-7 shows an example of a conveyor and associated vegetation clearing.



Photo 6-7 Example of existing conveyor for Myara Region

6.6 Construction

The construction phase is anticipated to be two years and would commence in 2026. The construction activities would be similar to the existing Myara operations and would include but not be limited to:

- Clearance of vegetation for construction of haul roads, conveyor, and infrastructure areas
- Construction of buildings within the infrastructure area including vehicle wash bays, vehicle maintenance sheds, storage sheds, crusher etc.
- Presence of construction machinery and works within and around the mine regions.

6.7 Rehabilitation

Following the completion of mining within the mine pit areas the disturbed areas would be rehabilitated with revegetation and monitored until completion criteria has been met. The proposed phases of the rehabilitation would include pit recontouring, topsoil placement, seeding, planting and fertilising, and rehabilitation monitoring and replanting. Photo 6-9 to Photo 6-11to show an example of the early stages of rehabilitation of a mine pit.



Image: Supplied by Alcoa

Photo 6-8 Rehabilitation at 3-4 years from completion of rehabilitation



Image: Supplied by Alcoa

Photo 6-9 Rehabilitation at established stage (1- 5 years)



Image: Supplied by Alcoa

Photo 6-10 Rehabilitation at established stage (6-15 years)



Image: Supplied by Alcoa

Photo 6-11 Rehabilitation at mature stage (16- 30 years)

7. Landscape impact assessment

The following section includes an assessment of the impacts to landscape character as a result of the O’Neil East Study Area. Refer to Section 4.1. for a description of the landscape character units.

7.1 Landscape Character Unit 1: Darling Plateau Forest

Refer to Table 7-1 for LCU impact assessment.

Table 7-1 Landscape Character Unit 1 impact assessment

Criteria	Assessment
Anticipated change to landscape character	<p>The majority of the O’Neil East Study Area would occur within LCU1 as shown in Figure 4-1. The O’Neil East mine region is located within the Dwellingup State Forest, which possesses the key characteristics identified within Section 4.1.</p> <p>Construction</p> <p>During construction, areas of vegetation within the State Forest would be cleared for the construction of the mining infrastructure area, haul roads and mining pits. This phase may also involve the construction of a conveyor. Construction activity and machinery would be present within the Study Area.</p> <p>Operation</p> <p>During operation, sections of vegetation within the Dwellingup State Forest would be cleared within the Study Area for mining. The vegetation clearance would occur in stages over the life of the mining operation. Mining activities would be present including trucks and excavators within the mine pits and along the haul roads. A conveyor may also be present. The O’Neil East Study Area would be expected to impact the key characteristics of LCU1 including the existing landform, vegetation, land use, infrastructure, and spatial qualities as identified in Table 4-1. As the landscape is mined during operation, the character of LCU1 would incrementally adopt the LCU2 characteristics outlined in Table 4-2. This would include the clearance of vegetation and the introduction of mine pits and mining infrastructure.</p> <p>Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation phases). The rehabilitation would occur in parallel with the continuation of mining operations as the different stages of pits are mined. Following the completion of mining at O’Neil East the vegetation would progressively mature.</p>
Landscape value	High (refer to Section 4.1.1)
Susceptibility to change	The susceptibility to change is considered high , as the type of development proposed would have a detrimental effect on some of the areas landscape character, condition and value that could not be mitigated in the immediate future.
Sensitivity to change	The sensitivity to change is high , as elements of the landscape character including the Dwellingup State Forest vegetation, the landscape’s spatial qualities and natural characteristics seen throughout the Darling Plateau Forest could not accommodate proposed changes without experiencing adverse impacts.
Magnitude of change	<p>Construction</p> <p>The magnitude of change is considered high as the removal of vegetation and introduction of mining activities, haul roads and infrastructure areas would cause parts of the LCU to be changed and its quality diminished. Some of the existing features and characteristics of LCU1 would come to resemble those of LCU2, thereby greatly reducing the value of the landscape character.</p> <p>Operation</p> <p>The magnitude of change during operation is considered high, as the removal of vegetation and introduction of mining activities, haul roads, and infrastructure areas would cause key elements of the LCU to be changed and its quality diminished. The scale of change would be uncharacteristic to LCU1. However, rehabilitation of the closed mine pits and haul roads would commence 3-4 years from clearing, and within 6-15 years these areas may begin to integrate back into the surrounding vegetated landscape.</p>

Criteria	Assessment
Duration of impact	The impacts associated with construction would be considered short-term (an anticipated two years), and the impacts associated with operation would be considered medium-term (an anticipated eight years) (refer to Section 2.8.4 for duration of impact). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation phases). Rehabilitation would be permanent once established.
Significance of impact	The significance of impact is assessed as high during construction and operation, as the magnitude of change and sensitivity to change are both high.

7.2 Landscape Character Unit 2: Previous and Existing Mining

Refer to Table 7-2 for LCU2 impact assessment.

Table 7-2 Landscape Character Unit 2 Assessment

Criteria	Assessment
Anticipated change to landscape character	<p>The O'Neil East Study Area would primarily occur outside of LCU2 though the Study Area overlaps with a small portion of the existing Myara mining area, as shown in Figure 4-1.</p> <p>Construction</p> <p>During construction the anticipated change within LCU2 may involve the clearance of vegetation for the construction of the infrastructure area, haul roads, mining pits and possible conveyor. The haul roads and possible conveyor may travel through the assessment area to connect to the existing Myara or McCoy infrastructure area, and/or the other regions within the Holyoake Mine Study Area infrastructure areas.</p> <p>Operation</p> <p>During operation it is not anticipated that any mine pits will be located within LCU2. However, the anticipated change may involve the operation of the haul roads and possible conveyor within LCU2, connecting the O'Neil East infrastructure area to the existing Myara or McCoy infrastructure area and/or the other regions within the Holyoake Mine Study Area infrastructure areas.</p>
Landscape value	Low (refer to Section 4.1.2).
Susceptibility to change:	The susceptibility to change is considered low , as development of this type will unlikely have an adverse effect on this existing landscape character, condition, or existing value as the development is not uncharacteristic of LCU2.
Sensitivity to change	The sensitivity to change is low . Although there is some fragmented patches of remnant vegetation present within LCU2, the landscape value and the susceptibility to change are both low.
Magnitude of change	<p>Construction</p> <p>The magnitude of change is considered low, as the anticipated changes may result in a minor loss to the forest vegetation, which is a key landscape feature of the LCU. The introduction of machinery and infrastructure would be new but not uncharacteristic within the existing landscape character.</p> <p>Operation</p> <p>The magnitude of change during operation would also be low, as the potential operation of the haul roads and/or conveyors would be new but not uncharacteristic within the existing landscape character.</p>
Duration of impact	The impacts associated with construction would be considered to be short-term, and the impacts associated with operation would be considered to be long-term (refer to Table 2-7 for duration of impact). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation phases). Rehabilitation would be permanent once established.
Significance of impact	The significance of impact is assessed as low during construction and operation, as the sensitivity to change and magnitude of change are both low.

8. Visual impact assessment

This chapter includes the ZTV analysis, identification of viewpoint locations, visual impact assessment from these locations, and an overview of construction impacts.

8.1 ZTV analysis

The following section provides a discussion of the ZTV analysis, assessing the theoretical visibility of changes associated with the O'Neil East Study Area. Refer to Section 2.8.2 for ZTV methodology.

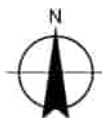
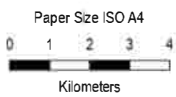
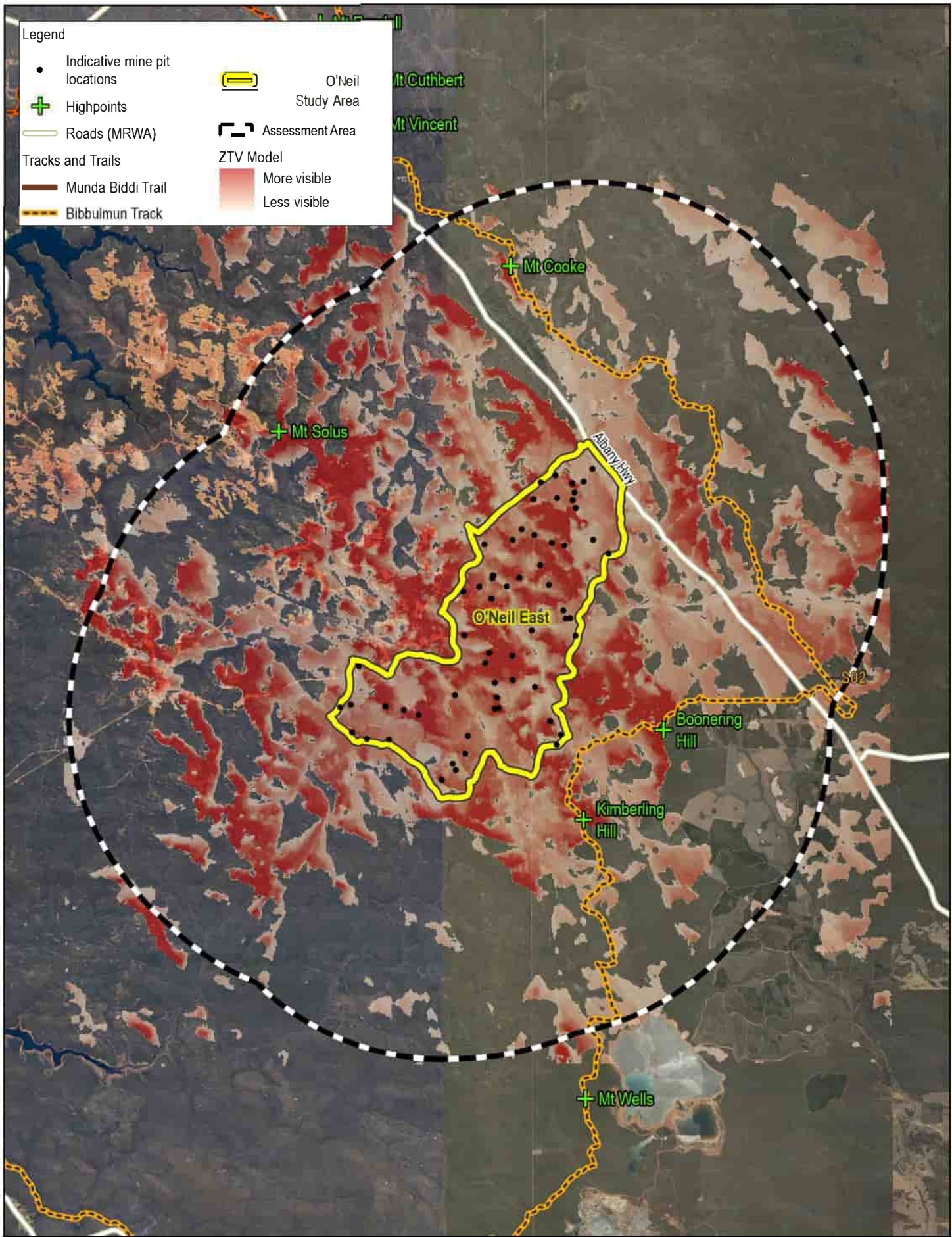
As an indicative mine pit plan was not available for this assessment, 60 computer-generated random points within the DE were used as indicative mine pit locations. The ZTV analysis was undertaken using the proposed height of an excavator (15 m), located at the 60 random points, which represent the possible location of mine pits. This assists in understanding the theoretical visibility of an excavator and to gain an understanding of where proposed vegetation clearance associated with an approximate similar quantity of randomly-located mine pits may be visible from.

The ZTV mapping represents the indicative extent of theoretical visibility of the indicative mine pit locations. Visibility is represented as the indicative quantity of random points theoretically visible. Less visible (white) represents fewer mine pits theoretically visible, and more visible (red) represents more mine pits theoretically visible. At locations where no colour is shown on the mapping, this indicates there would be no theoretical visibility of any of the random points.

As shown in Figure 8-1, the indicative O'Neil East mine pits would be theoretically visible from elevated areas throughout the assessment area. Areas with the most visibility (represented as red) are located in a broad area of the Dwellingup State Forest and more isolated sections the Youraling, Mundaring and Jarrahdale State Forests. The indicative mine pits are theoretically visible from Mount Cooke, Boonering Hill, Kimberling Hill and Mount Solus, as well as the White Horse Hills campsite on Kimberling Hill. Large sections of the Albany Highway and the Bibbulmun Track are also shown to have high theoretical visibility.

Some areas with less visibility (represented as white) include gullies, valleys and low-lying areas throughout the assessment area. The Albany Highway and Bibbulmun Track pass through areas of less visibility.

The mine pits are not theoretically visible from relatively low-lying areas of the Dwellingup State Forest in the south of the assessment area of the Youraling and Mundaring State Forests in the north of the assessment area. They are also not theoretically visible from the pine or blue gum plantations, aside from small, isolated areas with low visibility, or the Mount Cooke Campsite, Mount Cooke Group Campsite or Nerang Campsite.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50

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ZTV

FIGURE 8-1

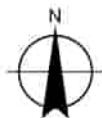
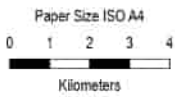
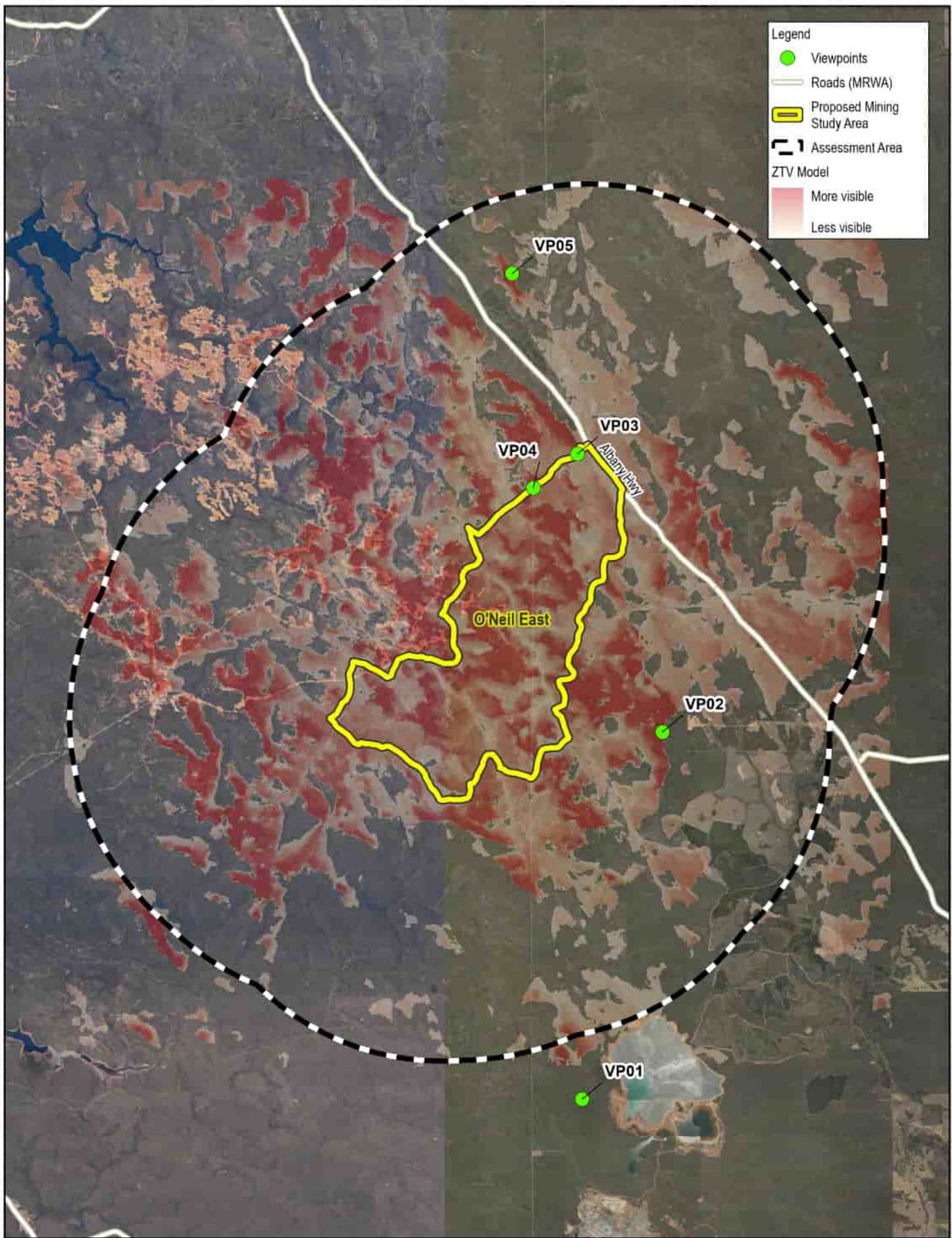
8.2 O'Neil East viewpoint locations

Based on the visual analysis, the ZTV analysis and an understanding of the O'Neil East Study Area, viewpoint locations were selected for assessment of sensitive receptors. Refer to Table 8-1 and Figure 8-2 for the viewpoint locations. For each viewpoint, a panorama of the existing view is provided, together with a description of the existing view, anticipated changes, and impact assessment rating.

Photomontages were created for VP01 (Mount Wells), VP02 (Boonering Hill) and VP05 (Mount Cooke). Using a redline overlay, the photomontages illustrate the visibility of the proposal from sensitive receptor location. Refer to Appendix A Photomontages.

Table 8-1 O'Neil East Viewpoints

Viewpoint	Location	Sensitive Receptors
VP01	Mount Wells	Users of the Bibbulmun Track
VP02	Boonering Hill	Users of the Bibbulmun Track
VP03	North East Road 1	Local road users on North East Road
VP04	North East Road 2	Local road users on North East Road
VP05	Mount Cooke	Users of the Bibbulmun Track and visitors to the Monadnocks Conservation Park



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

View Point locations

FIGURE 8-2

8.2.1 Viewpoint location 1 Mount Wells

VP01 is located on Mount Wells near the Bibbulmun Track, as shown in Figure 8-3. VP01 is facing north as shown in Figure 8-3 towards the Dwellingup State Forest. Refer to Table 8-2 for assessment and refer to Appendix A Photomontages.



Figure 8-3 VP01 location plan



Photo 8-1 View north from Mount Wells



Photo 8-2 Proposed view north-west from Mount Wells towards the O'Neil East Study Area

(Study Area delineated by a red overlay)

Table 8-2 VP01 impact assessment

Criteria	Assessment
Location and view direction	GPS location: 32° 41' 54.222" S 116° 20' 5.099" E, Elevation: 542.5 m VP01 is located south of the O'Neil East assessment area. This viewpoint is representative of views experienced by recreational users and tourists hiking the Bibbulmun Track.
Description of existing view	VP01 is an elevated viewpoint, and comprises long, open views over the undulating Dwellingup State Forest, which extends into the background. In the right of the foreground is the sloping terrain of Mount Wells, covered in dense vegetation. This foreground vegetation significantly filters views towards the existing Myara mining area, which is located in the right of the background.
Anticipated change to view	<p>Construction During construction the anticipated change would be located in the right of the background of this view, where the red overlay is located in Photo 8-2. Filtered views may be achieved of the clearance of vegetation associated with the construction of the haul roads and the mining infrastructure area, exposing bare ground. Views to the O'Neil East Study Area would be significantly filtered by the existing foreground vegetation on Mount Wells, would occupy a small portion of the view and would be ill-defined due to the hazy nature of the distant hills. There would be no change to the foreground vegetation or vegetation in the left of view as these areas are outside the proposed O'Neil East DE.</p> <p>Operation During operation the anticipated change would also be located in the right of the background of this view, where the red overlay is located in Photo 8-2. The potential change to the view includes sections of the Dwellingup State Forest being cleared for mining in stages over the life of the mining operations, exposing bare ground. As shown on Figure 8-1 the indicative mine pits would be theoretically visible from this location. However, if visible, the O'Neil East Study Area would occupy a small portion of the view and be ill-defined due to the hazy nature of the distant hills. Views to the O'Neil East Study Area would also be significantly filtered by the existing foreground vegetation on Mount Wells. The rehabilitation would occur in parallel with the continuation of mining operations within the view. Cleared areas would be progressively revegetated, thereby gradually being visually integrated back into the surrounding view as vegetation matures.</p>
Sensitivity to change	The sensitivity to change is considered high , as those using the Bibbulmun Track and experiencing scenic views from Mount Wells would place value upon the landscape and enjoyment of views within their setting. Sensitive receptors on the Bibbulmun Track are of 'national/state significance' (Western Australia Planning Commission, 2007).

Criteria	Assessment
Magnitude of change	<p>Construction and operation</p> <p>The magnitude of change during construction and operation would be considered low as the change to view would occur at a distance of over 12km and is therefore likely to be ill-defined and insignificant within the wider view. It is also likely to be filtered by the foreground vegetation seen in Photo 8-2 and is therefore unlikely to impact the quality of the view. Visual impacts would be mitigated in the long-term with rehabilitation.</p>
Duration of impact	<p>The impacts associated with construction would be considered short-term (an anticipated two years), and the impacts associated with operation would be considered medium-term (an anticipated eight years) (refer to Section 2.8.4 for duration of impact). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation development).</p>
Significance of impact	<p>The significance of impact is assessed as moderate during construction and operation, as the sensitivity to change is high and the magnitude of change is low.</p>

8.2.2 Viewpoint location 2 Boonering Hill

VP02 is located on Boonering Hill, adjacent to the Bibbulmun Track. VP02 is facing north-west as shown in Figure 8-4 towards the Dwellingup State Forest. Refer to Table 8-3 for assessment and refer to Appendix A Photomontages.



Figure 8-4 VP02 location plan



Photo 8-3 View north-west from Boonering Hill



Photo 8-4 Proposed view north-west from Boonering Hill towards the O'Neil East Study Area

(Study Area delineated by a red overlay)

Table 8-3 VP02 impact assessment

Criteria	Assessment
Location and view direction	<p>GPS location: 32° 34' 22.84" S 116° 22' 5.11" E, Elevation: 540.5 m</p> <p>This viewpoint is located approximately 3.6 km east of the proposed O'Neil East DE, on the peak of Boonering Hill, where walkers along the Bibbulmun Track can achieve panoramic views.</p>
Description of existing view	<p>VP02 is an elevated viewpoint that captures long, panoramic views of the surrounding area. Extending from the foreground to the background is the gently undulating, densely vegetated Dwellingup State Forest, with small, scattered granite outcrops throughout. In the centre of the background Mount Solus is visible, and in the right of the background is Mount Cooke. In the centre-left of the background cleared areas associated with the existing Myara mine operations are visible, contrasting with the surrounding forest.</p>
Anticipated change to view	<p>Construction</p> <p>During construction the anticipated change would be located within the Dwellingup State Forest, in the midground and background of this view where the red overlay is located in Photo 8-4. The anticipated changes would include the presence of construction equipment, machinery, and vehicles, and the clearance of vegetation associated with the construction of the haul roads and mining infrastructure area. There would be no change to the foreground vegetation within the State Forest as this is outside the proposed O'Neil East DE.</p> <p>Operation</p> <p>As shown on Figure 8-1 the indicative mine pits would be theoretically visible from this location. The O'Neil East Study Area would result in sections of the Dwellingup State Forest across the midground being cleared for mining operations. This vegetation clearance would occur in stages over the life of the mining operations. Throughout the mining area there would also be the presence of mining infrastructure, machinery and trucks, including excavators within mine pits and along haul roads.</p> <p>The rehabilitation would occur in parallel with the continuation of mining operations within the view. Cleared areas would be progressively revegetated, thereby gradually being visually integrated back into the surrounding view as vegetation matures.</p> <p>There would be no change to the foreground vegetation within the State Forest as this is outside the proposed O'Neil East DE as shown in Photo 8-4.</p>
Sensitivity to change	<p>The sensitivity to change is considered high, as those using the Bibbulmun Track and experiencing scenic views from Boonering Hill would place high value upon the landscape and enjoyment of views within their setting. Sensitive receptors on the Bibbulmun Track are of 'national/state significance' (Western Australia Planning Commission, 2007).</p>

Criteria	Assessment
Magnitude of change	<p>Construction The magnitude of change during construction would be considered moderate due to the partial change to the view, as a result of the clearance of vegetation and the presence of construction equipment, machinery and vehicles across the midground of the view. Though there is some existing mining activity visible in the centre-left of the background, the construction of the O’Neil East Study Area would result in the expansion of the cleared areas into the midground. Vehicles within view would be dynamic, moving throughout the DE. The O’Neil East Study Area would cause the landscape within the view to be changed and its quality diminished, though visual impacts are expected to be mitigated in the long-term with rehabilitation.</p> <p>Operation The magnitude of change during operation would be moderate due to the partial change to the view, as a result of the clearance of vegetation for mining and the presence of mining infrastructure, machinery and trucks across the midground of the view. Vehicles within view would be dynamic, moving throughout the DE. The operation of the O’Neil East Study Area would cause the landscape within the view to be changed and its quality diminished, though visual impacts would be mitigated in the long-term with rehabilitation.</p>
Duration of impact	The impacts associated with construction would be considered short-term (an anticipated two years), and the impacts associated with operation would be considered medium-term (an anticipated eight years) (refer to Section 2.8.4 for duration of impact). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation development).
Significance of impact	The significance of impact is assessed as high-moderate during construction and operation, as the sensitivity to change is high and the magnitude of change is moderate.

8.2.3 Viewpoint location 3 North East Road 1

VP03 is located adjacent to North East Road, near the boundary of the proposed O'Neil East DE, as shown in Figure 8-5. VP03 is facing south down an unnamed track as shown in Photo 8-5, within the Dwellingup State Forest. Refer to Table 8-4 for assessment.



Figure 8-5 VP03 location plan



Photo 8-5 View south from North East Road

Table 8-4 VP03 impact assessment

Criteria	Assessment
Location and view direction	<p>GPS location: 32° 28' 39.16" S 116° 20' 3.90" E, Elevation: 343.3 m</p> <p>VP03 is located on North East road, on the boundary of the proposed O'Neil East DE and Monadnocks Conservation Park. The viewpoint is representative of a typical view experienced by local road users at the intersection of North East Road and the unnamed track within view.</p>
Description of existing view	<p>VP03 comprises a view along an unsealed vehicle track within the Dwellingup State Forest, gently curving out of view to the right. In the foreground the vegetation is mostly comprised of low shrubs and grasses. Raised topography and tree coverage becoming increasingly dense frames the background view.</p>
Anticipated change to view	<p>Construction</p> <p>As this view is located on the boundary of the O'Neil East DE, during construction the anticipated change could be located within the entire field of this view. The anticipated changes may include the presence of construction equipment, machinery, and vehicles, and possible clearance of vegetation associated with the construction of the haul roads and mining infrastructure area.</p> <p>Operation</p> <p>As shown on Figure 8-1 the indicative mine pits may be theoretically visible from this location. During operation, the sections of the Dwellingup State Forest in the midground and background across the field of view may be cleared for mining operations. This vegetation clearance would occur in stages over the life of the mining operations, exposing bare earth and opening up longer views into the forest. Throughout the field of view, mining infrastructure, machinery and trucks, including excavators within mine pits and along haul roads, may also be present.</p> <p>Rehabilitation is proposed to occur in parallel with the continuation of mining operations. Cleared areas would be progressively revegetated, thereby gradually restoring the vegetated view as vegetation matures.</p>
Sensitivity to change	<p>The sensitivity to change is considered low, as the view represents road users in motor vehicles that are passing through and therefore have short-term views.</p>
Magnitude of change	<p>Construction</p> <p>The magnitude of change during construction would be considered high due to the possible obvious change to the view, as a result of the possible clearance of vegetation and the presence of construction equipment, machinery and vehicles within the entire field of view. The construction of the O'Neil East Study Area could cause the landscape within the view to be completely changed and its quality diminished, however these impacts have the potential to be mitigated as discussed in Section 9.</p> <p>Operation</p> <p>The magnitude of change during operation may be high, due to the obvious change to view, as a result of the possible clearance of vegetation for mining and presence of mining infrastructure, machinery and trucks within the entire field of view. The operation of the O'Neil East Study Area could cause the landscape within the view to be completely changed and its quality diminished, however these impacts have the potential to be mitigated as discussed in Section 9.</p>
Duration of impact	<p>The duration of the construction impacts would be short-term (an anticipated two years), and the duration of the operation impacts would be medium-term (an anticipated eight years). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation development).</p>
Significance of impact	<p>The significance of impact would be moderate during construction and operation, as the sensitivity to change is low and the magnitude of change is high. This impact rating has the potential to be reduced if mitigation recommendations outlined in Section 9 are adopted.</p>

8.2.4 Viewpoint location 4 North East Road 2

VP04 is located at the intersection of North East Road and the transmission line easement, on the boundary of the proposed O'Neil East DE, as shown in Figure 8-6. VP04 is facing south-east as shown in Photo 8-6 towards the Dwellingup State Forest. Refer to Table 8-5 for assessment.



Figure 8-6 VP04 location plan



Photo 8-6 View south-east from North East Road

Table 8-5 VP04 impact assessment

Criteria	Assessment
Location and view direction	GPS location: 32° 29' 20.80" S 116° 18' 59.05" E, Elevation: 319.6 m VP04 is located on the northern boundary of the proposed O'Neil East DE. The viewpoint is representative of a view experienced by local road users on North East Road.
Description of existing view	VP04 comprises a view from the northern shoulder of North East Road where it intersects with an overhead transmission line and associated easement. The cleared easement is visible in the left of the foreground. Above it the power lines and power poles extend away from view, into the right of the background. Also in the foreground is an area of bare dirt and low shrubs, which partially screen views of the easement. Beyond the easement, in the background, a low, densely vegetated hill is visible within the Dwellingup State Forest and enclosing the O'Neil East DE.
Anticipated change to view	<p>Construction During construction the anticipated change could be located throughout the field of this view. The anticipated changes may include the presence of construction equipment, machinery, and vehicles, and the clearance of vegetation associated with the construction of the haul roads and mining infrastructure area.</p> <p>Operation As shown on Figure 8-1 the indicative mine pits could be theoretically visible from this location. The O'Neil East Study Area may result in sections of the Dwellingup State Forest across the field of view being cleared for mining operations. This vegetation clearance would occur in stages over the life of the mining operations. Throughout the mining area, mining infrastructure, machinery and trucks, including excavators within mine pits and along haul roads, may also be present. Rehabilitation of cleared areas would occur in parallel with the continuation of mining operations. Cleared areas would be progressively revegetated, thereby gradually restoring the vegetated view as vegetation matures.</p>
Sensitivity to change	The sensitivity to change is considered low , as the view represents road users in motor vehicles that are passing through and therefore have short-term views.
Magnitude of change	<p>Construction The magnitude of change during construction would be considered high due to the possible change to the view, as a result of the possible clearance of vegetation and presence of construction equipment, machinery and vehicles within the entire field of view. The construction of the O'Neil East Study Area could cause the landscape within the view to be completely changed and its quality diminished, however these impacts have the potential to be mitigated as discussed in Section 9.</p> <p>Operation The magnitude of change during operation would be high, due to the possible change to view, as a result of the possible clearance of vegetation for mining and presence of mining infrastructure, machinery and trucks within the entire field of view. The operation of the O'Neil East Study Area could cause the landscape within the view to be completely changed and its quality diminished, however these impacts have the potential to be mitigated as discussed in Section 9.</p>
Duration of impact	The duration of the construction impacts would be short-term (an anticipated two years), and the duration of the operation impacts would be medium-term (an anticipated eight years). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation development).
Significance of impact	The significance of impact would be moderate during construction and operation, as the sensitivity to change is low and the magnitude of change is high. This impact rating has the potential to be reduced if mitigation recommendations outlined in Section 9 are adopted.

8.2.5 Viewpoint location 5 Mount Cooke

VP05 is located on Mount Cooke along the Bibbulmun Track, as shown in Figure 8-7. VP05 is situated within the Monadnocks Conservation Park and is facing south-west as shown in Figure 8-7. Refer to Table 8-6 for assessment. refer to Appendix A Photomontages.

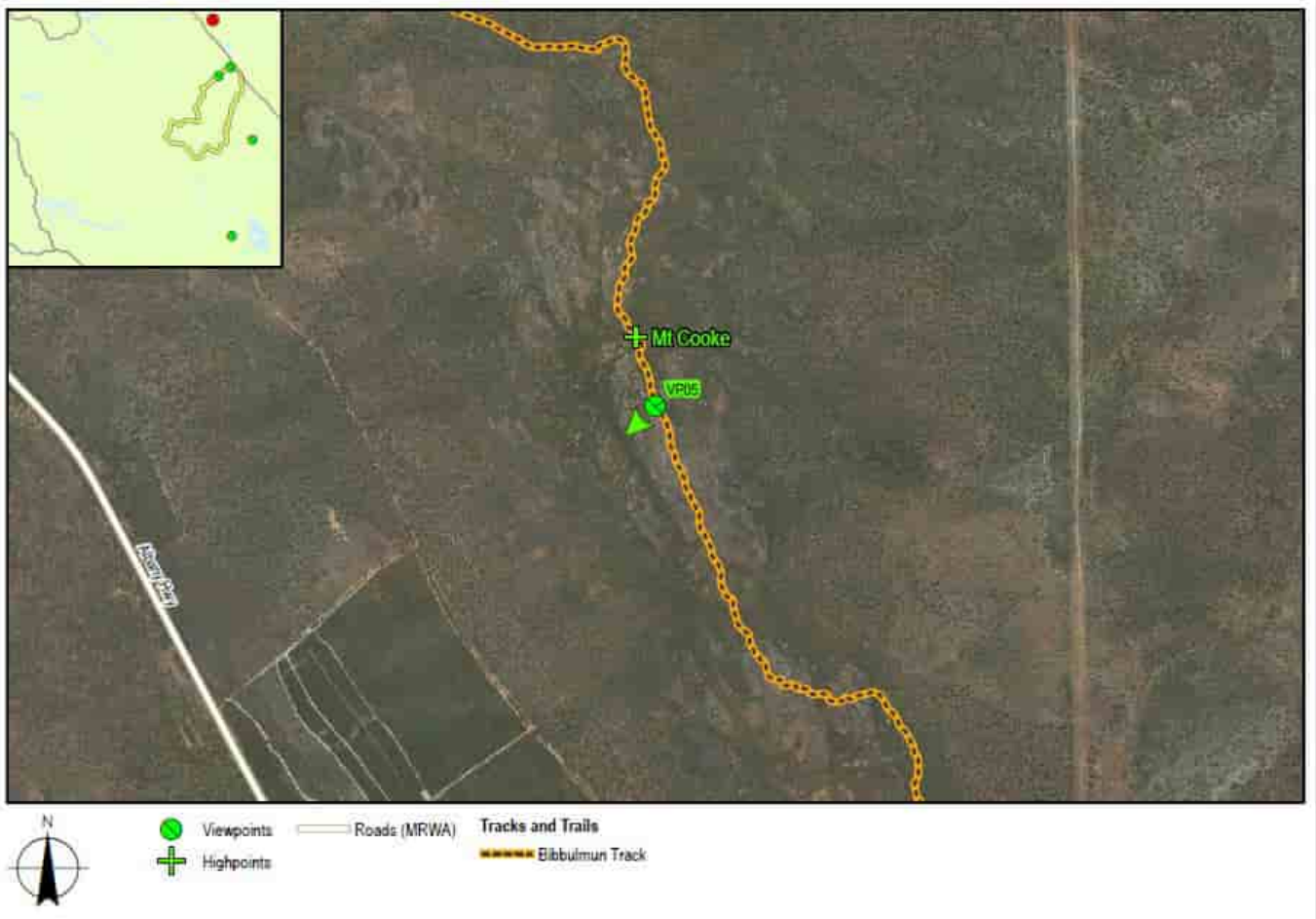


Figure 8-7 VP05 location plan



Photo 8-7 View south-west from Mount Cooke



Photo 8-8 Proposed view south-west from Mount Cooke towards the O'Neil East Study Area

(Study Area delineated by a red overlay)

Table 8-6 VP05 impact assessment

Criteria	Comments
Location and view direction	GPS location: 32° 24' 56.466" S 116° 18' 30.251" E, Elevation: 562m VP05 is located approximately seven km from the proposed O'Neil East DE. This viewpoint is representative of views experienced by tourists and recreational users hiking the Bibbulmun Track, near the peak of Mount Cooke.
Description of existing view	VP05 is an elevated viewpoint comprised of long, wide open views over the densely vegetated Dwellingup State Forest. In the foreground of the view, a rocky outcrop and dense vegetation of Mount Cooke is present. In the background is gently undulating terrain that continues long into the distance with a few elevated landforms in the background of view forming the horizon. To the centre and right of the background, areas cleared of vegetation are visible associated with the Myara mining operations.
Anticipated change to view	<p>Construction</p> <p>During construction the anticipated change would be located within the Dwellingup State Forest, in the left of the background of this view where red overlay is located in Photo 8-8. The anticipated changes may include the presence of construction equipment, machinery, and vehicles, and the clearance of vegetation associated with the construction of the haul roads and mining infrastructure area. There would be no change to the foreground vegetation or vegetation in the right of view as these areas are outside the proposed O'Neil East DE as shown in Photo 8-8.</p> <p>Operation</p> <p>As shown in Figure 8-1 the indicative mine pits would be theoretically visible from this location. The O'Neil East Study Area may result in sections of the Dwellingup State Forest in the left of the background being cleared for mining operations. Cleared areas would appear visually similar to the existing Myara mines in the right of the background. This vegetation clearance would occur in stages over the life of the mining operations. Throughout the mining area, most likely in areas cleared of vegetation, mining infrastructure, machinery and trucks, including excavators within mine pits and along haul roads may also be visible.</p> <p>Potential views to the O'Neil East Study Area would be partially filtered by the existing foreground vegetation and would occupy a small proportion of the view. There would be no change to the foreground vegetation or vegetation in the right of view as these areas are outside the proposed O'Neil East DE as shown in Photo 8-8.</p> <p>The rehabilitation would occur in parallel with the continuation of mining operations within the view. Cleared areas would be progressively revegetated, thereby gradually being visually integrated back into the surrounding view as vegetation matures.</p>
Sensitivity to change	The sensitivity to change is considered high , as those using the Bibbulmun Track and experiencing the views from Mount Cooke within the Monadnocks Conservation Park would place value upon the landscape and enjoyment of views of their setting. The view is a viewing destination along the Bibbulmun Track where hikers will stop to take in the long, wide open views.

Criteria	Comments
Magnitude to change	<p>Construction</p> <p>The magnitude of change during construction would be considered low due to the minor alteration to the view associated with the clearance of vegetation and the presence of construction equipment, machinery, and vehicles. The changes would be at a similar distance and scale to the existing Myara mines, and therefore would not be uncharacteristic within the existing view. Furthermore, views are likely to be filtered by the existing foreground vegetation on Mount Cooke and visual impacts would be mitigated in the long-term with rehabilitation.</p> <p>Operation</p> <p>The magnitude of change during operation would be low due to the minor alteration to the view associated with the clearance of vegetation and the presence of mining infrastructure, machinery, and trucks. If visible, the changes would be at a similar distance and scale to the existing Myara mines, and therefore would not be uncharacteristic within the existing view. Furthermore, views are likely to be filtered by the existing foreground vegetation within the view. Visual impacts would be mitigated in the long-term with rehabilitation.</p>
Duration of impact	<p>The impacts associated with construction would be considered short-term (an anticipated two years), and the impacts associated with operation would be considered medium-term (an anticipated eight years) (refer to Section 2.8.4 for duration of impact). Rehabilitation within the closed mine pits would commence three to four years from clearing and would become established to a mature stage at 16-30 years from completion (refer to Section 6.7 for rehabilitation development).</p>
Significance of impact	<p>The significance of impact is assessed as moderate during construction and operation, as the sensitivity to change is high and the magnitude of change is low.</p>

9. Mitigation and management measures

9.1 Response to visual management objectives

This section includes a discussion on how the O'Neil East Study Area responds to the visual management objectives identified in Section 5. Landscape and visual mitigation measures are proposed in Section 9.2.

9.1.1 Best practice siting and design

Siting of mine pits and/or haul roads should be located away from peaks and ridgelines and sensitive landscape features such as riparian corridors and drainage lines. The proximity to sensitive receptors identified in Table 4-3 and visibility from viewing locations identified in Section 8.2 including Monadhocks Conservation Park and the Bibbulmun Track should be considered when siting the mine pits, infrastructure areas, haul road networks, haul road crossing points and construction compounds. Landscape character values identified in Section 7 should also be protected through appropriate siting and design.

Due to the nature of the O'Neil East Study Area, earthworks should be restricted to the haul roads, mine pits, infrastructure area, conveyors and construction compounds. Where possible the haul roads and conveyors should generally be constructed at grade with the existing landform. The mine pits will require earthworks and alteration to the existing landform as part of the mining operations, however, these should be temporary and following the completion of the mining operations the mine pit areas should be regraded to blend into the surrounding landform.

Vegetation clearance should be kept to a minimum and should be carefully sited to minimise impact to areas of remnant native forest. Where possible minimise vegetation removal within the Dwellingup State Forest, Monadhocks Conservation Park and riparian corridors through the consolidation of haul roads and mine pit areas and clearing the minimum required area for each activity. The type of infrastructure should also be considered to limit visual impacts such as using conveyors over large roads.

Vegetation removal will occur as part of the O'Neil East Study Area, however, should be limited to the haul roads, infrastructure areas, conveyor corridor, mine pits and construction compounds. As the mine pits and associated haul roads are closed, these areas should be rehabilitated, with landform regraded and vegetation rehabilitated. All proposed earthworks and vegetation removal should occur within the mine region and associated infrastructure corridor for all mine regions. The proposed rehabilitation vegetation would include species that are in keeping with the existing vegetation complexes, assisting in rehabilitating the landscape and visual character of the mine regions.

Vegetation screening as described in Appendix B *Visual Screening Field Survey* could be a management solution to reduce the impacts of clearing on sensitive views. It has been proposed that vegetation visual screening of 200 m be established where vegetation clearance, mine pit operations and haul roads cannot be constructed be established from the Bibbulmun Track. This buffer could also be effective to reduce the visual impacts from campsites, tracks and trails, roads such as North East Road and the Albany Highway, local roads and other identified sensitive receptors.

9.1.2 Protection and maintenance of landscape character

The proposed mine pits, including associated vegetation removal, earthworks and mounds, would be located within the proposed O'Neil East mine region. The proposed mine pits would generally be surrounded by retained dense native vegetation, with views into the sites limited to elevated and distance viewpoints.

The existing landscape character of the peri-urban areas of Dwellingup township would be retained as it is located outside of the proposed DE. The landscape character of forested areas within the Dwellingup State Forest would be degraded through the vegetation removal and earthworks associated with the proposed O'Neil East mine pits, haul roads, infrastructure area and conveyor. This clearing and proposed works are likely to be visible from surrounding sensitive receptors including the Bibbulmun track, Mount Cooke and Boonering Hill; and potentially visible from the Albany Highway. Clearing and proposed works within the O'Neil East region are unlikely to be visible from the township of Dwellingup and sensitive receptors such as Lane Poole Reserve.

The proposed vegetation rehabilitation would be in keeping with the existing vegetation complexes. This would see the closed mine pit and haul roads areas disturbed during operations, rehabilitated to reflect the existing landscape character of the area. Further guidance in Section 9.2 outlines recommendations for the retention of vegetation and landform near sensitive receptors and along roadways.

9.1.3 Restoration of degraded character

As part of the O'Neil East Study Area, rehabilitation of the proposed mine pits and haul roads would occur. This would include contouring of the excavated pits to tie into the surrounding landform, and planting and establishment of vegetation to restore the vegetated character of the area. The rehabilitation would include monitoring of the rehabilitated vegetation to provide remedial planting where required and would provide an effective rehabilitation development program.

9.2 Landscape and visual mitigation measures

The following section outlines the key landscape and visual impacts of the O'Neil East Study Area identified in Section 7 and 8 and identifies mitigation measures to further reduce the negative impacts of the O'Neil East Study Area. The identified impacts for the proposed O'Neil East region have been identified with suggested mitigations within Table 9-1

Table 9-1 Mitigation measures

Potential Impact	Proposed mitigation
Visual impacts on tracks, trails and recreational areas including campsites.	<p><i>Avoid</i></p> <p>Where possible relocate haul road routes and mine pits to avoid crossing tracks and trails.</p> <p><i>Minimise</i></p> <p>Where possible minimise landscape and visual impacts to recreational facilities and their access routes through the provision of screening corridors suitable to the area.</p> <p>Refer to vegetation screening as described in Appendix B <i>Visual Screening Field Survey</i>. It has been proposed that vegetation visual screening of 200 m where vegetation clearance, mine pit operations and haul roads cannot be constructed be established from the Bibbulmun Track.</p>
Views to removal of native vegetation along road corridors	<p><i>Avoid</i></p> <p>Where possible locate proposed mine pits and haul roads out of visual range from existing road corridors including the Albany Highway and routes to sensitive locations including campsites and residential properties.</p> <p><i>Minimise</i></p> <p>Along North East Road and the Albany Highway for example retain suitable corridors of existing vegetation and plant vegetation buffers based on density and topography, to adequately screen clearing for mine pits, haul roads and other infrastructure.</p> <p><i>Mitigate</i></p> <p>Where proposed mine pits and haul roads are proposed to be located near existing road corridors, commence rehabilitation as soon as practicable to assist in the replanted vegetation reaching establishment as soon as possible.</p>
Removal of native vegetation within or near State Forest areas and degradation of existing landscape character.	<p><i>Minimise</i></p> <p>Where possible minimise vegetation removal within the Dwellingup State Forest, Monadnocks Conservation Park and riparian corridors through consolidation of haul roads and mine pit areas and clearing the minimum required area for each activity.</p>
Views of haul road crossings along road corridors.	<p><i>Avoid</i></p> <p>Where possible relocate haul road routes to avoid crossing major road corridors, specifically the Albany Highway.</p> <p><i>Minimise</i></p> <p>If haul roads are required to cross major road corridors, design will comply with all suitable standards and specifications as applied by the relevant Shire and Main</p>

Potential Impact	Proposed mitigation
	Roads WA respectively. Following the closure of the haul road crossing, vegetation should be re-established to integrate the haul road back into the surrounding vegetation.
Views to uncharacteristic features such as mining infrastructure site	<p><i>Mitigate</i></p> <p>The material used and structural finishes for all built form elements within the DE's including but not limited to conveyors, buildings and crusher facilities should be compatible with surrounding visual environment. Colours and materials that are sensitive to the surrounding vegetated environment should be used where practical, and bright colours and reflective surfaces should be avoided. This will assist the O'Neil East Study Area built form elements to blend in with the surrounding existing vegetation when viewed from elevated distant view locations such as those along the Bibbulmun Track.</p>

10. Conclusion

This report has been prepared to assess the potential landscape and visual impacts of the Holyoake Mine Study Area's O'Neil East mine region, within the Alcoa Huntly Mine transition, as part of the assessment of Social Surrounds.

The assessment area for this landscape and visual impact assessment is primarily within the shires of Boddington, Murray and Jarrahdale. The proposed DE is located within the Dwellingup State Forest surrounded by the rolling landscape of the Darling plateau, south-east of the existing Myara mine region. The vegetated landscape is cut by steep sided river valleys and is studded with granite outcrops. The eastern boundary of the O'Neil East mine region abuts the Albany Highway. The northern extent of the assessment area is located within the Monadnocks Conservation Park which includes the Bibbulmun Track and the elevated peaks of Mount Cuthbert, Mount Vincent and Mount Cooke.

A variety of established vegetation is present within the assessment area. Vegetation in the region is predominantly native forest including some old growth Jarrah Forest, replanted native forest and sections of pine and blue gum plantations. Due to the Darling Plateau's valued natural setting and the scenic quality seen throughout the surrounding forest and landscape, multiple sensitive receptors of varying levels of significance were identified within the LVIA, including residents, track and trail users, recreational users, campers, tourists, and road users. Community and stakeholder engagement included the concerns on visual impact on the nearby communities, State Forests, tracks, trails, camps, and roads.

Based on the contextual analysis, visual management objectives were defined for the assessment area for the best practice siting and design of the O'Neil East Study Area, the protection and maintenance of landscape character, and the restoration of degraded character or enhancement of opportunities. Key objectives included siting of the O'Neil East Study Area away from sensitive locations, including the views from the Bibbulmun Track and visitor locations within Monadnocks Conservation Park. The protection of the existing landscape character such as the valued views of the dense forest is recommended, as well as seeking opportunities for restoration of the cleared forest with planned rehabilitation.

The assessment area was reviewed and the landscape character units within the LVIA were categorised into two units. The assessment found that LCU1 would have the most significant impacts due to the high sensitivity relating to the valued forest area, the high susceptibility to change, and its valued condition within the assessment area. The magnitude of change was also assessed as high, resulting in a high overall significance of impact. LCU2 would have a low significance of impact due to the low sensitivity to change and magnitude of change. Anticipated changes associated with the O'Neil East Study Area would not be out of character within LCU2.

Table 10-1 Summary of landscape character impacts

Landscape Character Unit	Name	Sensitivity to Change	Magnitude of change	Significance of impact
LCU1	Darling Plateau Forest	High	High	High
LCU2	Previous and Existing Mining	Low	Low	Low

Five viewpoint locations were chosen for visual assessment. Photomontages were created for VP01 (Mount Wells), VP02 (Boonering Hill) and VP05 (Mount Cooke) to illustrate the proposed views from sensitive receptor locations.

The assessment found that visual impacts ranged from high-moderate to moderate, as outlined in Table 10-2. The most significant impacts would be within the vicinity of VP02 (Boonering Hill) due to the highly sensitive receptors, valued views within the State Forest, and the moderate magnitude of proposed change associated with the construction and operation of the O'Neil East Study Area. Moderate impacts would be afforded from VP01 (Mount Wells) and (VP05 Mount Cooke), as the distance of sensitive receptors from the proposed activity would reduce the impacts on these views. Moderate impacts would also be afforded from VP03 (North East Road 1) and VP04 (North East Road 2), due to the high magnitude of change and low sensitivity to change as local unsealed roads with limited users.

Visual impacts associated with the construction phase would be considered short-term and impacts associated with the operation phase would be considered medium-term. Rehabilitation would occur in parallel with the continuation of mining operations. Once the vegetation is established, the rehabilitation would be permanent.

Table 10-2 Summary of visual impacts

Viewpoint	Location	Sensitivity to change	Magnitude of change	Overall rating
VP01	Mount Wells	High	Low	Moderate
VP02	Boonering Hill	High	Moderate	High-moderate
VP03	North East Road 1	Low	High	Moderate
VP04	North East Road 2	Low	High	Moderate
VP05	Mount Cooke	High	Low	Moderate

The O'Neil East Study Area was reviewed against the visual management objectives established in Section 5, and a response was provided as to whether the visual management objectives could be achieved for the O'Neil East Study Area. Key issues identified were the extent of vegetation removal and earthworks that would occur within the forested areas of the assessment area, resulting degradation to the existing landscape character, and the potential visibility from the Inglehope rural residential areas and elevated locations along the Bibbulmun Track. However, these cleared areas would be rehabilitated at the closure of the mine operations.

Recommendations were provided in relation to the landscape and visual impacts identified in the assessment. Refer to Section 7 and Section 8, which should be taken into consideration as the O'Neil East Study Area progresses. Mitigation measures were categorised into a hierarchy of avoid, minimise, and mitigate. Key landscape character recommendations include minimising vegetation removal through consolidation of O'Neil East Study Area haul roads and mine pits throughout the Dwellingup State Forest. Key visual recommendations include locating proposed haul roads and mine pits away from existing key road corridors such as the Albany Highway and sensitive areas such as the Monadnocks Conservation Park; and where possible minimising landscape and visual impacts to recreational facilities including tracks, trails and campsites and their access routes through the provision of screening corridors suitable to the area. For appropriate visual screening widths refer to Appendix B.

11. References

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- Scottish Natural Heritage. (2017). *Visual Representation of Wind Farms Guidance, Version 2.2*.
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Appendices

Appendix A

Photomontages



EXISTING VIEW



PROPOSED DESIGN



KEY PLAN

View Direction: 288° - 8°
Horizontal Field Of View: 80°
Camera Height: 1.7 m
Camera Type: Canon EOS 6D
Lens Type: 50 mm
Photograph Time & Date: 18:03,
 22nd August 2022

Location: Mount Wells, Dwellingup
 State Forest, W.A.
Coordinates: 437633, 6381948
 (GDA 2020 MGA Zone 50)
Viewpoint Elevation: 540 m
Date of Photomontage: 27th March 2023
Issue: v 01

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Viewpoint 1 : Mount Wells



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PROJECT EXTENT



PROPOSED DESIGN

KEY PLAN



View Direction: 288° - 8°
Horizontal Field Of View: 80°
Camera Height: 1.7 m
Camera Type: Canon EOS 6D
Lens Type: 50 mm
Photograph Time & Date: 18:03,
 22nd August 2022

Location: Mount Wells, Dwellingup
 State Forest, W.A.
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Viewpoint 1 : Mount Wells


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EXISTING VIEW




PROPOSED DESIGN



KEY PLAN

View Direction: 280° - 360°
Horizontal Field Of View: 80°
Camera Height: 1.7 m
Camera Type: Canon EOS 6D
Lens Type: 50 mm
Photograph Time & Date: 16:10, 23rd August 2022

Location: Boonering Hill, Dwellingup State Forest, W.A.
Coordinates: 440686, 6395869 (GDA 2020 MGA Zone 50)
Viewpoint Elevation: 517 m
Date of Photomontage: 27th March 2023
Issue: v 01

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Viewpoint 2 : Boonering Hill

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PROJECT EXTENT



KEY PLAN



View Direction: 280° - 360°
Horizontal Field Of View: 80°
Camera Height: 1.7 m
Camera Type: Canon EOS 6D
Lens Type: 50 mm
Photograph Time & Date: 16:10,
23rd August 2022

Location: Boonering Hill, Dwellingup
State Forest, W.A.
Coordinates: 440686, 6395869
(GDA 2020 MGA Zone 50)
Viewpoint Elevation: 517 m
Date of Photomontage: 27th March 2023
Issue: v 01

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Viewpoint 2 : Boonering Hill



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EXISTING VIEW



PROPOSED DESIGN



KEY PLAN



View Direction: 176° - 256°
 Horizontal Field Of View: 80°
 Camera Height: 1.7 m
 Camera Type: Canon EOS 6D
 Lens Type: 50 mm
 Photograph Time & Date: 15:36,
 14thDecember 2020

Location: Mount Cooke, Dwellingup
 State Forest, W.A.
 Coordinates: 434969, 6413275
 (GDA 2020 MGA Zone 50)
 Viewpoint Elevation: 559 m
 Date of Photomontage: 27th March 2023
 Issue: v 01

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Viewpoint 5 : Mount Cooke

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PROJECT EXTENT



PROPOSED DESIGN

KEY PLAN



View Direction: 176° - 256°
Horizontal Field Of View: 80°
Camera Height: 1.7 m
Camera Type: Canon EOS 6D
Lens Type: 50 mm
Photograph Time & Date: 15:36,
 14th December 2020

Location: Mount Cooke, Dwellingup
 State Forest, W.A.
Coordinates: 434969, 6413275
 (GDA 2020 MGA Zone 50)
Viewpoint Elevation: 559 m
Date of Photomontage: 27th March 2023
Issue: v 01

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Viewpoint 5 : Mount Cooke


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Appendix B

Preliminary Visual Screening Field Survey

Technical Memorandum

Transect No.	1
Location	Marshall 7 (open pit with stockpiles), 415630 E, 6409870 S
Transect length (approximate)	200 m
Vegetation types	T – 0-165 m, TS – 165-200 m
Forest age	Immature (21-70 years) – harvested 1970-79
Average slope	20% downslope from pit
View of vegetation from pit Predominantly open understorey, minimal mid storey vegetation, typical of T vegetation type	
25m Mine pit stockpiles visible	

75m



125m

Mine pit stockpiles not visible due to 20% downslope / topographic shielding



150m

Presence of TS vegetation type (e.g. *Banksia grandis*)



175m



200m

Effective visual screening –
sky is barely visible



Transect No.	2
Location	Lloyd 3 (3-4 year rehabilitation), 417615 E, 6408600 N
Transect length (approximate)	150 m
Vegetation types	PS – 0-40 m, S – 40-150 m
Forest age	Immature (21-70 years) – harvested 1970-79
Average slope	6% downslope from pit
View of vegetation from pit Initial open understorey, then presence of mid-storey vegetation typical of P and S vegetation types	
25m Mine pit rehabilitation visible	

50m



75m

Mine pit rehabilitation obscured by understorey, and downslope position



125m


Presence of *B. grandis* mid-storey



150m

Effective visual screening by
mid-storey and understorey



Transect No.	3
Location	Lloyd 4 haul road, 417765 E, 6408655 N
Transect length (approximate)	175 m
Vegetation types	S – 0-75 m, PS – 75-175 m
Forest age	Immature (21-70 years) – harvested 1970-79
Average slope	4% upslope from haul road
View of vegetation from pit Initial open understorey, then presence of dense Jarrah saplings, then mid-storey vegetation typical of P and S vegetation types	
25m	

50m



75m



100 m

Dense Jarrah saplings
provide partial visual
screening



125m





150m

Effective visual screening,
haul road barely visible



175m



Transect No.	4
Location	Lloyd 3 (3-4 year rehabilitation), 417695 E, 6408445 N
Transect length (approximate)	125 m
Vegetation types	PS
Forest age	Immature (21-70 years) – harvested 1970-79
Average slope	6% downslope from mine pit
View of vegetation from pit Open understorey, minimal mid storey vegetation	
25m	

50m



75m

Understorey shrubs provide partial screening



100m





125m

Presence of mid-storey

Effective visual screening



Transect No.	5
Location	Kisler 2 rehab (<1 year complete), 421420 E, 6408090 N
Transect length (approximate)	225 m
Vegetation types	TS 0-210 m, S 210-225 m
Forest age	Immature (21-70 years) – harvested 1960-69
Average slope	11% downslope from pit for 190 , then flat
View of vegetation from pit Dense Jarrah saplings mid-storey of sapling regrowth	
25m Rehabilitation not visible due to 11% downslope position topographic shielding	

50m



75m



100m



125m

Substantial screening by dense understorey and Jarrah saplings



150m



175m





200m



225m

Effective visual screening –
sky no longer visible within
canopy



Transect No.	6
Location	Kisler Road three stage sump, 421965 E, 6407645 N
Transect length (approximate)	100 m
Vegetation types	W 0-40 m, PW 40-60 m, CW 60-100 m
Forest age	Immature (21-70 years) – harvested 1960-69
Average slope	4% downslope from sump
View of vegetation from pit Initial open vegetation then thick understorey	
25m Understorey provides partial screening	

50m



75m

Thick understorey screens foreground/lower elevation, mid-ground/higher elevation views remains visible





100m

Transect terminated during presence of stream/access not practical

Haul road visible over the understorey in the mid-ground/higher elevation



Transect No.	7
Location	Big Brook haul road sump, 421580 E, 6406650 N
Transect length (approximate)	125 m
Vegetation types	W 0-55 m, TS 55-125 m
Forest age	Immature (21-70 years) – harvested 1960-69
Average slope	16% upslope from sump
View of vegetation from pit Dense understorey and mid-storey vegetation	
25m	

50m



75m

Partial screening by dense understorey (*Xanthorrhoea*) and mid-storey (*B. grandis*)



100m

Effective visual screening, haul road sump barely visible



125m

Haul road sump not visible



Transect No.	8
Location	Downes 4 (open pit), 419115 E, 6406080 N
Transect length (approximate)	100 m
Vegetation types	S 0-35 m, W 35-100 m
Forest age	Juvenile-Establishment (21-70 years) – harvested 2000-09
Average slope	1% downslope from pit
View of vegetation from pit Dense Jarrah saplings, regrowth from recent timber harvesting	
25m Partial screening due to dense Jarrah saplings	

50m



75m



100m

Thick understorey screens foreground/lower elevation, mid-ground/higher elevation views remains visible





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