APPENDIX V: VISUAL IMPACT ASSESSMENT

MARA CONSULTING

Visual Impact Assessment

Deep Creek Quarry

Ironstone Developments

April 2021

Mara Consulting

Consultation + Urban Design

Creating vibrant communities through
powerful conversations

Confidentiality

Project Name	
Location	Deep Creek Road, Limeburners Creek NSW 2324
Project Number	1906
Client	Ironstone Developments
Mara Consulting Document	20210415_1906_Mara_Ironstone_ DCQ - VIA-RevE

Mara Consulting Pty Ltd

ACN: 168 093 918
ABN: 13 168 093 918

5 Griffith Avenue
Stockton NSW 2295

E: mara@maraconsulting.com.au
W: maraconsulting.com.au
P: 02 4965 4317

Revision	Date of issue	Details	Author	Approved
A	18/11/2020	Preliminary draft	TA	KL
B	2/12/2020	Final	TA	KL
C	10/12/2020	Final issue	TA	KL
D	04/01/2021	Final issue	TA	KL
E	15/04/2021	Final	TA	KL

Contents

1. Introduction

1.1. Background

Mara Consulting (Mara) was engaged by Kleinfelder on behalf of Ironstone Developments to conduct a visual impact assessment (VIA) for a proposed quarry located in Limeburners Creek.

The quarry development is considered a State Significant Development (SSD) due to the amount of resource that will be extracted over the life of the quarry. This VIA will be included as part the documentation for the SSD approval process.

This visual impact assessment has been prepared to meet the SSD requirements by identifying and evaluating the visual impacts of the proposed quarry operations on the surrounding landscape.

This VIA describes the existing visual character and then applies a method to assess the visual sensitivity of the site and to assess the visual impact of the changes resulting from the planned development.

1.2. Assessment method

There is currently no universally agreed method of undertaking visual impact assessments in New South Wales and no reference is given in Mid-Coast Council's Development Control Plans. Therefore, the method used in this visual impact assessment is based on established practices and policies.

Mara has developed a system that enables consideration of the visual impact in rural environments. Documents used for broad guidance include the Roads and Maritime Services Environmental Impact Assessment Guidance Note (2013): Guidelines for landscape character and visual impact assessment.

The study method for the VIA follows three key steps:

- Existing visual environment
  - Review proposal and extents of the development
  - Landscape character - Types of landscape and how it is perceived
  - Visual catchment area defined through reviewing maps and satellite imagery to identify where the site is visible from
  - Site visit - undertake inspections from viewpoints, including photographs of the site from each location and verifying the visual catchment.
- Visual impact
  - Assessment of the visual impact by applying the visual sensitivity and visual effect criteria
  - Superimpose the visual model into the viewpoints (photo-montages)
  - Review against baseline information (impact of change from proposal)
- Acceptability of the visual impact
  - Assessment of the acceptability of the visual impact against relevant considerations
  - Drawing conclusion and recommendations.

2. Context

2.1. Project description

The project location is off Deep Creek Road, in Limeburners Creek. The site is approximately 10km northeast of Clarence Town and 11km north-west of Karuah, within the Mid-Coast Local Government Area (LGA). Access to the site would be from The Bucketts Way via a new private haul road with a new intersection on The Bucketts Way.

The proposed development is a quarry that will extract a natural aggregate material. This material will be loaded onto trucks and transported off the site to The Bucketts Way and to potential customers located from Coffs Harbour to Canberra.

The project includes excavation for the quarry, using mobile machinery, construction of the office and workshop, stockpile pads, and construction of a new sealed haul road from the quarry to The Bucketts Way.

The ongoing operations will include excavation within the quarry and truck movements along the haul road.

Image: Aerial view of the proposed quarry site and surrounding landscape.
Photo was taken at an elevation of 100m above ground level.

Figure 2.1: Site Location and regional overview

3. Existing visual environment

The proposed development site is located in Limeburners Creek, approximately 1.8km from The Bucketts Way. Except for the new road, none of the quarry site is visible from The Bucketts Way.

Thick bushland occupies most of the site and also surrounds the site on all sides. The bushland forms an effective visual barrier and is made up of the following vegetation communities:

- Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest (EEC)
- Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and North Coast (EEC)
- Smooth-barked Apple - Red Bloodwood - Brown Stringybark - Hairpin Banksia heathy open forest of coastal lowlands.

The topography is hilly with steep slopes and narrow valleys. The quarry site sits along the bottom of a valley alongside Deep Creek. The valley runs west to east, opening up with rolling hills near The Bucketts Way. The extraction area will begin near the bottom of the valley and extend up toward the adjacent ridge line. The quarry will remain below the dominant ridge lines.

Image: Aerial view of the site and surrounding landscape - office and workshop will be located in the visible clearing with the quarry operations beyond the tree line. Photo was taken at an elevation of 26m above ground level.

4. Proposal

4.1. Project Description

The proposed quarry will produce a range of quarried materials, including road base and high grip aggregate materials used in road construction and decorative landscaping products.

The site sits within a property of 344 hectares. The quarry operations will cover approximately 30 hectares with 18 of these making up the extraction area. An indicative layout for the proposal has been provided (refer to Figure 3.1).

4.1.1. Indicative project layout

The quarry facility will consist of the following elements:

- extraction area up to 18 hectares over multiple stages, including a mobile crusher
- stockpile area
- electrical generation plant (diesel or solar)
- administration offices, workshop and support structures
- haulage road within the site and connection to The Bucketts Way.

During construction there is a potential for short-term visual impact that may include:

- road construction
- large vehicle movement onto and from site
- laydown yards.

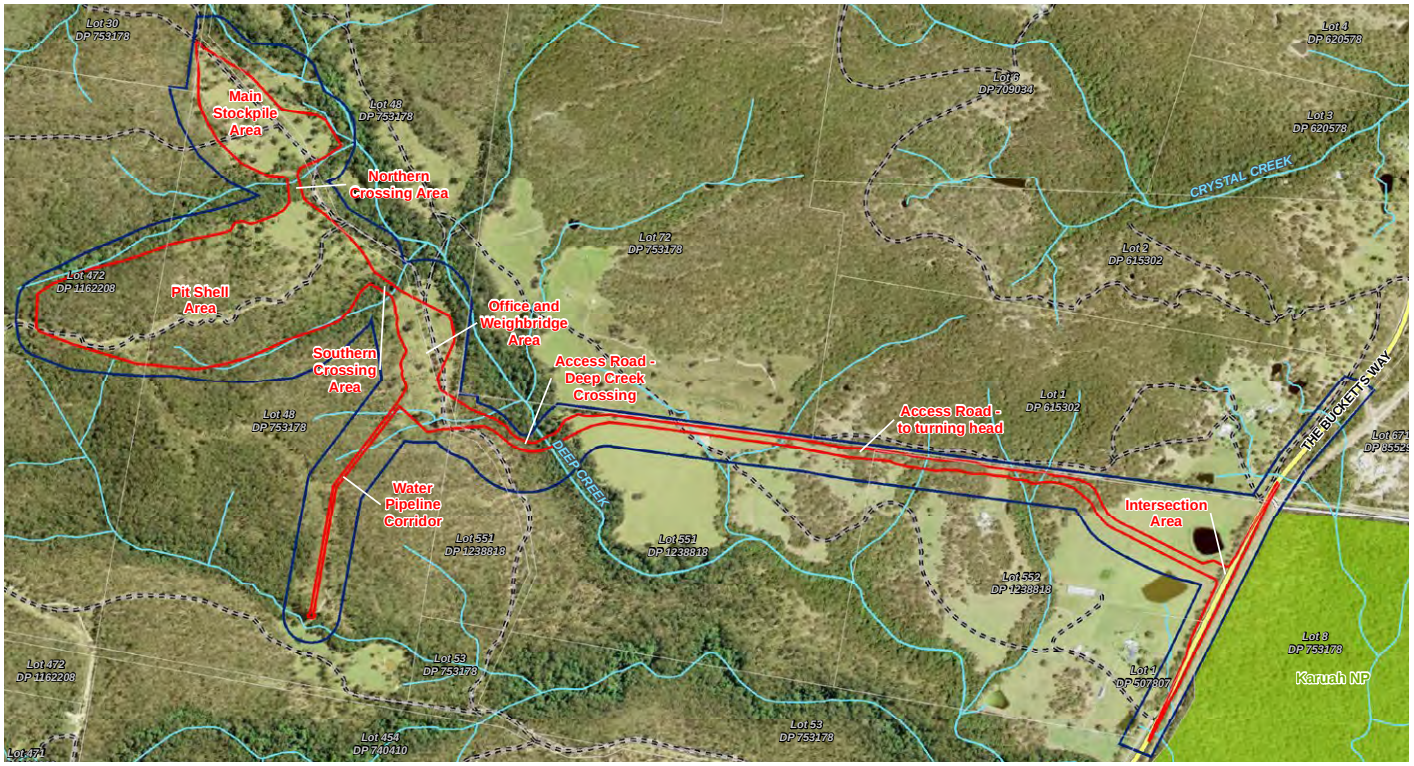


Figure 4.1: Concept project layout showing locations of the quarry elements.

4.2. Project Works

The project will progress logically from the initial establishment and construction works to a final rehabilitated site at the end of the project.

4.2.1. Staging

The initial phase of the project will include the road works and construction of the offices, workshops and stockpile areas (refer to Figure 4.2). This will provide the infrastructure needed to begin the aggregate extraction.

The bulk of the extraction works will occur in stages 1 - 3 of the project. This will follow a logical progression of quarrying into the hillside with wide benches for stability and safety. Figures 4.3-4.5 illustrate the extent of this process for each stage.

Stage 4 represents the final stage of extraction and processing the material, see Figure 4.6.

4.2.2. Final landform

As the extraction process comes to an end, the land will be rehabilitated in keeping with the quarry's rehabilitation plan. The rehabilitation plan describes the final result as follows:

> The final land form for the quarry will consist of a broad gently sloping quarry floor that drains to the east into the former sediment basin located in the north eastern corner of the quarry area. This basin will serve to provide some initial sediment control as the landform establishes and in the longer term serve as an agricultural dam and provide aquatic habitat (e.g. similar to a wetland). The dam will overtop to the north east into the existing ephemeral drainage line.
>
> The quarry floor and benches will have 100-200mm thick topsoil / friable growth media distributed across the service, utilising previously stripped topsoil and friable overburden. The need for additional roughening of the quarry floor rock will be considered prior to placement of topsoil to assist in the retention of water within the landscape.
>
> The toe of the highwall will include a wedge of soil to promote woody vegetation growth. Benches and patches across the quarry floor will be re-vegetated with native woodland vegetation generally consistent with adjacent vegetation communities.
>
> The remainder of the quarry floor will be vegetated with pasture species suitable for potential future agricultural grazing with paddock trees. Roads and infrastructure that supports future land use will be retained. The primary focus of the rehabilitation will be the creation of a safe, stable and non-polluting landform with a self-sustaining vegetation community.

The extent of the extraction is illustrated below in Figures 4.8 - 4.11. The initial landform is shown in Figure 4.8 and 4.10. After the extraction, the resulting landform after rehabilitation is illustrated in Figure 4.9 and 4.11.

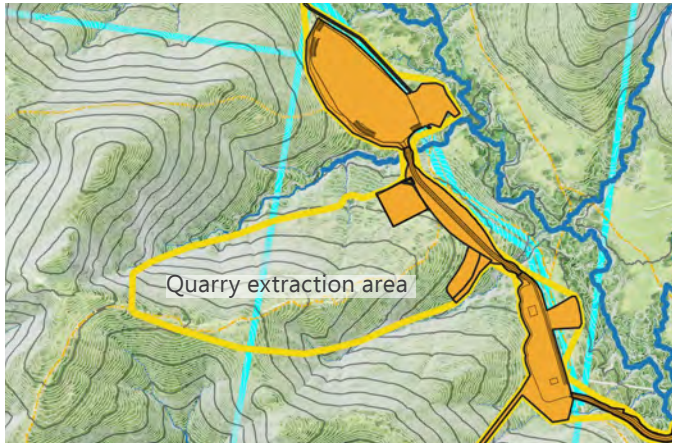


Figure 4.2: Initial construction phase of the project.

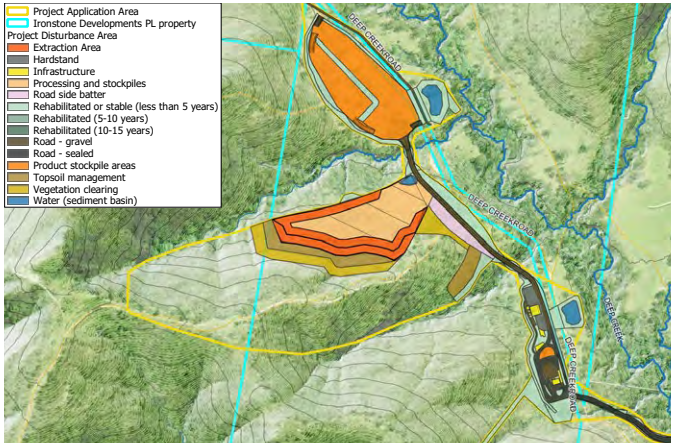


Figure 4.3: Extent of disturbance for Stage 1 of the project.

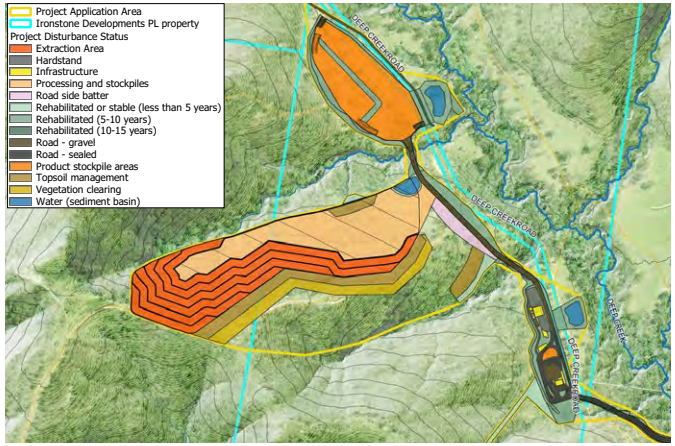


Figure 4.4: Extent of disturbance for Stage 2 of the project.

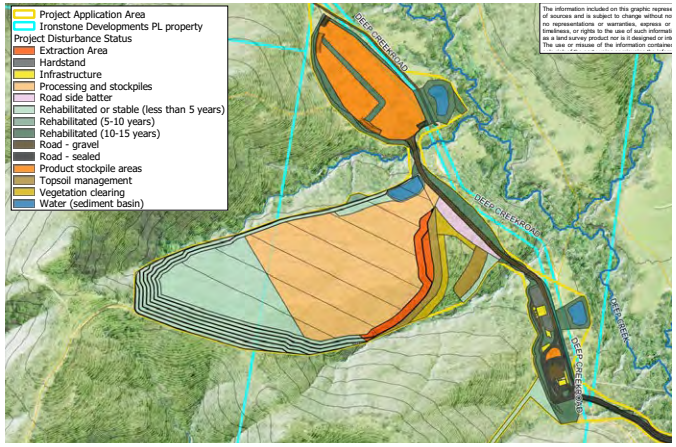


Figure 4.5: Extent of disturbance for Stage 3 of the project. Rehabilitation works begin.

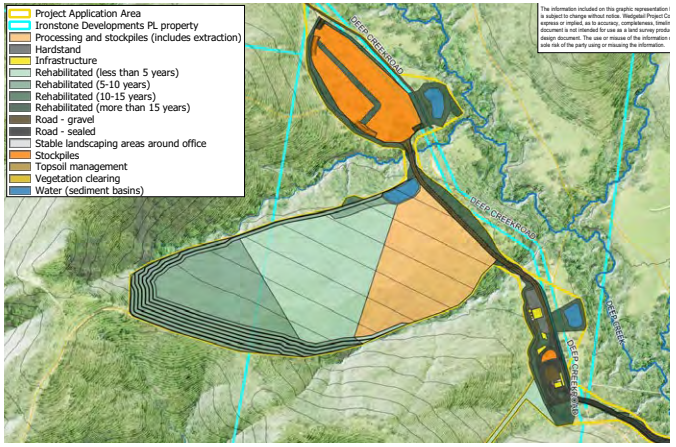


Figure 4.6: Extent of disturbance for Stage 4 of the project. Rehabilitation works over most of extraction area.

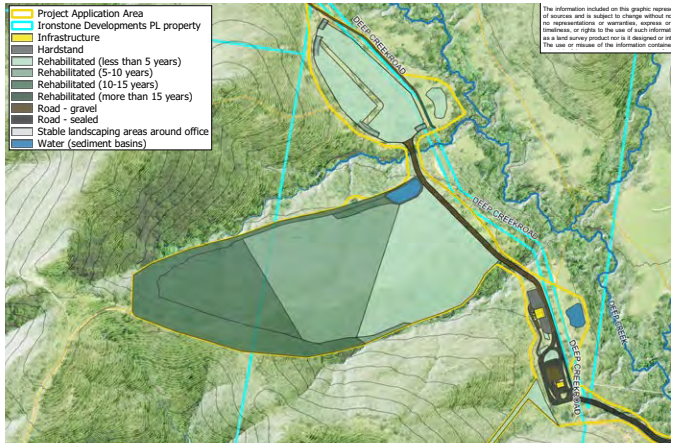


Figure 4.7: Final landform after extraction with rehabilitation works over the extraction and stockpile area.

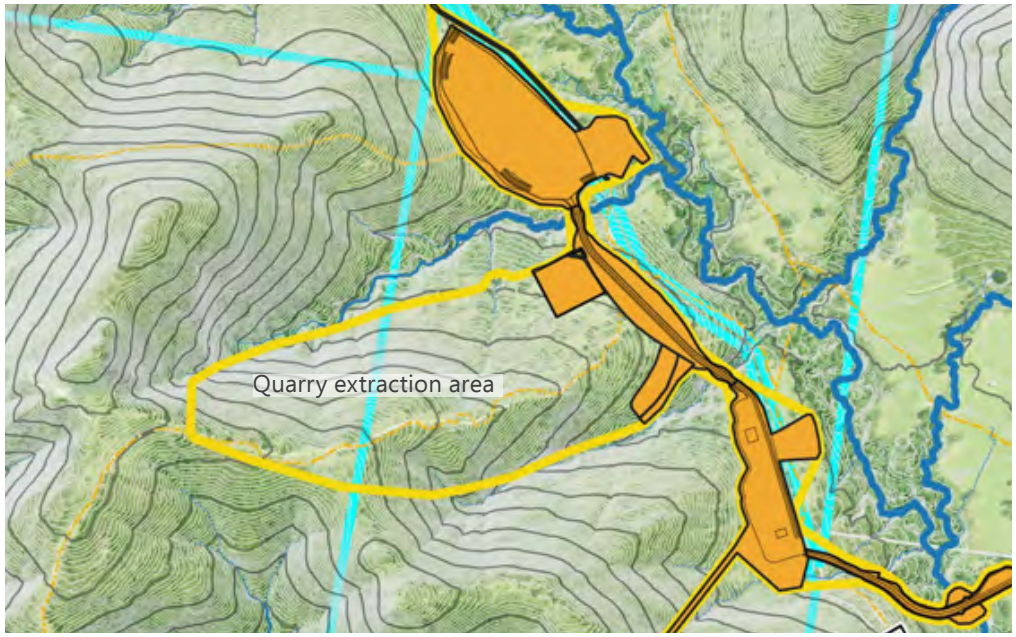


Figure 4.8: Initial phase of the project prior to any quarrying activity - 3d modelling below

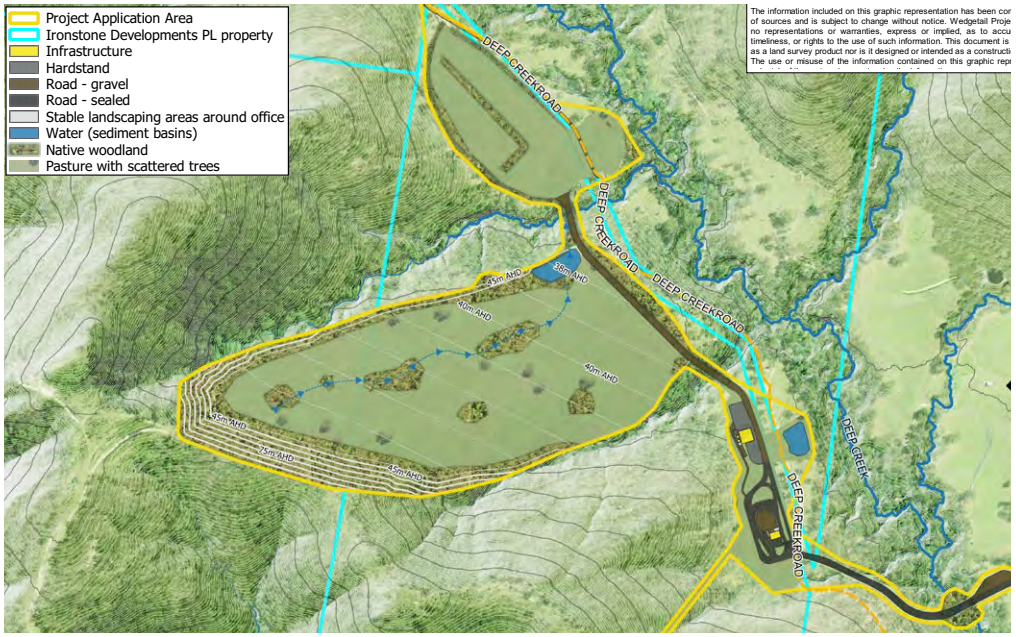


Figure 4.9: Final condition of the site after rehabilitation - 3d modelling below

Figure 4.10: Existing landform void of vegetation - extraction area in green

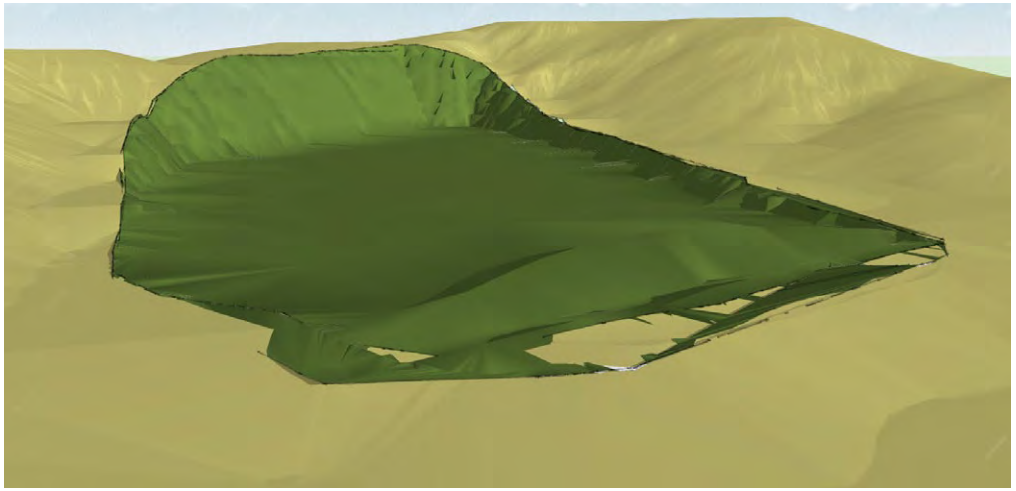


Figure 4.11: Final landform after rehabilitation

5. Visual impact assessment

5.1. Assessment criteria

The potential visual impact of the planned development is measured through the combination of two factors:

- Visual sensitivity of the development on the viewer
- Visual effect of the development on the landscape.

To measure the visual sensitivity and the visual effect of the site, specific locations known as 'viewpoints' are chosen as representative views (refer to Section 5.2). These are then assessed to determine the overall visual impact. Visual sensitivity and visual effect are defined below.

5.1.1. Visual sensitivity

Visual sensitivity is a measure of the extent to which particular activities or components of a proposal may change the landscape and be visible from surrounding areas. This takes into account the relative number of viewers, the period of view, viewing distance and context of view.

The rationale for the assessment is that if a proposal is not visible the impact is nil and if the number of people who would potentially see the proposal is low, then the visual impact would be lower than if a potential large number of people had the same view.

For the purpose of this study, the general category of visual sensitivity has been divided into two elements. The first, viewing location, is a rating based on distance from the site and the type of landscape as shown in Table 5.1. The second, viewer experience is based on the number of people affected and the duration of the impact as indicated in Table 5.2.

Table 5.1: Visual sensitivity rating - location.

Viewing location					
	Distance from site (km)				
Land-use	0-0.5	0.5-1.0	1.0-2.5	2.5-4.0	>4.0
Townships	High	Moderate	Moderate	Moderate	Low
Recreation reserve	High	Moderate	Moderate	Moderate	Low
Residence	High	Moderate	Moderate	Low	Low
Rural township	High	Moderate	Low	Low	Nil
Main highway	Moderate	Low	Low	Low	Nil
Local roads	Moderate	Low	Low	Low	Nil
Farm roads	Low	Low	Low	Nil	Nil
Agricultural land	Low	Low	Low	Nil	Nil

Table 5.2: Visual sensitivity rating - experience.

Viewer experience			
	Number of viewers		
Duration of view	Large	Moderate	Small
Long (>10 minutes)	High	High	Moderate
Moderate (1-10 minutes)	High	Moderate	Low
Short (<1 minute)	Moderate	Low	Low

The two sensitivity ratings above are then combined to form the visual sensitivity rating as indicated in Table 5.3. This combined rating is applied to the visual impact rating shown in Table 5.5.

Table 5.3: Visual sensitivity rating.

Visual sensitivity rating				
		Viewing location		
		High	Moderate	Low
Viewer experience	High	High	High	Moderate
	Moderate	High	Moderate	Low
	Low	Moderate	Low	Low

5.1.2. Visual effect

Visual Effect is an estimation of the capacity of the landscape to absorb development without creating significant visual change. The capacity to absorb development is primarily dependent on landform, vegetation cover and the presence of other development.

The extent to which portions of the site can potentially absorb development without reducing the scenic quality of the area is assessed under this criteria. Generally, an urban context is able to absorb buildings and structures with low impact to the scenic value, while erecting structures in a natural or agricultural setting may impact the scenic quality significantly.

The level of contrast is also strongly influenced by the nature of the backdrop against which development is viewed. In particular, structures that are viewed above the skyline will potentially create a higher degree of contrast that the same elements viewed against a backdrop of similar structures or a landscape of similar colour/textures as the building or structure.

The degree of contrast between proposed development and the existing landscape (buildings and vegetation) can be reduced by careful attention to the colour, scale, texture, and reflectivity of building materials and by avoiding development that breaks the height of the existing tree canopy. Where possible these considerations are to be incorporated into the design and locations of buildings, roads and other structures.

Table 5.4: Visual effect criteria.

Criteria	Definition
High	A substantial or obvious change to the landscape due to a total loss or change to characteristic elements or features of the landscape. Existing landscape is unable to absorb the change / development and a high degree of visual contrast is apparent. There is little, or no screening or integration with the vegetation, topography or existing urban context.
Moderate	Discernible changes to the landscape due to partial loss or change to elements or features that are characteristic of the landscape. The changes may be partly mitigated, but will leave an adverse, recognisable change to the landscape. Existing landscape is able to visually absorb some of the development, but there is some visual contrast and the development is visible.
Low	Minor loss or change to key landscape elements or features that may alter the landscape but still maintain the existing landscape character. Existing landscape or built environment is able to visually absorb the development. There is a low degree of visual contrast and effective use of screening.

5.1.3. Visual Impact Rating

Visual impact refers to the change in the appearance of the landscape because of development. This report addresses a number of factors that contribute to the visual impacts and has presented them in a measurable way.

Table 5.5 provides a matrix that combines the visual sensitivity rating with the visual effect rating to determine the visual impact rating. This rating is applied to each viewpoint as a way to measure the impacts of a development from particular locations.

Table 5.5: Visual impact rating matrix

Visual impact rating				
		Visual effect		
		High	Moderate	Low
Visual sensitivity	High	High	High	Moderate
	Moderate	High	Moderate	Low
	Low	Moderate	Low	Low

5.2. View locations

Site visibility helps to determine where the site can be seen from. This is important in mapping out the visual catchment of the site and determining viewing zones and viewpoint locations.

Viewing zones are areas outside the site that have potential views into the site. These are categorised by distance since visibility diminishes with distance. The categories are the site context, immediate vicinity, local area, district area and regional area. These are illustrated in Figure 5.1.

After the viewing zones are determined, viewpoints are selected. Viewpoints are locations from which photographs are taken that will illustrate the views from that area. These are then tested through field investigations and photography to determine if the site is visible and how much of the site can be seen from the viewpoint.

The viewpoints, as shown on Figure 5.2, were selected on the basis of where the development would appear to be most prominent either based on degree of exposure or the number of people likely to be affected.

In order to assess the potential visual impacts of the proposed quarry, viewing zones based on the distance from the proposed development were defined as follows:

- Site context (0 – 0.5km)
- Immediate vicinity (0.5 – 1.0km)
- Local area (1.0km – 2.5km)
- District area (2.5km – 4.0km)
- Regional area (>4.0km).

Representative view locations were selected from each zone and the visual impact of the planned development has been assessed from each location.

Site context (0 – 0.5km)

- View 1: The Bucketts Way
- View 2: The Bucketts Way
- View 3: Residence along proposed access road
- View 4: Deep Creek Road

Immediate vicinity (0.5 – 1.0km).

- There are no viewpoints in this zone

Local area (1.0km – 2.5km).

- View 5: Forest Glen Road.

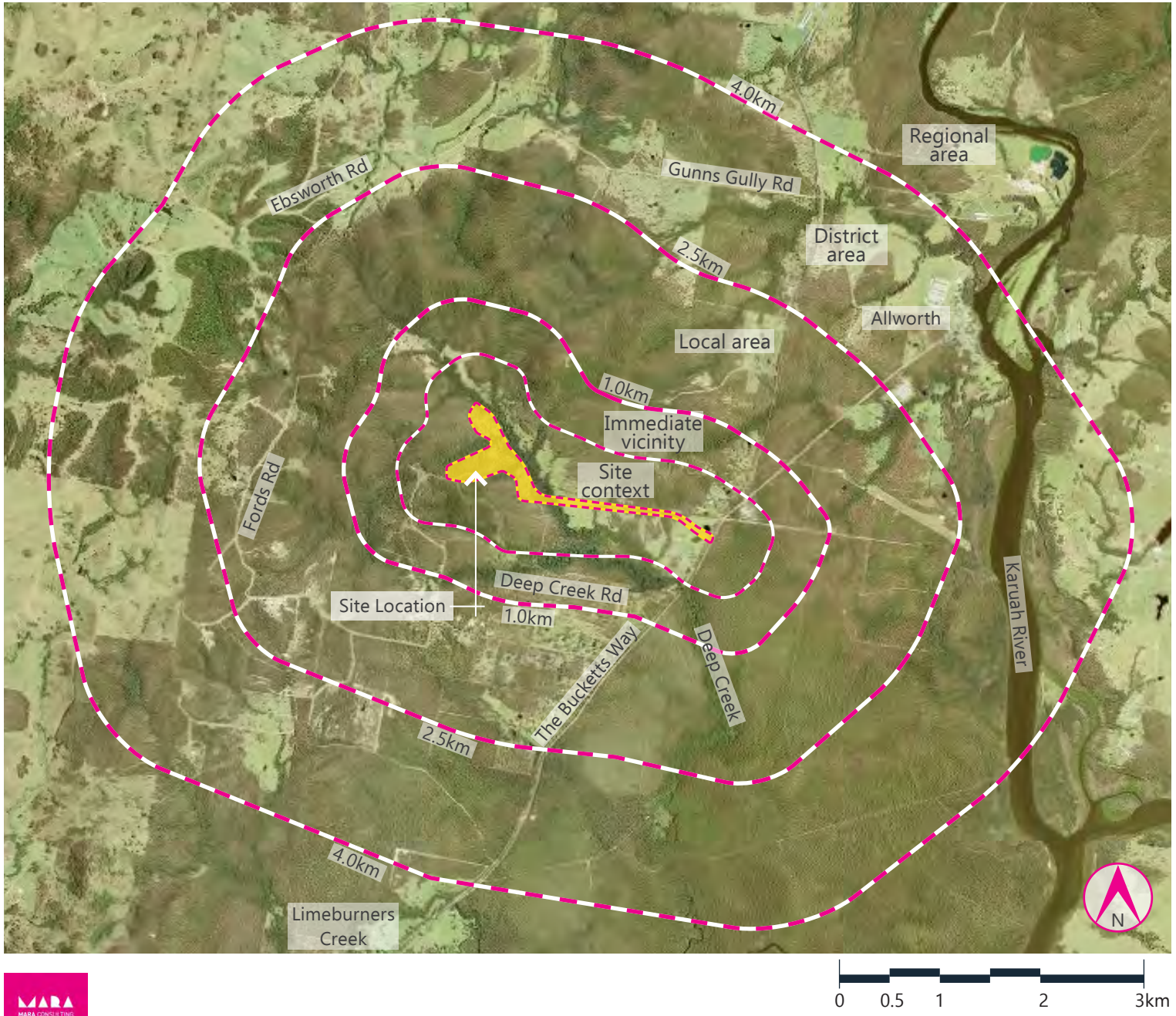
District area (2.5km – 4.0km).

- View 6: Ebsworth Road.

Regional area (>4.0km).

- There are no viewpoints in this zone.

Each view is addressed separately in Section 6 of this report.



Viewing zone locations

- Site context (0 – 0.5km)
- Immediate vicinity (0.5 – 1.0km)
- Local area (1.0km – 2.5km)
- District area (2.5km – 4.0km)
- Regional area (>4.0km).

Figure 5.1: Viewing zones
The viewing zones are indicated as distance from the subject site.

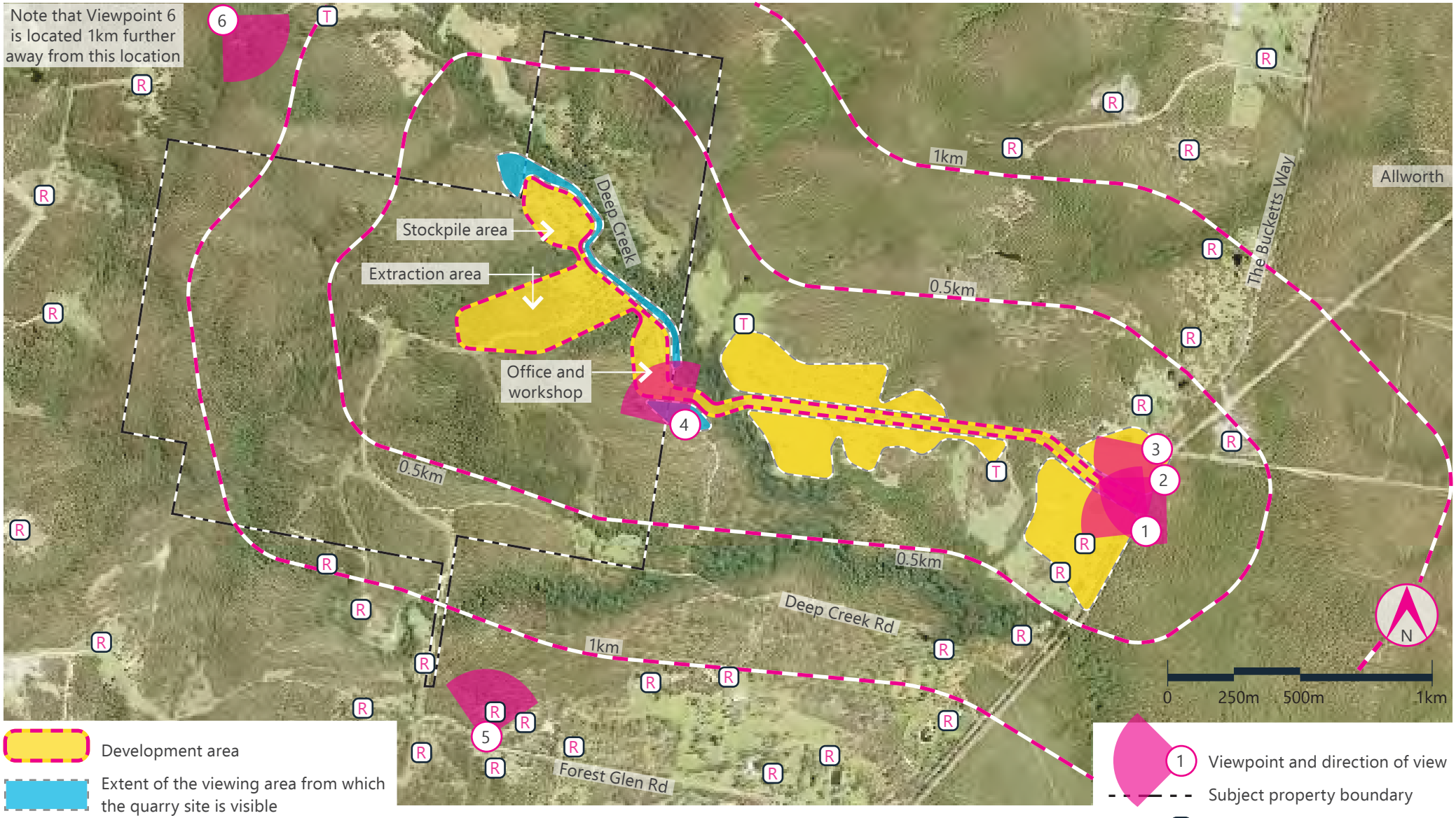


Figure 5.2: Viewing zones
The view locations are shown with the number associated with the visual assessment in Section 6 of this report

6. Acceptability of the visual impact

An inspection of the site located at Limeburners Creek considers the existing landscape and how it is seen at various points in the surrounding region. Identification of potentially impacted viewpoints that are publicly accessible have been captured through aerial images and photographs.

6.1. Viewpoint assessment

The following viewpoint worksheets provide photographs and analysis data from each of the viewpoints (refer to Figure 5.2 for viewpoint locations).

The images were taken using a digital camera with a focal length equal to a standard 50mm for a conventional 35mm camera. This focal length is widely accepted as closely approximating the vision of the human eye.

6.1.1. Site Visit

A site visit was undertaken on 8 September 2020 by a registered landscape architect and environmental planner who has substantial experience analysing and mitigating visual impacts on the landscape.

During the site visit, viewpoints were confirmed and an assessment was made of each potential public viewpoint against the extent of the project.

At the time of the site visit, the weather was fine with full sunlight shining directly on the site.

Image: Aerial view toward quarry site from above the proposed access road. This photo was taken at an elevation of 25m above ground level.

Viewpoint 1

Viewpoint 1	The Bucketts Way
Category of view	Immediate vicinity
Landscape context	Arterial road
Distance of view	15m
Relative number of viewers	Large
Likely duration of view	Short (traffic)
Visual sensitivity	Moderate
Visual effect	Moderate
Visual impact rating	Moderate

Description:
View from The Bucketts Way at the location of the proposed intersection and access road.

Comments:
This view represents the greatest visual impact of the proposed project on the general public. The visual impact will be greatest during construction of the intersection and proposed roadway. After the road is in place, the visual impact will be minimal as it will be seen as just another road entering The Bucketts Way.

Viewpoint 2

Viewpoint 2	The Bucketts Way
Category of view	Immediate vicinity
Landscape context	Arterial road
Distance of view	100m (from intersection)
Relative number of viewers	Large
Likely duration of view	Short (traffic)
Visual sensitivity	Moderate
Visual effect	Moderate
Visual impact rating	Moderate

Description:
View from north of the intersection along The Bucketts Way looking southward toward the proposed intersection. The existing road will be widened to accommodate acceleration/deceleration lanes as well as central turning lanes.

Comments:
This view represents the typical view when driving along The Bucketts Way. As with Viewpoint 1, the visual impact will be greatest during the construction of the intersection. After the intersection and road is in place, the visual impact will be minimal as it will be seen as just another road entering The Bucketts Way.

Viewpoint 3

Viewpoint 3	Residence along access road
Category of view	Immediate vicinity
Landscape context	Residence
Distance of view	180-340m
Relative number of viewers	Small
Likely duration of view	Moderate
Visual sensitivity	Moderate
Visual effect	Moderate
Visual impact rating	Moderate

Description:
View toward the proposed access road from near a residence. The access road will run along the paddocks from The Bucketts Way. It will disappear into the existing bushland and continue over a hill. Approximately 250m of the road will be visible as it runs through this cleared area.

Comments:
The access road will carry an average of less than 10 trucks per hour during the day (max. 25 trucks) and will be gated at the end of each day.

Visually, the most intrusive element will be the construction equipment while the road is being built. After construction, the road will lie at ground-level and become just another road in the landscape.

Viewpoint 4

Viewpoint 4	Deep Creek Road
Category of view	Immediate vicinity
Landscape context	Local road / farm road
Distance of view	50m
Relative number of viewers	Small
Likely duration of view	Short
Visual sensitivity	Low
Visual effect	Low
Visual impact rating	Low

Description:
View from south, approaching the development site on the public roadway.

Comments:
This view is from Deep Creek Road approaching the subject property. This is the only road that has public access to the proposed quarry. It is a dead-end road that provides access to the quarry property and three other properties. There are no permanent residences that currently use the road.

The quarry offices and workshop will be located directly ahead behind the stand of trees that are visible. The existing vegetation will remain in place to screen the development from view while approaching on this road.

Viewpoint 5

Viewpoint 5	148 & 160 Forest Glen Road
Category of view	District area
Landscape context	Local road
Distance of view	1.6km
Relative number of viewers	Small
Likely duration of view	Short
Visual sensitivity	Low
Visual effect	Low
Visual impact rating	Low

Description:
View from south of the site from an elevated position along Forest Glen Rd.

Comments:
This view is from a rise in the road and represents the best vantage point for possible views along Forest Glen Rd. There is dense bushland and two ridge-lines between this location and the proposed quarry operation.

This view illustrates the difficulty in seeing the proposed quarry from outside the property boundaries.

Viewpoint 6

Viewpoint 6	Ebsworth Road
Category of view	District area
Landscape context	Local road
Distance of view	2.9km
Relative number of viewers	Small
Likely duration of view	Short
Visual sensitivity	Low
Visual effect	Low
Visual impact rating	Low

Description:
View from west of the site, along a ridge that overlooks the valley through which Deep Creek flows. The valley runs down and directly away from this viewing location toward the Karuah River.

Comments:
This view is from an elevated position and represents the best accessible vantage point for views along the valley.

The ridges that form the edge of the valley extend into the valley to block any views of the proposed quarry site.

6.2. Viewpoint analysis

As discussed previously, the viewpoints chosen were representative views from the surrounding area.

Of the 6 viewpoints assessed in this VIA:

- 0 received a visual impact rating of HIGH
- 3 received a visual impact rating of MODERATE
- 3 received a visual impact rating of LOW

In the case of viewpoints 1 and 2, they represent the worst case scenario for the public because a new road intersection will be installed in this location. The two viewpoints were close to the proposed intersection and road with direct views of the proposed changes to the roads. Even though these locations are quite close to the site, the context of The Bucketts Way only allows momentary glimpses of the new roadway. This reduces the visual impact of the proposed development.

Viewpoint 3 is the typical view from a residence (this photo is taken adjacent to a driveway). There are three residences with similar views, as they are all located near this section of the proposed road. They are also closer to The Bucketts Way than they are to the proposed haul road. The closest residence is approximately 220m from the proposed road.

Even though the ratings for viewpoints 1, 2 and 3 are moderate, the impact is from a roadway and will be greatest during construction. After the roadway is established and in use, the visual impact will begin to diminish as the road becomes a part of the landscape.

Viewpoints 4, 5 and 6 had views toward the site, but trees, vegetation and topography obscure the proposed development from view. These illustrate that there are very few locations, if any, from which the quarry will be visible.

Table 6.1: Viewpoint visual impact summary

Viewpoint	Visual sensitivity	Visual effect	Visual impact rating
VP 1	Moderate	Low	Moderate
VP 2	Moderate	Low	Moderate
VP 3	Moderate	Low	Moderate
VP 4	Low	Low	Low
VP 5	Low	Low	Low
VP 6	Low	Low	Low

6.3. Visual impact summary

The visual impacts for this project are limited. The proposed quarry itself is not visible from any residences and is shielded by ridge lines and bushland that surround it. Even though the change in landform is significant in the extraction area (Figures 4.8-4.11), the surrounding bushland will remain in place and therefore maintain the existing natural screening.

The visual impacts posed by the project will be the private access road as it approaches and connects to The Bucketts Way.

7. Visual mitigation measures

7.1. Recommendations

The visual impact assessment in Section 6 of this report assigns either a high, medium or low visual impact rating when viewed from the immediate vicinity, local views and regional views. The following mitigation measures should be considered in the design and assessment of the proposed development.

Visual character

To maintain the visual character of the area around the site, the following recommendations are suggested.

- Trees and shrubs can be planted along the proposed access road near The Bucketts Way to screen views of the proposed road where it can be seen from nearby residences
- Bushland around the quarry site should be maintained to keep the existing visual screen intact
- Introduce naturalistic land shaping to any disturbed areas including the quarry area after production is completed
- Re-vegetate any disturbed areas with native and endemic plant species, including trees and under-storey plants.

Built form, materials and colours

- Materials, textures and colour selection should relate to the palette of the surrounding environment to minimise visibility and potential for visual impact
- Reflective surfaces and bright, contrasting colours should be avoided.

References

Alucobond Architectural (2019) Solar & Light Reflectivity Values for Alucobond Colours & Finishes. www.alucobond.com.au.

EDAW (Australia) Pty Ltd (2000) '*Section 12 – Visual Assessment', The Mount Arthur North Coal Project: Environmental Impact Statement*, URS Australia Pty Ltd, Prepared for Coal Operations Limited.

Google Maps (2020), http://google.com/maps/

Horner + Maclennan & Envision (2006) *Visual Representation of Windfarms - Good Practice Guidelines.*Scottish Natural Heritage, Inverness, Scotland.

New South Wales Department of Planning, (2010) http://www.planning.nsw.gov.au/

Pager Power (2018) *Solar Photovoltaic Glint and Glare Study*, Prepared for Bookaar Solar Farm Pty Ltd.

Roads and Maritime Services *Environmental Impact Assessment Guidance Note (2013): Guidelines for landscape character and visual impact assessment.*

Six Maps (2020), https://maps.six.nsw.gov.au/

Transport for NSW (2020), *Guideline for Landscape Character and Visual Impact Assessment*, EIA-N04, Version 2.2, Centre for Urban Design.

The Landscape Institute with the Institute of Environmental Management and Assessment (2013), *Guidelines for Landscape and Visual Assessment,* Third Edition, Newport, Lincoln.

The University of North Carolina, Greensboro - College of Arts and Sciences, e-light (2020), https://iarc.uncg.edu/elight/learn/learn.html.

Creating vibrant communities through powerful conversations

Consultation and urban design working together

Phone 02 4965 4317
mara@maraconsulting.com.au
maraconsulting.com.au
ABN 13 168 093 918