INTEGRATED ENVIRONMENTAL MANAGEMENT AUSTRALIA

Visual Impact Assessment

Bobs Farm Quarry

Prepared for:

Newcastle Sand

3631 Nelson Bay Road Bobs Farm

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1 INTRODUCTION

Integrated Environmental Management Australia (IEMA) has been engaged by Bobs Farm Sand Syndicate to prepare a Visual Impact Assessment for a new, standalone quarry located on Lot 254 DP 753204, 3631 Nelson Bay Road, Bobs Farm. The quarry 'Bobs Farm Quarry' and will extract up to 530,000 tonnes per annum of sand with maximum average sales estimated at 10,000 to 12,000t per week. The proposed quarry will be developed and operated by Newcastle Sand.

Through the State Significant Development Application under the *Environmental Planning and Assessment Act 1979* (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) were issued by the NSW Department of Planning, Housing and Infrastructure (DPHI) on 18 December 2025. The SEARs require that a visual impact assessment be prepared for the project.

To address the SEARs requirements, this assessment has considered the '*likely visual impacts of the development on private landowners in the vicinity of the development, and key vantage points in the public domain, including with respect to any new landforms'.*

1.1 Project Description

The Proponent seeks to develop the site for an extractive industry as a sand quarry. Consent is sought for annual extraction of 530,000tpa for 10 years, equating to a total life-of-quarry of approximately 4.4 million tonnes. It is anticipated the proposal will average sales of 10,000 to 12,000 tonnes per week.

The site has an area of approximately 40.9ha with the proposal seeking to use most of the subject site for extractive industry purposes with the exception of:

- A minimum 15m buffer between the site boundary and any areas of extraction
- The existing right-of-carriage way including a 3m buffer in the north-east of the site and the area east of this right-of-carriageway
- The existing electricity easement including a 3m buffer at the southern end of the site and the vegetated area to the south of this easement

No dredging is proposed with only dry (surface) sand extraction being employed.

Preparation of the site and proposed sand quarry operations would broadly comprise:

- Construction of a new left-in left-out intersection
- Establishment of processing and sales area including installation of onsite office (Atco structure), installation of screening and wash facilities, designation of stockpiling areas, associated ancillary structures, and use of the existing dwelling at the site for a manager's residence
- Staged vegetation clearing and topsoil stripping in accordance with the approved staging plan with topsoil stored onsite to be used for future rehabilitation works.
- Dry extraction down to a maximum of 0.7m above the ground water table
- Ongoing rehabilitation

Day-to-day operations would require two (2) articulated haul trucks (Volvo A40G) loaded by a hydraulic excavator (Volvo EC350) to transport sand from the extraction area to the on-site processing facility being a full electric screen and wash plant. Equipment will include excavators, front-end loaders, haul trucks, conveyors and water carts. Operations will utilise modern, well-maintained equipment incorporating advanced noise attenuation and water saving measures as well as fuel efficiency technology to reduce operational impacts on the surrounding environment.

The site benefits from a Water Access Licence (WAL5960) for 40ML per annum which is proposed to be used for sand washing purposes. Approximately 85% of extracted sand will be washed requiring a total of approximately 32ML per annum which is within the current Water Access Licence.

All essential services are available, or able to be made available, at the site including electricity, water tanks for potable water, pump-out system for sewage management, stormwater drainage and suitable vehicular access.

Sales would be by haulage truck at a maximum of ten (10) loaded trucks per hour equating to a maximum of 120 loaded trucks per day but with an average of 46 loaded trucks per day. All transport trucks would travel east along Nelson Bay Road and complete a U-turn at the Port Stephens Drive roundabout. Haulage trucks will be prohibited from using Marsh Road.

The site will be accessed by way of a new left-in left-out intersection onto Nelson Bay Road. The existing access to the site at the electricity easement is proposed to be retained for light vehicle access for the quarry as well as for access to the manager's residence.

Progressive rehabilitation of exhausted areas will take place in accordance with the approved rehabilitation plan. The proposed post-quarry use of the site is to return the site to its current condition, being the same ratio of vegetated land and land used for the purpose of extensive agriculture. The proposed final land use is intended to achieve a land use outcome consistent with the existing rural landscape character, comprising a combination of native vegetation and managed grassland areas.

1.2 Project Background

Bobs Farm Quarry is located within the Port Stephens Council area, approximately 1.0 kilometre south-west of the intersection of Marsh Road and Nelson Bay Road, Bobs Farm. The project area lies on the Stockton Bight dune system and is currently used for mixed rural purposes including orchard farming, containing patches of surrounding native vegetation.

To the immediate northeast of Lot 254 there is a small parcel of Crown land. The current use of the site is for an olive and fig farm, with surrounding development that includes Bobs Farm Primary School to the northeast of the site. Rural residential properties and small-scale businesses which include a go-kart track lies to the northeast and a tourist shark and ray aquarium to the northwest surround the project area. Worimi National Park adjoins the site to the east and south. The location of the subject site is shown in **Figure 1.**

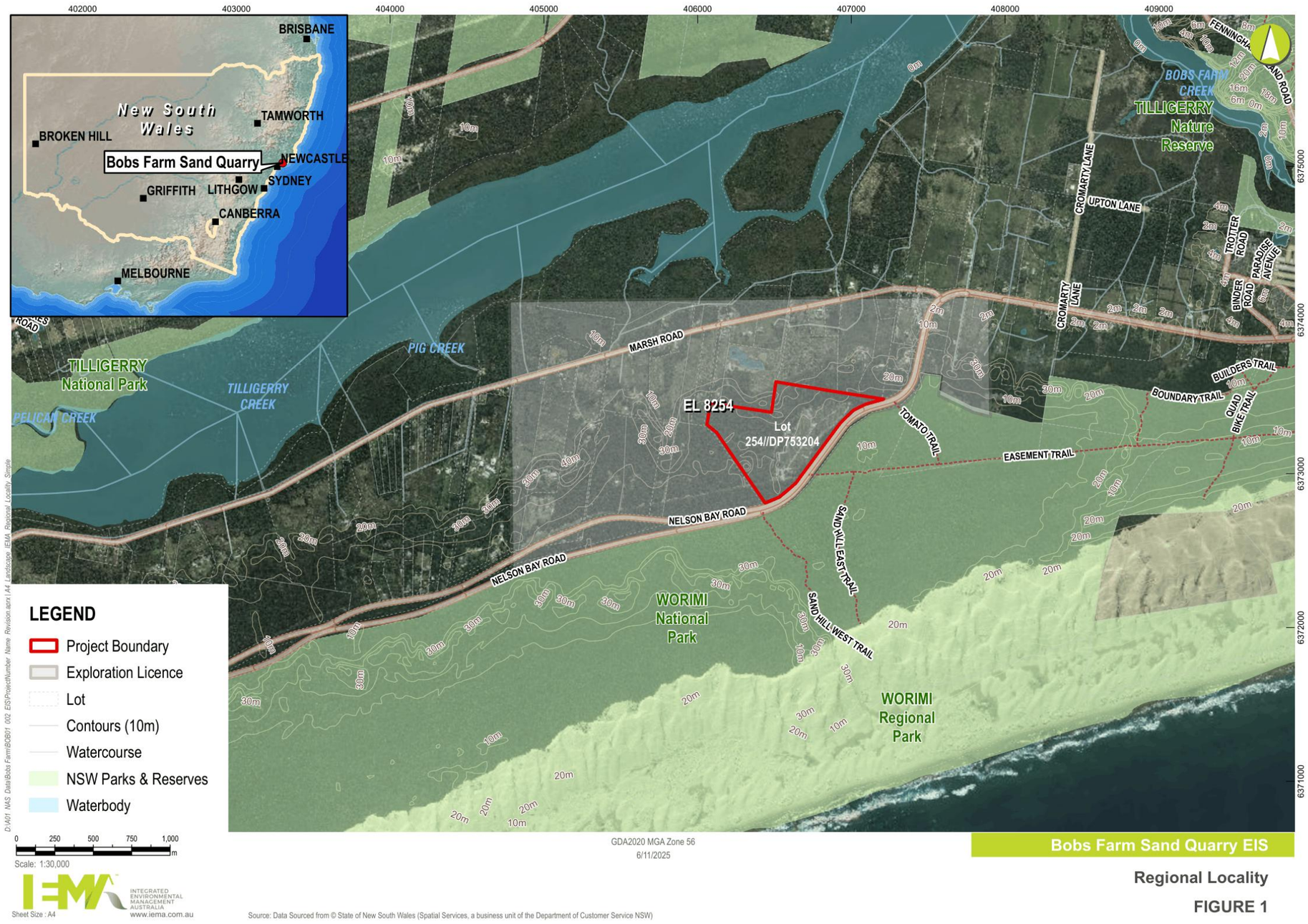

Figure 1 Regional Locality

1.3 Purpose and Scope

This Visual Impact Assessment (VIA) has been prepared to support the environmental impact statement (EIS) application for the proposed Bobs Farm Quarry.

The purpose of this Visual Impact Assessment (VIA) is to assess the potential visual impacts associated with the proposed Bobs Farm Quarry on surrounding sensitive receivers and public viewpoints. The assessment evaluates the visibility of the proposed disturbance area and associated infrastructure using geographic information system (GIS) viewshed modelling and considers the effectiveness of existing landscape screening.

1.4 SEARS

This VIA has been prepared to satisfy Point 11 Visual of the SEARs outlined in **Table 1**.

Table 1 SEAR's Requirement's

SEAR's Requirement	Section
"A detailed assessment of the likely visual impacts of the development on private landowners in the vicinity of the development"	Covered in **Section 6.1** of this VIA.
"and key vantage points in the public domain, including with respect to any new landforms."	Covered in **Section 5.4** of this VIA.

2 SURROUNDING LAND USE

The project site is located at 3631 Nelson Bay Road, Bobs Farm within the Port Stephens Local Government Area (LGA). The surrounding area is characterised by a predominantly rural landscape comprising agricultural land uses, rural residential properties, conservation areas and existing extractive industries associated with the coastal sand deposits of the Stockton Bight region.

Land uses in the immediate locality include small-scale agricultural activities such as horticulture, together with dispersed rural residential dwellings generally located on larger rural landholdings. Nelson Bay Road forms a major regional transport corridor connecting Newcastle with Port Stephens and supports both local traffic and heavy vehicle movements associated with regional industries, including sand extraction. The broader Stockton Bight area contains a number of existing sand extraction operations that supply construction and industrial sand to the Hunter Region and greater Sydney markets.

Conservation areas are also present within the wider region, including lands associated with the Stockton Bight coastal dune system and nearby wetlands. These areas support important ecological values and form part of the broader environmental landscape surrounding the site. Receptors are generally dispersed throughout the rural landscape and separated from the project area by distance and vegetation.

2.1 Topography and Landform

The project site is located within the Stockton Bight sand mass and forms part of a relict coastal dune system deposited during the Holocene epoch approximately 4,500–7,000 years ago. The landform is characterised by elevated dune ridge crests and lower relief sand plains, with dune ridges predominantly occurring to the north and west of the site and sand plains to the east. Elevations across the site range from approximately 5 m AHD on the lower sand plains to around 35 m AHD along the dune ridges, with most of the site above 8 to 10 m AHD. Localised dune knolls create areas of higher relief, with generally gentle slopes of 0–5% across the eastern portion of the site and steeper gradients of up to approximately 10–50% on the dune ridges.

The site generally slopes east toward Nelson Bay Road and the coastal dune system associated with Stockton Beach, while some areas drain toward the north, west and south-west depending on dune orientation. The Tilligerry Creek floodplain lies to the north and comprises relatively flat terrain, while the site itself represents a localised elevated landform within the broader dune landscape.

2.2 Roads and Access

Nelson Bay Road is the only major road in the vicinity. The entry will include a left-turn deceleration lane for inbound heavy vehicles and an acceleration lane for outbound trucks, ensuring safe and efficient vehicle movements. This arrangement removes the use of Marsh Road for heavy vehicles and increases separation from Bobs Farm Primary School. The current concept is that loaded haul trucks will exit the site and travel east along Nelson Bay Road, completing a U-turn at the Port Stephens Drive roundabout before continuing toward Newcastle, Sydney and regional markets. The intersection is subject to final design in consultation with Transport for NSW.

2.3 Vegetation and Landscape

The site is situated within a landscape characterised by low-lying, undulating coastal sand dunes, with vegetation dominated by coastal sand-based communities typical of the Stockton sandplain. The prevailing vegetation, primarily Coastal Sand Apple–Blackbutt Forest, forms a generally continuous native canopy across the broader landscape, with a small area of Tall Alluvial Moist Forest in the north-west associated with lower-lying terrain (**Figure 2**). Within the site, a cleared central area contrasts with the surrounding native vegetation, reflecting historical land use.

From a visual perspective, the site is relatively well contained by existing vegetation. A narrow band of mature forest along the southern boundary, together with more extensive forested areas to the west, provides partial visual screening. The surrounding Worimi National Park to the east and south forms a dominant and continuous vegetated backdrop, contributing to a largely natural visual character. As a result, the site is generally perceived within the context of an expansive, vegetated coastal landscape, where existing vegetation plays a key role in filtering and softening views of disturbed or cleared areas.

This section establishes the visual baseline for the study area, consistent with Stage 1 of the assessment methodology outlined in **Section 3.2**, by describing the existing landscape character, vegetation, landform and surrounding land uses that influence visual sensitivity and capacity to absorb change.

Figure 2 Vegetation and Landscape at the Site

Note: The area around the development is mostly surrounded by native dry sclerophyll forest which assists in providing a visual screen of the operations from the public.

2.4 Surrounding Public Amenities

2.4.1 Community Facilities and Structures

Local community facilities include the Bobs Farm Public School located north of the site and Bobs Farm Community Hall located on Marsh Road. Additionally a power easement runs through the southern portion of the site. There are also rural residences, tourist sites and community facilities in the local area.

2.4.2 Waterbodies

Surface water features in the surrounding area include Tilligerry Creek and an artificial lake located to the north-west within the Shark and Ray Centre facility. No permanent waterbodies occur within the proposed quarry site. The site is located on elevated relict sand dunes of the Stockton Bight system, which form a local topographic high above the surrounding floodplain.

3 METHODOLOGY

3.1 Objectives

The visibility analysis was conducted to assess how visible the site is to the public. Two types of visibility were assessed. The first is how visible the site is from nearby sensitive receivers such as residential housing. The second is how visible the site is from traffic on Nelson Bay Road.

3.2 VIA Methodology Framework

The visual impact assessment has been undertaken using a structured, staged approach consistent with established landscape and visual assessment practices. The methodology comprises the following key steps:

1. Data Acquisition and Inputs

Relevant spatial datasets were compiled, including client-provided disturbance area, pit design and access road design, alongside sourced elevation data (DEM), LiDAR point clouds and sensitive receiver locations. These datasets formed the basis for modelling both terrain and real-world screening conditions.

2. Data Preparation and Surface Modelling

All datasets were validated, standardised to a common coordinate system, and processed within GIS (ArcGIS Pro). Terrain models (DEM) and surface models (DSM) were developed, incorporating vegetation, buildings and proposed quarry design to represent both “ground-only” and “realistic” visibility scenarios.

3. Viewshed Analysis Setup

Observer locations were defined for two receptor groups:

1. Sensitive receivers (e.g. nearby dwellings within 3 km)
2. Road users along Nelson Bay Road (spaced at regular intervals)

A geodetic viewshed analysis was then configured using consistent parameters (e.g. 2 m observer height, full line-of-sight modelling).

4. Visibility Modelling and Assessment

Viewshed modelling was undertaken to determine theoretical and realistic visibility of the disturbance area, accounting for terrain, vegetation and infrastructure. Results were interpreted to assess extent of visibility, screening effects, and key viewing locations (e.g. site access and road frontage).

5. Interpretation of Results and Impact Identification

Model outputs were analysed to determine visual impact significance, confirming:

- No visibility from surrounding sensitive receivers
- Highly limited, localised visibility from Nelson Bay Road (at the new access point).

4 ASSUMPTIONS

4.1 Data-Related

- The pit design accurately reflects the end state of the workings. Deviations from this would change the visibility analysis results.
- The proposed new access road design did not have any elevation values. These were calculated from the DEM for the purposes of the visibility analysis. If the new access road changes the elevation from the current terrain this would change the visibility analysis results.

- The LiDAR used is captured from a plane with an Airborne Laser Scanner. This captures information from above with a low swath angle. This means that objects get scanned from above and not from the side. For visibility analysis this can lead to issues such as a treed canopy with very little understory being classified as an effective visibility screen whereas there may be partial visibility.

4.2 Observer and Target Parameters

- Observer height is assumed constant (i.e., 2 m for a person). An increase in the observer height would change the results.
- The elevation of the disturbance area is assumed to be as per the pit design. This analysis does not account for objects within the disturbance area such as plant or vehicles.
- It's assumed that the observer points are positioned in the centre of the addressed building. A quick look at the 5 closest points appears to confirm this assumption.

4.3 Environmental Conditions

- Visibility is calculated under ideal conditions (no fog, rain, haze).
- Atmospheric refraction coefficient (set to 0.13) and earth curvature have been accounted for.

4.4 Line-of-Sight

- Visibility is based on direct line-of-sight which considers diffraction but not reflection.
- Areas are either visible or not, partial visibility is not modelled.

4.5 Temporal

- Both the DEM and point clouds were captured in late 2012. Desktop inspection was done with historical aerial imagery, and it appears that there has been no significant changes since this date.
- The sensitive receivers were sourced from the authoritative NSW Addressing database at the time of analysis. The metadata sheet did not discuss how often the database is updated. It's assumed that it was current and there are no new or removed receivers.

5 DATA & ANALYSIS PREPARATION

5.1 Data Collection

The analysis required a mix of client received and sourced data.

5.1.1 Client Received Data

Three datasets that the client provided was used in the analysis. They are the disturbance area, pit design and the proposed new access road design.

Disturbance area

The disturbance area is a 2D polygon (*Disturbance Area 20251017 V0.shp*) that defines the extent of the workings.

Pit Design

The 3D design for the pit is a CAD file (*Design Pit V2.dwg*). It shows the last bucket landform using 1 m contours.

Proposed New Access Road Design

The 3D design for the proposed new access road is a CAD file (*2026-02-19--EXPORT-240856.dwg*). It shows in full detail the new intersection into the site. The new intersection will allow trucks safe access off and onto Nelson Bay Road.

5.1.2 Sourced Data

Three datasets were sourced to support the analysis. They are Digital Elevation Models (DEM), LiDAR Point Clouds and Sensitive Receivers.

Digital Elevation Models (DEM)

To assess the visibility using the ground only required sourcing of Digital Elevation Models (DEM). The ground only model is just the physical terrain. It removes all things on the surface such as buildings, vegetation, etc.

The DEMs were sourced using the federal government service ELVIS. The subject site was defined, and the best available product was chosen. To cover the site 3 DEMs were selected, each is 2km x 2km with a 1 metre resolution. This data has an accuracy of 0.3m (95% Confidence Interval) vertical and 0.8m (95% Confidence Interval) horizontal.

LiDAR Point Clouds

To assess the realistic visibility required the sourcing of LiDAR point clouds. The realistic model is all things that obscure an observer's view such as the terrain, buildings, trees, etc.

The point clouds were sourced using the federal government service ELVIS. The subject site was defined, and the best available product was chosen. To cover the site 3 DEMs were selected, each is 2km x 2km with a minimum point density of 1.01 laser pulse per square metre resolution. This data has an accuracy of 0.3m (95% Confidence Interval) vertical and 0.8m (95% Confidence Interval) horizontal.

Sensitive Receivers

To model visibility from nearby sensitive receivers required observer locations such as residential housing, businesses, etc. The NSW Geocoded Addressing theme was used to identify all structures with an address. The NSW Addressing database is the authoritative property addressing system for NSW. The data was sourced from the web service and was current as of the date of analysis. This provides the observer points.

5.2 Data Preparation

The data was checked to make sure it was suitable for the analysis. All data was prepared using ArcGIS Pro.

Coordinate Reference System (CRS)

The CRS for the project is GDA2020 MGA Zone 56/AHD. All incoming datasets were checked to see if they had the same that CRS. DEM and LiDAR required transformation from GDA94.

5.2.1 Client Received Data

Disturbance area

Imported into project file geodatabase from the original shapefile.

Pit Design

The received pit design required some slight fixes. A few of the contour line vertices had Z values of 0 which was only detectable when viewed in 3D. This was corrected by interpolating between the closest contour elevations.

Proposed New Access Road Design

No preparation required.

5.2.2 Sourced Data

Digital Elevation Models (DEM)

All 3 sourced DEMs were added to the project and compared with a global elevation model to check for gross errors. They were then added to a mosaic dataset for further processing.

LiDAR Point Clouds

All 3 sourced LAZ files were first extracted. Then they were added to the project and compared with a global elevation model to check for gross errors. The first return filter was applied and the point cloud compared with the imagery as a check.

Sensitive Receivers

All sensitive receivers within 3 km of the site were extracted and saved into the project geodatabase.

5.3 Receiver Visual Impact

This section addresses the SEARs requirement to assess the ‘likely visual impacts of the development on private landowners in the vicinity of the development.’

The first question is “are there any observer locations that can view the disturbance caused by the quarry”. The sensitive receiver points were used as the observer locations in **Figure 4**.

Two tests were performed: a ground only test and a realistic test. The first is very conservative and found there was some site visibility, particularly from the north. The second test was to see if any disturbance could be viewed when considering all obstructions. In other words, if the site’s visibility was affected by the ground, vegetation, structures, etc. This was done as a realistic test of visibility.

To run the analysis the pit design needed to be inserted into a DSM mosaic dataset. A Digital Surface Model (DSM) is a model of the surface that includes all visible features such as buildings, trees, etc. The point clouds that were set to first return were used to create the DSM raster. The same parameters as the DEM were adopted, such as 1 m resolution, to make the analysis comparable. The same pit design raster used in the

ground only test was reused. The DSMs and the pit design raster were then put into a mosaic dataset which simulates the realistic surface when the mines disturbance is at last bucket.

The analysis was then run using a geodetic viewshed tool. The analysis included all sightlines and not just a representative sample which makes the analysis conservative. The observers were given a height of 2 m off the ground to simulate the upper end of a typical person's height. The result is shown in **Figure 4**.

The result of this analysis is there is no visibility to the area of disturbance from any of the sensitive receivers when a realistic model is used. The analysis finds when the vegetation is considered, there is no visibility to the area of disturbance from any of the sensitive receivers. A 3 m bund was considered for this visual analysis in case there was still some remaining visibility from the Northwest. The current analysis concludes that a bund is unnecessary as long as the band of vegetation is retained. This analysis represents Stage 2 of the methodology outlined in **Section 3.2**, whereby the visual catchment of the project is defined through GIS-based viewshed modelling to identify the extent of theoretical visibility and inform the study area. The visibility assessment incorporates the final pit design (last bucket landform). Any refinements to the final landform are not expected to materially alter the outcomes of the viewshed analysis, as visibility is primarily controlled by surrounding vegetation and topography.

5.4 Visibility from Nelson Bay Road

This section addresses the SEARs requirement to assess the 'likely visual impacts of the key vantage points in the public domain, including with respect to any new landforms'. In accordance with Stage 3 of the methodology, representative viewpoints have been identified, including nearby residential receivers and publicly accessible locations such as Nelson Bay Road, to reflect where the Project is most likely to be experienced.

The second question is "can traffic travelling on Nelson Bay Road see into the site?".

Firstly, the northbound lane centreline of Nelson Bay Road needed to be sourced. Unfortunately, the state dataset centreline waved into the northbound and southbound lanes. There is a vegetated median between the lanes that would screen visibility. The northbound lane centreline was manually digitised using aerial imagery. The road section runs 200 m before and 100 m after the site's disturbance area.

The observer points were then created using the northbound lane centreline. Initially the observation points were spaced 5 m apart but that led to 154 observation points which seemed too high. Instead, they are spaced 10 m apart providing 67 observation points. The analysis incorporates the full disturbance area, including both extraction stages and surface infrastructure, to determine potential theoretical visibility from Nelson Bay Road.

The new access road design was required as part of the DSM. The design from the client was done as linework but the analysis needed a polygon. Automatically enclosing the polylines was attempted but failed due to the number of gaps in the linework. A temporary scratch layer was used to close some of these gaps and the auto fill was attempted again with partial success. The rest had to be manually enclosed and merged. The 2D polygon of the new access road needed to have elevation in order to be useful in the analysis. The interpolate shape tool was used with the DEM to give each polygon vertices a Z elevation. The elevation was compared with the existing roads elevation as a check. Like the pit design this needed to be converted to an interim TIN and then into a DEM. Finally, this could be mosaiced into the DSM to provide a model of what an observer would see after the access roads construction. The result is shown in **Figure 3**. The geodetic viewshed tool was run and it concludes that up to 3 of the observers can see into the site. A reasonable control measure would be to install a solid sensor gate to prevent road user visibility.

To assess visibility from Nelson Bay Road, observer locations were established along the northbound lane centreline at regular intervals. **Figure 4** illustrates the location of the road and the approximate observer height used in the analysis. The view is 2 m off the ground which is typical for an observer inside a car. Before disturbance traffic cannot see into the site. After the new access road is constructed, traffic can see into site. Controlling visibility with, for instance, a solid gate would effectively prevent visibility from the road.

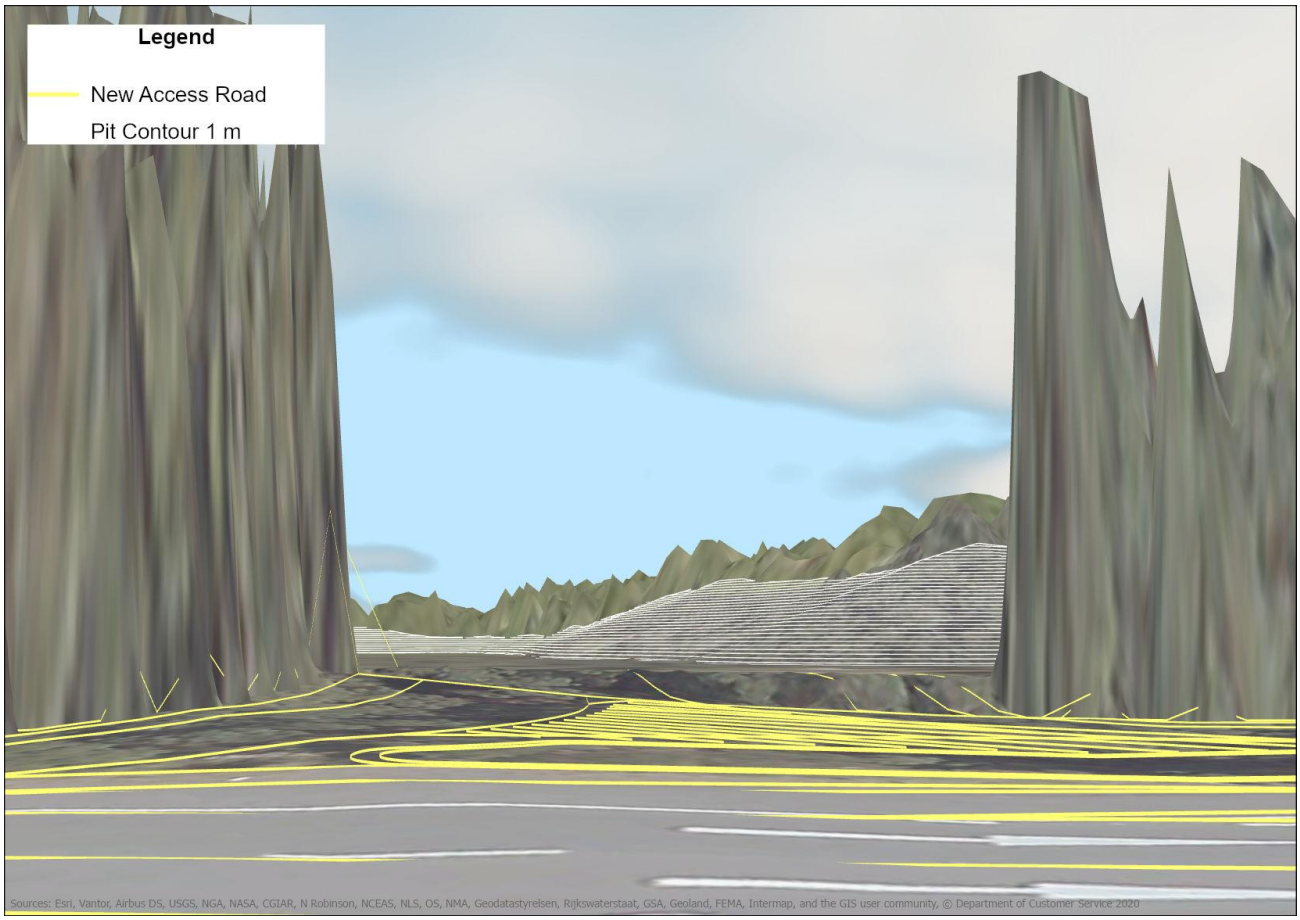

Figure 3 Visibility from Nelson Bay Road at the new access

5.5 Validation and Ground Truthing

Visibility from Nelson Bay Road was desktop inspected using Google StreetView. The vast majority of the site is not visible. However, the small existing access approximately in the middle of the site has some visibility which disagrees with the analysis. The access has tree canopy above which is what the LiDAR would have seen and hence determined there is no visibility. If the new access road and the suggested control measure is used, then the findings stand.

6 VISUAL IMPACT ASSESSMENT RESULTS

6.1 Receiver Visual Impact Analysis

Consistent with Stage 4 of the methodology, the potential visual impact from key viewpoints has been assessed by considering the extent of visibility (magnitude of change), the sensitivity of the viewing context, and the resulting significance of visual impact. Viewshed modelling identifying areas where the disturbance area may be visible from sensitive receivers.

The viewshed modelling incorporated all proposed extraction stages. The results indicate that extraction areas are not visible from nearby residential receivers and are largely screened from Nelson Bay Road by vegetation and topography.

The receiver visual impact analysis finds that:

1. No sensitive receivers within 3 km can see into the disturbance area.
2. Most observers were obstructed by the terrain. Some in the Northern plains and at high elevations were obstructed by objects on the ground such as buildings, vegetation, etc.
3. All observers were assumed to be a person standing on the ground (2 m).

Note: A 3 km study radius was adopted as this distance typically represents the limit at which small-scale extractive operations become visually indistinguishable within rural landscapes.

Figure 4 below outlines the receiver visual impact analysis, and confirms under the assessment no observers can view the disturbance area.

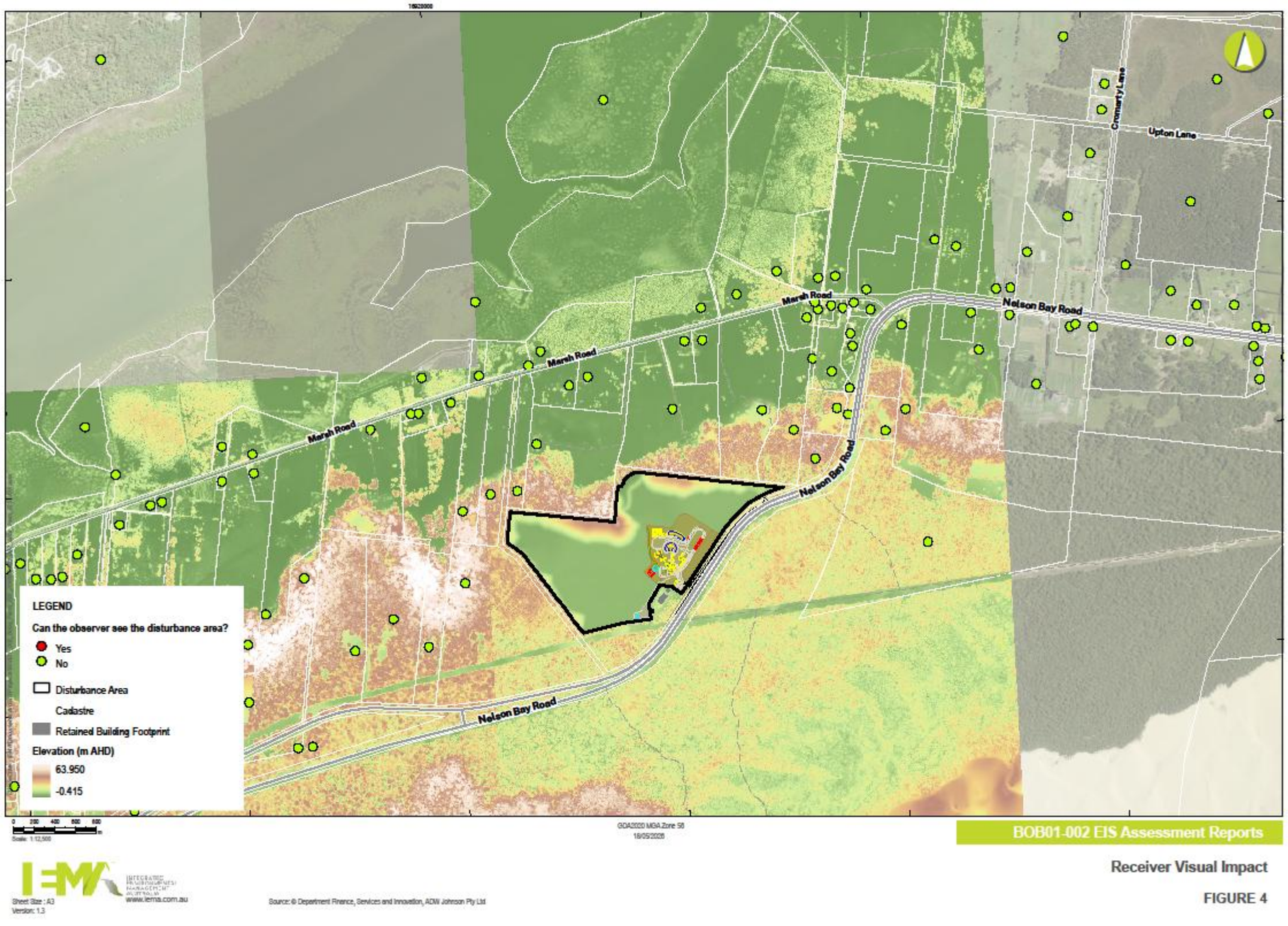

Figure 4 Receiver Visual Impact Analysis

6.2 Visibility Analysis from Nelson Bay Road

The visibility analysis from Nelson Bay Road that incorporates the full disturbance area, including both extraction stages and surface infrastructure. in **Figure 5** finds that:

1. The only visibility is at new access road. Visibility to the site could be prevented by using a solid rolling sensor gate or equivalent.
2. All obstructions were due to the vegetation buffer on the western side of Nelson Bay Road. Without this the public would have full visibility. It is recommended that this buffer be retained.
3. All observers were placed every 10 m on Nelson Bay Road at the same height as a typical car driver (2 m).

The viewshed modelling incorporated all proposed extraction stages within the disturbance area. The results indicate that extraction activities are not expected to be visible from Nelson Bay Road, due to effective screening by surrounding vegetation and landform. Accordingly, visual impacts associated with progressive extraction are expected to be negligible.

Figure 5 presents the results of a viewshed analysis undertaken using observer points spaced at 10 m intervals along Nelson Bay Road. The analysis assesses theoretical visibility to the entire disturbance area, including both the extraction areas and the processing and sales area. The mapped values indicate the number of observer locations from which any part of the disturbance area may be visible. These values do not represent the extent or duration of views, and in many instances, visibility is expected to be partial, filtered by intervening vegetation, or limited to brief views at the site access.

The results indicate that potential visibility is primarily confined to the site access and immediate frontage to Nelson Bay Road, with the majority of the extraction area screened by retained vegetation and local topography. Areas identified as having higher numbers of visible observer points correspond to locations where multiple viewpoints along Nelson Bay Road may have a line-of-sight to a portion of the disturbance area. This does not indicate continuous or widespread visibility of the Project. In practice, views are expected to be limited in extent and duration and largely restricted to the access point where vegetation is more open. The values shown represent the number of observer points along Nelson Bay Road from which any part of the disturbance area may be theoretically visible. This does not indicate continuous or full visibility of the site.

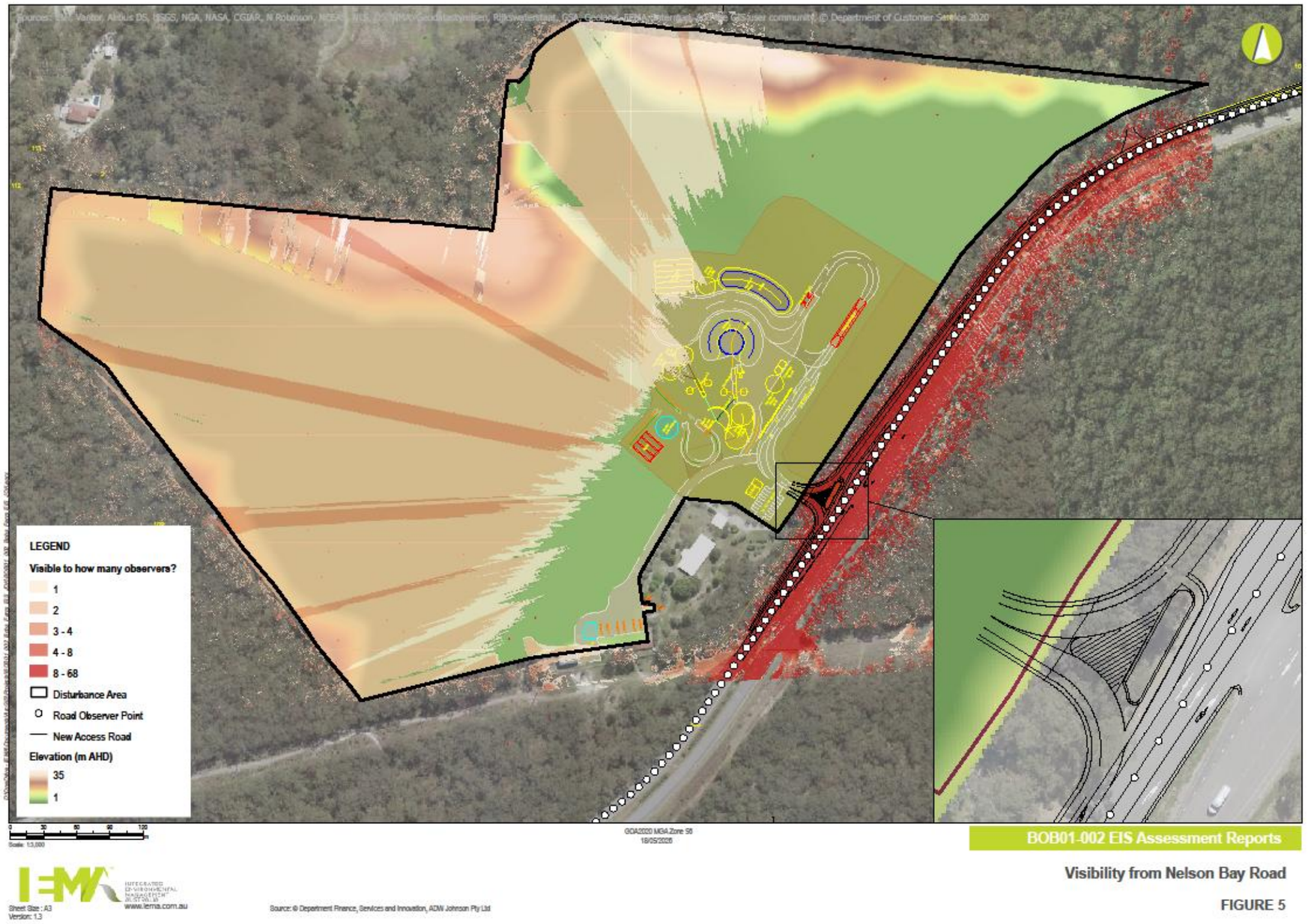

Figure 5 Visibility from Nelson Bay Road (observer points at 10 m intervals)

7 MITIGATION MEASURES

In practice, visibility is expected to be intermittent, filtered by retained roadside vegetation, and limited to brief views at the site access. Retained vegetation along Nelson Bay Road is expected to substantially screen views to the majority of the disturbance area. Recommended visual mitigation measures include:

- Retention of existing vegetation buffers, at a minimum 15m along the site boundary.
- Installation of a solid gate or fencing at the site access to restrict views from Nelson Bay Road.
- Maintenance of vegetated screening along Nelson Bay Road.

8 CONCLUSION

In line with Stage 5 of the methodology, mitigation measures have been identified to minimise potential visual impacts, including retention of existing vegetation buffers and appropriate design of the site access. The visual assessment indicates that the proposed disturbance area is not visible from surrounding sensitive receivers when existing vegetation and terrain are considered. No mapped receiver locations were identified as having direct line-of-sight to the disturbance area under the modelled scenario.

Limited visibility may occur from Nelson Bay Road at the proposed access location following construction of the access road. This visibility would be minor and localised and could be effectively mitigated through the installation of a solid gate or fencing and the retention of the existing vegetation buffer.

Given the limited scale of the quarry, the surrounding vegetation screening and the relatively low elevation of the proposed disturbance area, the project is not expected to result in significant visual impacts on surrounding landowners or public vantage points.

Retention of the existing vegetation buffer along Nelson Bay Road and the northern site boundary would be important in maintaining the current level of visual screening. Overall, the staged assessment indicates that the project will result in low visual impact, with limited visibility primarily confined to the site access, and effective mitigation measures available to further minimise visual effects.

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