Adani Mining Pty Ltd

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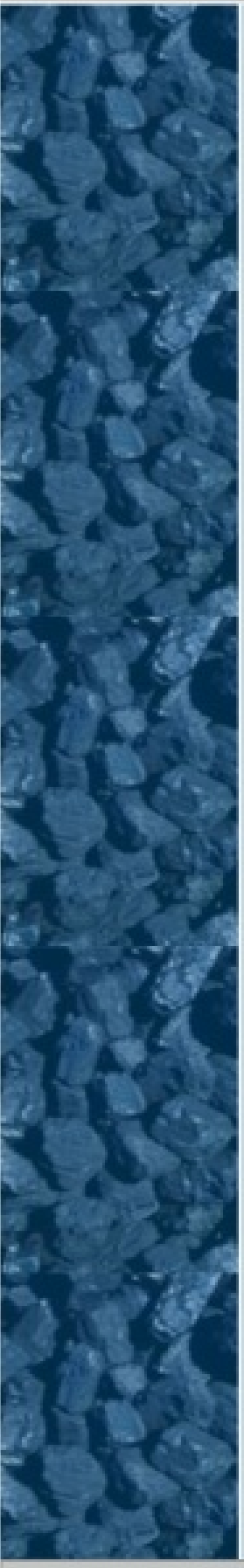

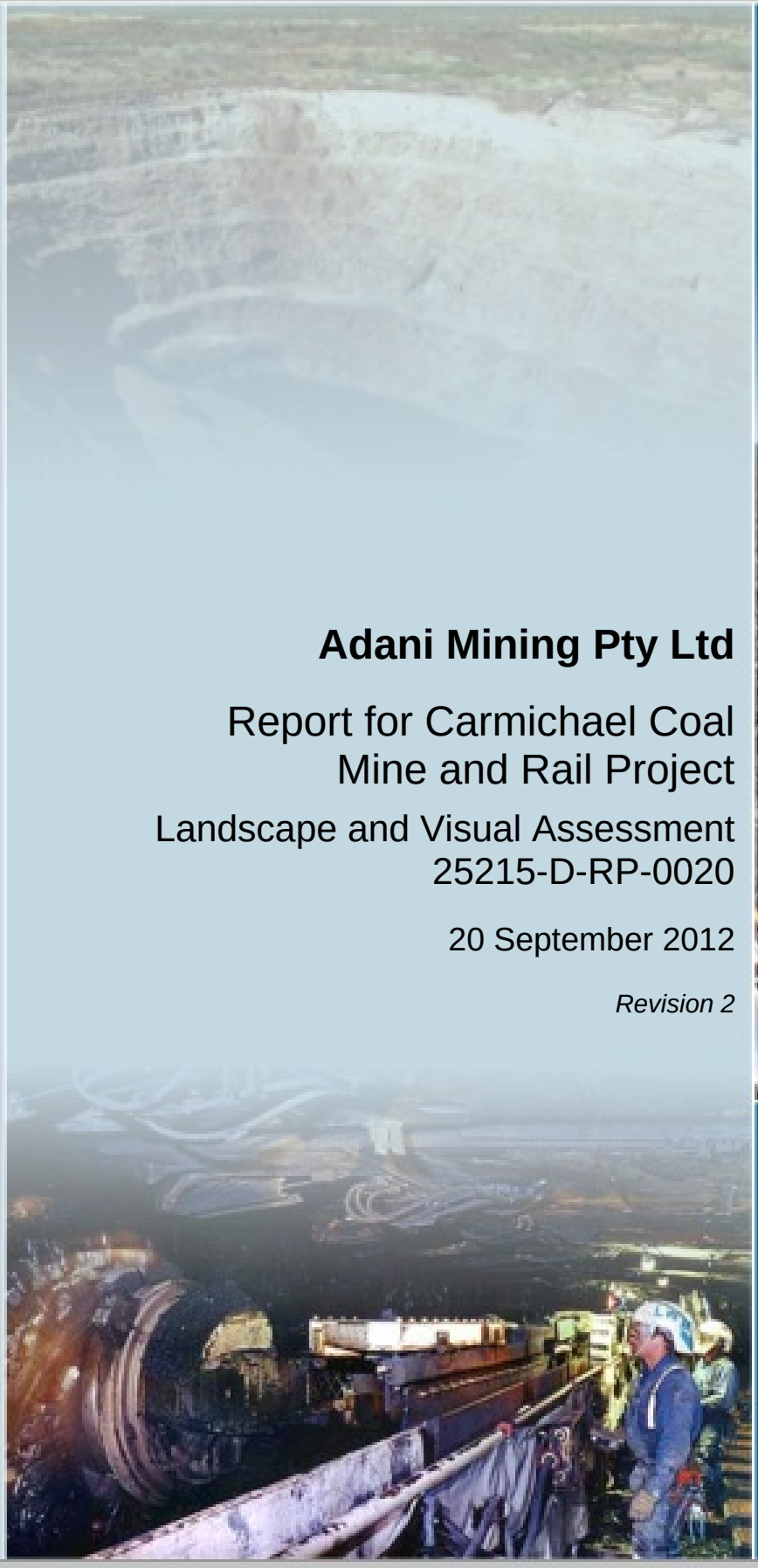

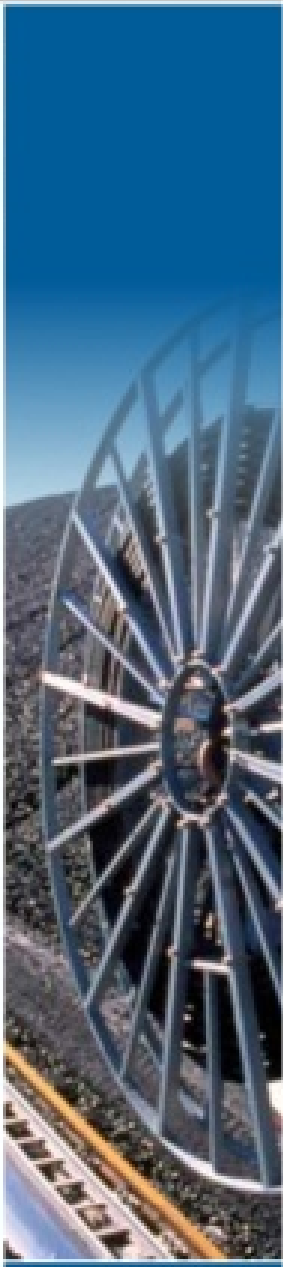

Adani Mining Pty Ltd

Report for Carmichael Coal Mine and Rail Project

Landscape and Visual Assessment
25215-D-RP-0020

20 September 2012

Revision 2

GHD

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The Report may only be used and relied on by Adani for the purpose of informing environmental assessments and planning approvals for the proposed Carmichael Coal Mine and Rail Project (Purpose)and may not be used by, or relied on by any person other than Adani.

The services undertaken by GHD in connection with preparing the Report were limited to those specifically detailed in Section 2 of the Report.

The Report is based on conditions encountered and information reviewed, including assumptions made by GHD, at the time of preparing the Report. Assumptions made by GHD are listed within Section 1.4 of the Report and contained through the Report.

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- *reliance on the Report by a third party, or use of this Report other than for the Purpose.*

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Glossary of Terms

Project Specific Terminology	
Abbreviation	**Term**
The EIS	Carmichael Coal Mine and Rail Project Environmental Impact Statement
The Proponent	Adani Mining Pty Ltd
The Project	Carmichael Coal Mine and Rail Project
The Project (Mine)	Carmichael Coal Mine and Rail Project: Mine Component
The Project (Rail)	Carmichael Coal Mine and Rail Project: Rail Component

Generic Terminology	
Abbreviation	**Term**
Background view	6 km – 16 km - Textures are no longer visible, but mountain and valley forms, skylines and ridgelines are important (Forest Practice Board Tasmania, 2006).
Cut	An excavation for constructing below the natural ground level.
Cut batters	The side slopes of cuttings.
Ecology	A branch of biology dealing with the relations and interactions between organisms and their environment, including other organisms.
Fill	Earth used to construct an embankment.
Foreground	0-1 km – Is the visual zone where colour contrast and textural detail are most clearly perceived (Forest Practice Board Tasmania, 2006).
Intervisibility	Two points in the landscape that are mutually visible.
Landscape feature	A component, part or feature of the landscape that is prominent or eye-catching, e.g. hills, buildings, vegetation.

Landscape quality	Largely subjective judgement based on particular characteristics that influence the way in which the environment is experienced, including special interests such as cultural associations or heritage interests, the presence and/or type of elements and condition.
Landscape sensitivity	The extent to which landscape can accept a change of a particular type and scale without unacceptable adverse impacts on its character.

Generic Terminology	
Abbreviation	**Term**
Landscape value	Areas of formally designated landscape that through national or local consensus, reflect the value placed by society on particular environments and/or their features.
Middleground view	1 km - 6 km – different elements in the landscape are visually apparent (Forest Practice Board Tasmania, 2006).
Mitigation	Limit the intensity of impacts or prevent impacts.
National Environmental Significance (NES)	Matters of NES as listed under the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* which include World/National Heritage properties, Ramsar Wetlands, Nationally Threatened Species and Ecological Communities, Migratory Species, Commonwealth Marine Areas, Nuclear Actions and National Heritage Places.
Sensitive visual receptor	Person and/or viewer group that would experience an impact.
Viewing locations	Viewing locations are used in this report to typify the views experienced by sensitive visual receptors throughout the visual catchment of the proposal. Viewing locations in this report often represent a viewing area, rather than one exact point.
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual impact	Changes in the appearance of the landscape or in the composition of available views as a result of development, to people's responses to these changes, and to the overall impacts in regard to visual amenity. This can be positive (i.e. beneficial or an improvement) or negative (i.e. adverse or a detraction).
Visual catchment	Extent of potential visibility to or from a specific area, feature or proposal.

Abbreviations	
AHD	Australian Height Datum
DERM	Former Queensland Department of Environment and Resource Management
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1994*
GIS	Geographic Information Systems
Abbreviations	
IP Act	*Integrated Planning Act 1997*
IRC	Isaac Regional Council
LCU	Landscape Character Unit
LGA	Local Government Area
MIW Regional Plan	Mackay, Isaac, Whitsunday Regional Plan 2012
NC Act	*Nature Conservation Act 1992*
SP Act	*Sustainable Planning Act 2009*
ToR	Terms of Reference
VL	Viewing Location
VM Act	*Vegetation Management Act 1999*
ZTV	Zone of Theoretical Visibility

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Executive Summary

The Carmichael Coal Mine and Rail Project (the Project) is comprised of two major components:

- The Project (Mine): a greenfield coal mine over EPC1690 and the eastern portion of EPC1080, which includes both open cut and underground mining, on mine infrastructure and associated mine processing facilities (the Mine) and the Mine (offsite)
- The Project (Rail): a greenfield rail line connecting the Mine to the existing Goonyella and Newlands rail systems to provide for the export of coal via the Port of Hay Point (Dudgeon Point expansion) and the Port of Abbot Point, respectively; including:

A Landscape Visual Impact Assessment of the Project (Rail) has been undertaken. This involved a desktop study and a site survey.

The desktop study included a review of the relevant published documents in relation to visual impact and landscapes at a national, regional and local level for the Study Area. The study area is the visual catchment (the area from within which the Project (Rail) may be seen). The desktop study also included a review of the legislative framework and consultation with Isaac Regional Council which assisted in identifying key planning considerations relevant to this assessment. A Geographical Information System (GIS) was used to identify the location of potentially sensitive visual receptors.

A site survey was undertaken to verify the desktop study, allow characterisation of the landscape, identify sensitive visual receptors, and observe and document how the landscape may be viewed from sensitive visual receptors.

Representative public and private viewpoints were selected, recorded and photographed. Ten viewing locations were chosen to represent a range of typical views possible from that locality, to the Project (Rail), as well as represent views from key visual receptors (residents and road users) where a potentially significant change in view may occur as a result of the Project (Rail).

The Project (Rail) predominantly traverses a rural (agricultural) landscape, primarily used for cattle grazing. The Project (Rail) corridor is located in a remote region. The topography in the Project (Rail) region is largely flat with some gently undulating slopes. There are also a number of small hills to the north and south of the Project (Rail) corridor. The landform often provides open views across flat plains, sometimes to distant hills. However, vegetation dominates and provides short, middle and long views within the Study Area.

Potential impacts on landscape and visual amenity from the Project (Rail) during construction and / or operation include clearing of vegetation, earthworks, large machinery, trucks and other vehicles, fencing, lighting and freight trains carrying coal.

The landscape and visual impacts of the Project (Rail) are of moderate and / or minor significance to not significant for the viewing locations assessed. Due to the nature of the Project (Rail) there will be a permanent impact on the visual landscape and amenity for some viewing locations within the Project (Rail) area.

The landscape and visual impacts of the Project (Rail) will occur both during the construction and operational phases and measures to minimise these impacts will be required.

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1. Introduction

1.1 Project Overview

Adani Mining Pty Ltd (Adani) is proposing to develop a 60 million tonne (product) per annum (Mtpa) thermal coal mine in the north Galilee Basin approximately 160 kilometres (km) north-west of the town of Clermont, Central Queensland. All coal will be railed via a privately owned rail line connecting to the existing QR National rail infrastructure, and shipped through coal terminal facilities at the Port of Abbot Point and the Port of Hay Point (Dudgeon Point expansion). The Carmichael Coal Mine and Rail Project (the Project) will have an operating life of approximately 90 years.

The Project comprises of two major components:

- The Project (Mine): a greenfield coal mine over EPC1690 and the eastern portion of EPC1080, which includes both open cut and underground mining, on mine infrastructure and associated mine processing facilities (the Mine) and the Mine (offsite) infrastructure including:
  - A workers accommodation village and associated facilities
  - A permanent airport site
  - Water supply infrastructure
- The Project (Rail): a greenfield rail line connecting the Mine to the existing Goonyella and Newlands rail systems to provide for the export of coal via the Port of Hay Point (Dudgeon Point expansion) and the Port of Abbot Point, respectively; including:
  - Rail (west): a 120 km dual gauge portion from the Mine site running west to east to Diamond Creek
  - Rail (east): a 69 km narrow gauge portion running east from Diamond Creek connecting to the Goonyella rail system south of Moranbah

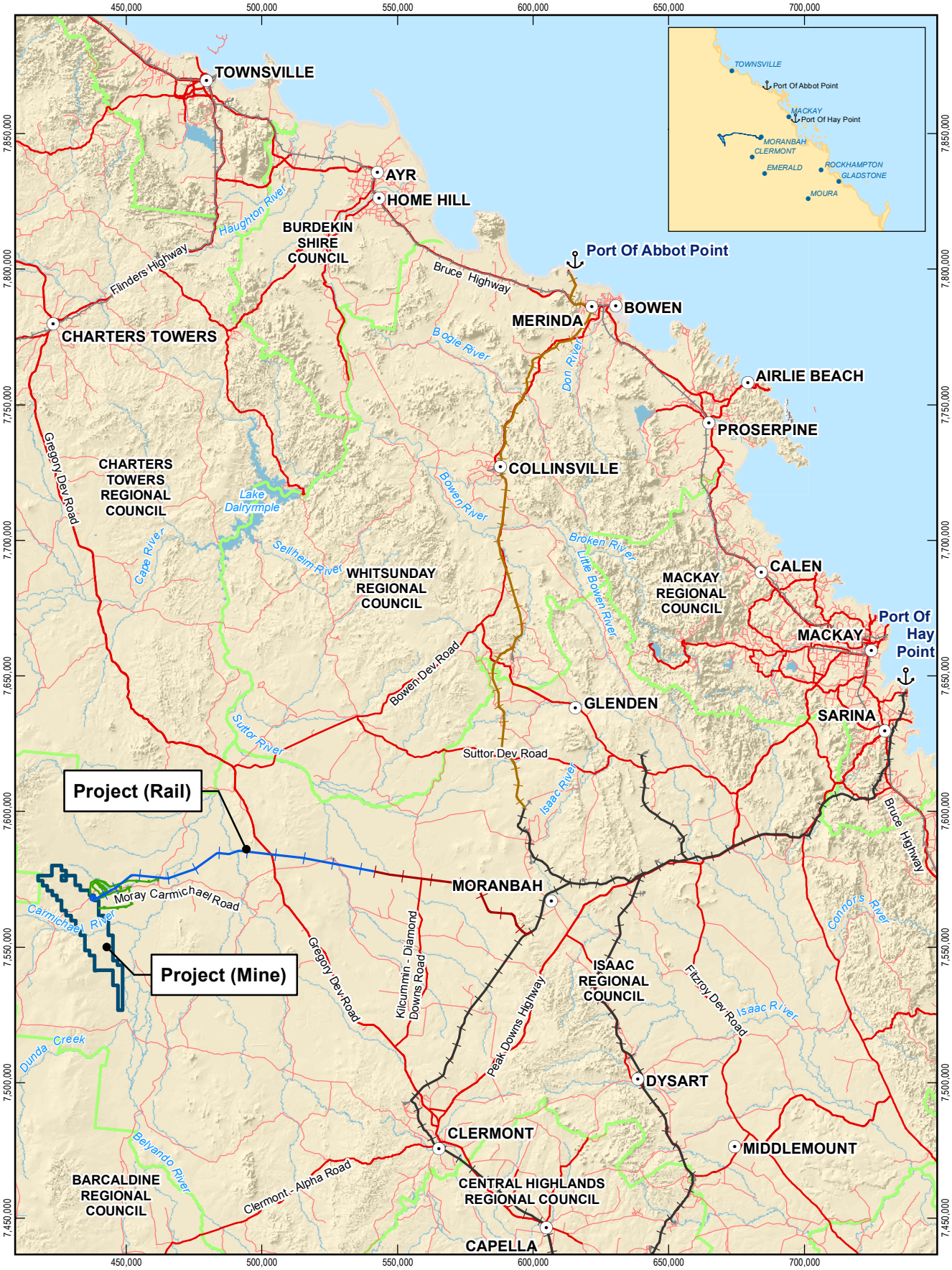
The Project has been declared a 'significant project' under the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and as such, an Environmental Impact Statement (EIS) is required for the Project. The Project is also a 'controlled action' and requires assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Project EIS has been developed with the objective of avoiding or mitigating all potential adverse impacts to environmental, social and economic values and enhancing positive impacts. Detailed descriptions of the Project are provided in Volume 2 Section 2 Project Description (Mine) and Volume 3 Section 2 Project Description (Rail).

Figure 1-1 shows the Project location.

1.2 Purpose of this Report

The purpose of this report is to provide a landscape and visual impact assessment of the Project (Rail) and present strategies to mitigate its impact. In doing so, this visual impact assessment describes the existing landscape character within the visual catchment of the Project (Rail), identifies and assesses the significance of the visual impacts and provides a clear management hierarchy to be applied to address those potential impacts.



LEGEND

- Town
- Major Port
- Other Rail Network
- Goonyella System
- Newlands System
- State Road
- Local Road
- Watercourse
- Local Government Area
- Project (Rail)
- Rail (West)
- Rail (East)
- Project (Mine)
- Mine (Offsite)

Based on or contains data provided by the State of QLD (DERM) [2010]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

1:2,000,000 (at A4)

0 10 20 30 40 50

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision L
Date 28-08-2012

Project Location

Figure: 1-1

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Data Source: © Commonwealth of Australia (Geoscience Australia): Town, Railways, Watercourses (2007); DERM: LGA, (2011), Hillshade (2009); DMR: State Roads (2008); Gassman/Hyder: Mine (Offsite) (2012); DME: EPC1690 (2010), EPC1080 (2011); Adani: Alignment Opt9 Rev3 (2012). Created by: BW, JVC

This report addresses the criteria of the terms of reference (ToR) for the Project EIS outlined in Section 3.2.1, relating to the Project (Rail) only. Compliance with the terms of reference of the Project environmental impact statement is provided in Table 1-1.

The central purpose of the visual impact assessment is to identify significant adverse potential impacts at the Project planning stage and to propose measures to mitigate or ameliorate such impacts.

Table 1-1 Terms of Reference Cross Reference

Terms of Reference Requirement/Section Number	Section of this report
Section 3.2.1 Scenic Amenity and Lighting	
Describe in general terms the existing character of the landscape and the general impression that would be obtained while travelling through and around it	Section 0
Outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community	Sections 4.4 and 4.5
Provide information in the form of maps and photographs, particularly where addressing the following issues:	
◗ major views, view sheds, outlooks and features contributing to the amenity of the area, including assessment from private residences	Section 4.6
◗ focal points, landmarks, waterways (e.g. rivers, streams, creeks other bodies of water and wetlands) and other features contributing to the visual quality of the area and the project site(s)	Section 4.2
◗ character of the local and surrounding areas including vegetation and land use	Sections 4.3 and 4.4
Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area	Section 5.1
Provide details about measures to be undertaken to mitigate or avoid the identified impacts	Section 5.2

1.3 Aim and Objectives

Consistent with the terms of reference, the aim of the visual impact assessment is to describe the environmental values in general terms, the existing character of the landscape and the general impression that would be obtained while travelling through and around it; outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community; and provide information in the form of maps and photographs, particularly where addressing the following issues:

- Major views, view sheds, outlooks and features contributing to the amenity of the area, including assessment from private residences
- Focal points, landmarks, waterways (e.g. rivers, streams, creeks, other bodies of water and wetlands) and other features contributing to the visual quality of the area and the Project site(s)
- Character of the local and surrounding areas including vegetation and land use.

It is noted that the assessment of lighting has not been undertaken as part of this assessment as the Project (Rail) will have a very limited need for lighting. The proposed maintenance depot, located on the western extent of the Project (Rail) near the Mine Site will require some lighting during the operation stage however this is unlikely to have an impact upon any sensitive visual receptors due to the distance between the viewing locations and the maintenance depot location.

1.4 Assumptions and Limitations

A desktop study was undertaken to determine key viewing locations. These locations were selected to represent the points from which the Project (Rail) is likely to be viewed by the greatest number of visual receptors and from where the most sensitive visual receptors are likely to perceive the Project (Rail). Some selected sensitive visual receptor viewing locations were inaccessible at the time of the site survey, as permission for access had not been granted. The assessment for these locations was therefore undertaken based on the desktop study and an assessment from the nearest publicly accessible area.

The assessment process aims to be objective and describe any changes factually. Potential changes to the landscape as a result of the Project (Rail) have been defined, however the significance of these changes requires qualitative (subjective) judgements to be made. The conclusions to this assessment therefore combine objective measurement and professional interpretation. This assessment has attempted to be objective, however it is recognised that visual assessment can be highly subjective and individuals are likely to associate different visual experiences to the Study Area.

A number of assumptions have been made for this assessment, as outlined below.

- The assessment is based on the information available for the Project (Rail) at the time of writing.
- Baseline conditions were assessed in the field during the site survey in June 2011.
- For the purpose of this report, general assumptions have been made in order to appraise the impact of the construction works upon landscape resources and visual amenity based upon similar projects and specialist advice.

1.5 Study Area

For the purposes of this report, the Study Area is the visual catchment. The visual catchment is defined as the area from within which the Project (Rail) and associated activities, such as the development of quarries and borrow areas may be seen. The Project (Rail) development is based on the project description as provided in Volume 3 Section 2 Project Description.

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2. Methodology

2.1 Introduction

For the purpose of this report, the term ‘landscape’ includes:

- Landscape character
- Landscape context
- Views and prospects
- Historical landscapes
- Anthropogenic landscapes

The landscape and visual assessment is a combination of two separate but closely related aspects, namely:

- The impact upon the landscape character, that is, responses that are felt by sensitive visual receptors towards the combined effects of the new development.
- The visual impact, that is, the extent to which new developments can be seen within a visual catchment.

2.2 Standards and Guidance

The methodology for the landscape and visual assessment responds to particular project requirements and constraints including the scale and nature of the Project (Rail).

There are no guidelines for the assessment of landscape and visual effects specific to Australia. The industry therefore typically refers to guidelines provided by the British Institute of Landscape Architects in the United Kingdom (UK). This assessment has been conducted in accordance with the Guidelines for Landscape and Visual Impact Assessment (2002) published by The Landscape Institute and the Institute for Environmental Management and Assessment (UK).

Generally, terminology and assessment methods have also been derived from the Visual Landscape Planning in Western Australia, produced by the Western Australian Planning Commission (2007) and the Forest Practice Board of Tasmania’s, A Manual for Forest Landscape Management (2006).

2.3 Baseline Landscape Characterisation

2.3.1 Desktop Study

The desktop study included a review of the relevant published documents in relation to visual impact and landscapes at a national, regional and local level for the Study Area. The desktop study also included a review of the legislative framework (further described in Section 3). GIS was also used to identify the location of potentially sensitive visual receptors. Sensitive visual receptors are defined as a person or viewer group that would experience a potential impact.

Consultation with Isaac Regional Council (IRC) also assisted in identifying key planning considerations relevant to this assessment.

The following data sets were reviewed:

- Aerial photography
- Topographic maps with contours at 10 m (Department of Environment and Research Management (DERM) 2010)
- Hillshade (Shuttle Radar Topography Mission Shaded Relief)
- Road networks
- Existing rail networks
- Proposed rail alignments (QR National Goonyella to Abbot Point expansion Project, Hancock Prospecting Pty Ltd's Alpha Coal and Rail Project and Waratah Coal Pty Ltd's Galilee Coal (Northern Export Facility) Project
- Homestead locations
- Cadastre (DERM 2011)
- Water courses
- Protected areas as defined under the *Nature Conservation Act 1992* (NC Act) (DCDB DERM 2011)
- Nature refuges as defined under the NC Act (DCDB DERM 2010)
- Local Government Area (LGA) boundaries
- Interim Biogeographic Regionalisation for Australia Version 6.1 (regions and subregions (DEH 2005))
- Survey maps

2.3.2 Site Survey

A site survey was undertaken to verify the desktop study, to:

- Allow characterisation of the landscape
- Identify sensitive visual receptors
- Observe and document how the landscape may be viewed from sensitive visual receptors

The site survey was conducted in June 2011, during conditions of good visibility. The site survey was undertaken by two qualified Landscape Architects.

During the site survey, the Landscape Architects traversed the study area and viewed the proposed rail corridor from publicly and privately accessible viewpoints. At representative locations photographs were taken with the bearing and GPS location recoded along with field notes and sketches. The site survey assisted in building consensus, thereby limiting subjectivity.

Representative public and private viewpoints were selected, recorded and photographed. Sites were chosen to represent a range of typical views possible from that locality, to the Project (Rail). In addition, the viewpoints were selected to:

- Represent views of particular landscape and /or visual features of importance.
- Represent views from key visual receptors (residents and road users) where a potentially significant change in view may occur as a result of the Project (Rail).

2.3.3 Defining the Landscape Character Areas

Landscape character areas are considered to be common landscape types (defined by typical features and characteristics) and highlight any principal landscape features. A description of the landscape character differentiates between subjective assessments and objective description and is provided from both within the Study Area, and from the wider landscape.

The potential impact on the landscape character is measured by the responses that are felt by sensitive visual receptors towards the combined effects of the new development. Sensitive visual receptors are defined as a person and/or viewer group that would experience a potential impact. They are taken from viewing locations where the Project (Rail) may be visible to residents, or areas where visitors spend extended amounts of time. Other locations include areas from which fixed or transient views would be possible, but where the time of stay is shorter, such as roads and rail lines.

The categorising of the landscape character areas include:

- Landform
- Vegetation
- Intensity
- Character of land

Landscape categorisation was informed by a review of information during the desktop study as described in Section 2.3.1 and the site survey described in Section 2.3.2. Particular attention was paid to the relevant regions/ subregions selected from the Interim Biogeographic Regionalisation for Australia regions and subregions (DEH, 2005). This national data set which classifies the land surface of Australia is derived from specialist ecological knowledge and the assessment of climate, geomorphology, landform, lithology, and characteristic flora and fauna (DEH, 2005). These attributes are common to some of the attributes used to define landscape character.

2.3.4 Defining the Visual Catchment

The visual catchment is defined as the area from within which the Project (Rail) may be seen, which in turn is defined as the Study Area. The Study Area was determined through a desk top study of aerial photographs and topographic maps where landform and land cover (screening) were both considered in parallel. The visual impact assessment defines the visual catchment at the maximum visibility for the Project (Rail) based on the Project (Rail) concept design.

2.3.5 Description of Existing Conditions

A description of the existing conditions of the landscape and visual environment forms the baseline against which the Project (Rail) has been assessed. The description of the existing conditions is based upon outcomes of the desk top study and the site survey. The principal document and data sources used include:

- Survey mapping and GIS data sets
- Aerial photography
- Information from local planning authorities, including land use planning

- Site survey outcomes including a photographic record of landscape features, key views and sensitive visual receptors
- Observations of the way elements of the public realm, such as the roads, are used

The assessment takes into account:

- The landscape character defined for the Study Area
- Representative viewing locations
- Sensitive visual receptors

As outlined in Section 1.4, some selected sensitive visual receptor viewing locations were inaccessible at the time of site survey. The assessment for these locations was therefore undertaken based on the desktop study and an assessment from the nearest publicly accessible area.

2.4 Assessment of Impacts

2.4.1 Overview

Impacts are defined as the relative capacity of the landscape to accommodate changes to the physical landscape of the type and scale proposed that would occur as a direct result of the Project (Rail).

The level of the impact is evaluated considering:

- Visual modification
- Visual sensitivity

Both are defined in Sections 2.4.3 and 2.4.4, respectively, and their use in identifying severity of the impacts is outlined.

Assessment of landscape and visual impacts is necessarily qualitative as both the values of a particular landscape and the extent to which change to landscape character are acceptable are subjective.

2.4.2 Zone of Theoretical Visibility

A zone of theoretical visibility is the theoretic assessment of visibility to or from a designated point in the landscape using elevation data such as a Digital Elevation Model (DEM) to calculate the extent of visibility of that point from anywhere in the Study Area. The mapping does not take account of buildings or vegetation screening and hence reflects a lunar landscape, which for the visual impact assessment process represents the "worst case scenario". The zone of theoretical visibility generated for this assessment is based on 10 m contour intervals and an observer eye height of 1.7 m.

2.4.3 Visual Modification

Visual modification refers to the extent of change to the landscape, and therefore impact upon visual amenity, that would occur as a direct result of the Project (Rail) from a given viewpoint. Landscape is defined as features (such as vegetation, built elements, topography, etc.) either within the Project (Rail) site or on land adjacent. The features of the landscape are considered as an integral part of the landscape and visual context of the route and important contributors to the overall character of the environment.

Assessment of changes to the landscape includes identification of:

- The nature of the change that is the degree of contrast, or integration of, any new features with existing features.
- Context and quality of the views including the extent to which the Project (Rail) will be visible in the wider landscape (with consideration of the presence of intervening vegetation or features).
- The scale or degree of change i.e. obvious/imperceptible with respect to loss or addition of features.
- The nature of the impact (adverse or beneficial).

For the purposes of this assessment the definitions in Table 2-1 have been used to describe visual modification.

Table 2-1 Visual Modification Definitions

Level of Modification	Definition
Large reduction or improvement	A substantial / obvious change to the landscape 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.
Moderate reduction or improvement	Discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape. May be partly mitigated. The change would be out of scale with the landscape, and at odds with the local pattern and landform and will leave an adverse impact on the landscape.
Small reduction or improvement	Minor loss or alteration to one or more key landscape elements, features, or characteristics, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.
No perceivable reduction or improvement	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 landscape.

Source: Landscape Institute and Institute for Environmental Management and Assessment (2002)

2.4.4 Visual Sensitivity

Visual sensitivity refers to visual receptors and their sensitivity to their visual environment. Visual sensitivity is defined as the perception of viewers. Visual impacts relate to the changes that arise in composition of available views as a result of changes to the existing landscape, to people's responses to these changes, and to the overall impacts with respect to visual amenity.

For the purposes of this assessment, key visual receptors comprise residents, users of transport routes (road and rail) as well as users of public recreation spaces and all have differing sensitivities to their visual environment. Generally, sensitivity is derived from a combination of factors including:

- Receptors' interest in the visual environment i.e. high, medium or low interest in their everyday visual environment, and the duration of the effect.
- Receptors' duration and viewing opportunity i.e. prolonged, regular viewing opportunities.

- Number of viewers and their distance / angle of view from the source of the effect, extent of screening / filtering of the view, where relevant.
- Magnitude of change in the view (i.e. loss/addition of features that change the view's composition) and integration of changes within the existing view (form, mass, height, colour and texture).
- Effectiveness of proposed mitigation.

For the purposes of this assessment, the terminology set out in Table 2-2 has been used to describe visual sensitivity.

Table 2-2 Visual Sensitivity Definitions

Sensitivity	Definition
High	Occupiers of residential properties with long viewing periods, within close proximity to the proposed development. Communities that place value upon the landscape and enjoyment of views of their landscape setting.
Medium	Outdoor workers who have a key focus on their work that may also have intermittent views of the Project (Rail) area. Viewers at outdoor recreation areas located within close proximity but where viewing periods are limited. Occupiers of residential properties with long viewing periods, at a distance from or screened / filtered views of the Project (Rail) area.
Low	Road users in motor vehicles, trains or on transport routes that are passing through or adjacent to the study area and have short term / transient views. Viewers indoors at their place of work, or similar.
Neutral	Viewers from locations where there is screening by vegetation or structures where only occasional views are available and viewing times are short.

2.4.5 Duration of Impact

Duration of impact has been defined for the purposes of this assessment as outlined in Table 2-3.

Table 2-3 Duration of Impacts

Temporary	Impacts lasting one year or less
Short Term	Impacts lasting one to seven years
Medium Term	Impacts lasting seven to fifteen years
Long Term	Impacts lasting fifteen to sixty years
Permanent	Impacts lasting over sixty years

Source: Landscape Institute and Institute for Environmental Management and Assessment (2002)

2.4.6 Impact Type

The definition type of impact as used in this assessment has been outlined in Table 2-4.

Table 2-4 Quality of the Impact

Neutral	A neutral impact will neither enhance nor detract from the landscape character or view.
Positive	A positive impact will improve or enhance the landscape character or view.
Negative	A negative impact will reduce or have an adverse effect on the existing landscape character or view.

2.4.7 Significance of Impact

The significance (or severity) of impact has been assessed in accordance with the impact significance criteria described in Table 2-5.

Only impacts of major or high significance in the context of this assessment have been considered. These impacts will require further refinement through mitigation or scheme design.

Table 2-5 Significance of Impact

		Landscape Impact			
		Large	**Moderate**	**Small**	**Negligible**
Visual Sensitivity	**High**	Major significance	High significance	Moderate significance	Minor significance
	Medium	High significance	Moderate significance	Minor significance	Not significant
	Low	Moderate significance	Minor significance	Not significant	Not significant
	Negligible	Minor significance	Not significant	Not significant	Not significant

2.5 Mitigation

Preliminary evaluation of Project (Rail) alignment options and siting of depots has been guided by the need to avoid or reduce potential adverse effects on landscape character and visual receptors (refer Volume 1 Section 3 Introduction).

Environmental constraints and opportunities have been taken into consideration at each stage of the Project (Rail) design. This iterative approach assists to avoid or minimise potential negative impacts of the Project (Rail) while helping to identify opportunities for landscape enhancement.

The construction strategy sets out a series of key objectives and measures to be applied throughout the Project (Rail) construction to facilitate that satisfactory levels of environmental protection are achieved and to limit disturbance from construction activities as far as reasonably practicable.

Additionally, a landscape design guide sets out principles, objectives and standards for the proposed Project (Rail) and its associated facilities and equipment. Where impacts have been deemed adversely

significant, site specific mitigation measures have been proposed in order to lessen the impact on the landscape character and visual amenity.

The hierarchy of strategies for impact mitigation include:

- **Avoidance** - Avoid developments in sensitive or prominent landscapes, and avoid insensitive or visually intrusive designs. Prevention of adverse effects at source.
- **Reduction** – Reduction of adverse effects that cannot be eliminated by avoidance. The significance of adverse impacts is lessened. Seeks to limit the exposure of the sensitive visual receptor. Reduce the visual intrusiveness of the design and reduce the visibility of the Project (Rail) (e.g. by installing barriers between the location(s) of likely receptors and the source of the impact).
- **Remedy** – Remedy serves to improve adverse conditions by carrying out further works which seek to restore the environment e.g. increased planting of trees/shrubs to offset unavoidable loss of vegetation.

If it is not possible or practical to mitigate an impact (e.g. felling mature trees) this is described as a residual impact.

3. Legislative Framework

3.1 National Legislative Framework

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act protects those aspects of the environment that are of national environmental significance (NES) and heritage value. The protection of the environment includes the qualities and characteristics of locations, places and areas; and heritage values of places.

3.1.2 Native Title Act 1993

The Project (Rail) intersects native title claims for the Wangan and Jagalingou People (registered native title claim QUD85/04, QC04/6)), the Jangga People (registered native title claim (QUD6230/98, QC98/10)), and the Barada Barna People (registered native title claim (QUD380/08, QC08/11)) current under the *Native Title Act 1993*. The Project (Rail) intersects the former claim area of the Barada Barna Kabalbara and Yetimarla People #4 (former registered native title claim (QUD6023/01, QC01/25). Landscapes may have particular cultural significance for Aboriginal people.

3.2 State Legislative Framework

3.2.1 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) protects native vegetation in Queensland. The VM Act regulates the clearing of vegetation for a variety of reasons, including the protection of amenity. However, vegetation management codes established under the VM Act do not specifically require any consideration of visual impact when assessing compliance with the codes.

3.2.2 Nature Conservation Act 1992

The NC Act is established to conserve nature. The NC Act protects areas of conservation significance including National Parks, Nature Refuges and other conservation areas, as well as individual plants and animals. The NC Act recognises that biological diversity is important at a landscape scale.

Nearby to the proposed Project (Rail) are Wilandspey Conservation Park, Nairanna National Park and Bygana West Nature Refuge which are protected under the NC Act.

3.2.3 Aboriginal Cultural Heritage Act 2003

The main purpose of the *Aboriginal Cultural Heritage Act 2003* is to provide effective recognition, protection and conservation of Aboriginal cultural heritage. Landscapes can play an important part in Aboriginal cultural heritage. A separate cultural heritage assessment process is being be undertaken for the Project (refer Volume 1 Section 7 Indigenous and Non-indigenous Cultural Heritage) and is not discussed further herein.

3.2.4 Sustainable Planning Act 2009

The *Sustainable Planning Act 2009* (SP Act) provides the framework for planning for and assessment of development. The SP Act includes aesthetic and amenity values as matters that should be considered in planning. In relation to assessment of aesthetic or visual aspects of development, local governments may recommend that applications be refused where:

- "the building or structure, when built, will have an extremely adverse effect on the amenity or likely amenity of its neighbourhood; or
- the aesthetics of the building or structure, when built, will be in extreme conflict with the character of its neighbourhood" (SP Act Section 288)

3.2.5 The MacKay, Isaac and Whitsunday Regional Plan

The *Mackay, Isaac and Whitsunday Regional Plan 2012* (MIW Regional Plan) recognises that the natural environment of the region needs protection to maintain landscape values.

Regional landscape values and regional landscape areas are identified in Sections 2.1 and 2.2 of the MIW Regional Plan and are addressed in Table 3-1.

Table 3-1 Mackay, Isaac and Whitsunday Regional Plan Landscape Values and Areas

Regional Plan Provisions	
Principle	2.1.1 Manage and enhance the values of the regional landscape to optimise their ability to contribute to the region's liveability, lifestyle, health and economy.
Policies	2.1.2 Plan, design and manage development, infrastructure and other activities to manage and enhance landscape values.
Programs	2.1.3 Develop a consistent methodology for identifying regional landscape values across the region
	2.1.4 Develop a consistent approach to the assessment, approval and management of rural, nature-based and ecotourism facilities that ensures such facilities do not degrade the values of the regional landscape.
Principle	2.2.1 Optimise multiple community benefits through coordinated planning, management and investment in regional landscape areas.
Policies	2.2.2 Regional landscape areas are managed to optimise economic, social, recreational and ecosystem services to the region.
	2.2.3 Inter-urban breaks are protected from development that diminishes their function.
Programs	2.2.4 Identify and map regional landscape areas to inform land-use planning and decision-making.
	2.2.5 Identify current and potential landscape corridors, including regional and local biodiversity corridors and networks, to connect priority regional landscape areas.

Source: DLGP, 2012

3.3 Local Planning Framework

3.3.1 Overview

The Study Area is located within the IRC LGA, formally the Belyando Shire. The IRC was formed on 15 March 2008, following the amalgamation of the shires of Belyando, Broadsound and Nebo Shires. The former Shire Planning Schemes are currently still in effect, until a new Regional Council Planning Scheme is developed.

Development of land within the former Belyando Shire is regulated through the *Planning Scheme for the Belyando Shire 2008*. This Planning Scheme was formed under the former *Integrated Planning Act 1997* (IP Act) (now superseded by the SP Act) for the purposes of managing development in a way that advances the purposes of the IP Act.

3.3.2 Isaac Regional Council: Belyando Shire

The policies relating to scenic amenity in the Belyando Shire include:

1. Desired Environmental Outcome

In Belyando Shire, ecological systems, the natural environment (including natural features and unique habitats such as Peak Range National Park, Mazeppa National Park, Narrien Range National Park, Epping Forest National Park, Wilandspey Conservation Park, Doongmabulla Springs Important Wetland and the declared catchment), and items and places of cultural and heritage significance are protected such that biodiversity, cultural heritage values and existing or intended landscape character are maintained.

2. Strategies

(a) *Development is regulated to minimise any adverse impacts on air and water quality, to prevent land degradation, loss of unique habitat and biodiversity and to maintain the integrity of riparian areas, ridgelines and escarpments.*

(b) *Development is regulated to be compatible with the environmental, habitat, biodiversity and landscape values and historic significance of protected areas (including Peak Range National Park, Mazeppa National Park, Narrien Range National Park, Epping Forest National Park, Wilandspey Conservation Park, Doongmabulla Springs Important Wetland and the declared catchment) and areas, local items and places of cultural significance (including areas along water courses).*

The policies relating to the Rural Zone states that development:

- *is located, designed and operated in a manner that protects and enhances the predominant rural scale, intensity, form and character;*
- *does not adversely impact on areas and sites of conservation importance, including cultural and high landscape values.*

These specifically include:

Non-Rural Activities - Locational Criteria 9 (PC1)

Non-"rural activities" are located in the Rural "Zone" only where those activities:

(a) *do not unduly impact on the character and amenity of the locality;*

(b) are directly and primarily associated with rural activities, a natural resource related industry or natural or cultural resources;

(c) cannot reasonably be located in another more appropriate zone;

(d) do not prejudice the existing or future productive capacity of rural land or other natural resources; and

(e) do not adversely affect the landscape values and scenic qualities of the locality.

Setbacks and Boundary Clearances (PC7)

"Buildings" and "structures" are located to ensure the rural amenity is maintained by:

- *"Buildings" and "structures" have a setback of not less than 20 metres from any road frontage other than a State Controlled Road.*
- *"Buildings" and "structures" have side and rear boundary clearances of not less than 15 metres from property boundaries (except where establishing in an existing "building" and no "building works" are being undertaken for that existing "building").*

Building and "Structure Design (PC9*)*

"Buildings" and "structures" are designed such that the amenity of the locality is protected and maintained. No acceptable solution is prescribed.

Ridgelines and Escarpments (PC10)

Ridgelines and escarpments are maintained in a natural state to protect rural character, landscape values, and visual amenity.

Landscaping and External Activity Areas (PC11)

Landscaping and external activity areas are provided onsite to:

(a) contribute to a pleasant and functional rural built form;

(b) provide positive sun and breeze control;

(c) make provision for recreation areas; and

(d) contribute to the positive visual qualities of the Locality

Watercourses and Lakes (PC24)

"Development" ensures the maintenance of riparian areas and water quality including protection from offsite transfer of sediment.

- *A minimum 50 metre wide buffer area is provided extending out from the "defining bank" of any "watercourse" or "lake".*

Vegetation Retention (PC25)

"Development" retains vegetation for the:

(a) protection of scenic quality;

(b) protection of general habitat;

(c) protection of soil quality; and

(d) establishment of open space corridors and networks.

Vegetation comprising 20 per cent of each regional ecosystem type is retained within each lot with retained vegetation made up of woody remnant, regrowth or replanted natural species, excluding deep-rooted crops and clear fell plantation forestry. The shade lines are a minimum of 10 metres in width; clumps have an area greater than 2 hectares.

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4. Description of Environmental Values

4.1 Overview

The following section provides an overview of the existing land use, landform, vegetation, landscape character areas and viewpoints in the vicinity of the Project (Rail) corridor. Site wide land use, topography and landscape features are largely similar and contribute directly to landscape character and visual amenity. Figure 4-1 provides a location overview and viewing locations.

4.2 Land Use and Land form

The Project (Rail) predominantly transverses a rural (agricultural) landscape, primarily used for cattle grazing. The Project (Rail) corridor is located in a remote region. The town of Moranbah is situated approximately 15 km to the eastern extent of Rail (east). Clermont is located to the south at approximately 160 km of Rail (west). Charters Towers is located approximately 200 km to the north of the Project (Rail). The principal road connecting these towns is the Gregory Developmental Road which intersects the Project (Rail) corridor. There are nine minor roads which dissect the corridor. There are three identified stock routes which intersect the Project (Rail) corridor.

The topography in the Project (Rail) region is largely flat with some gently undulating slopes. There are also a number of small hills to the north and south of the Project (Rail) corridor. The land form often provides open views across flat plains, sometimes to distant hills. However, vegetation dominates and provides short, middle and long views within the Study Area.

4.3 Vegetation

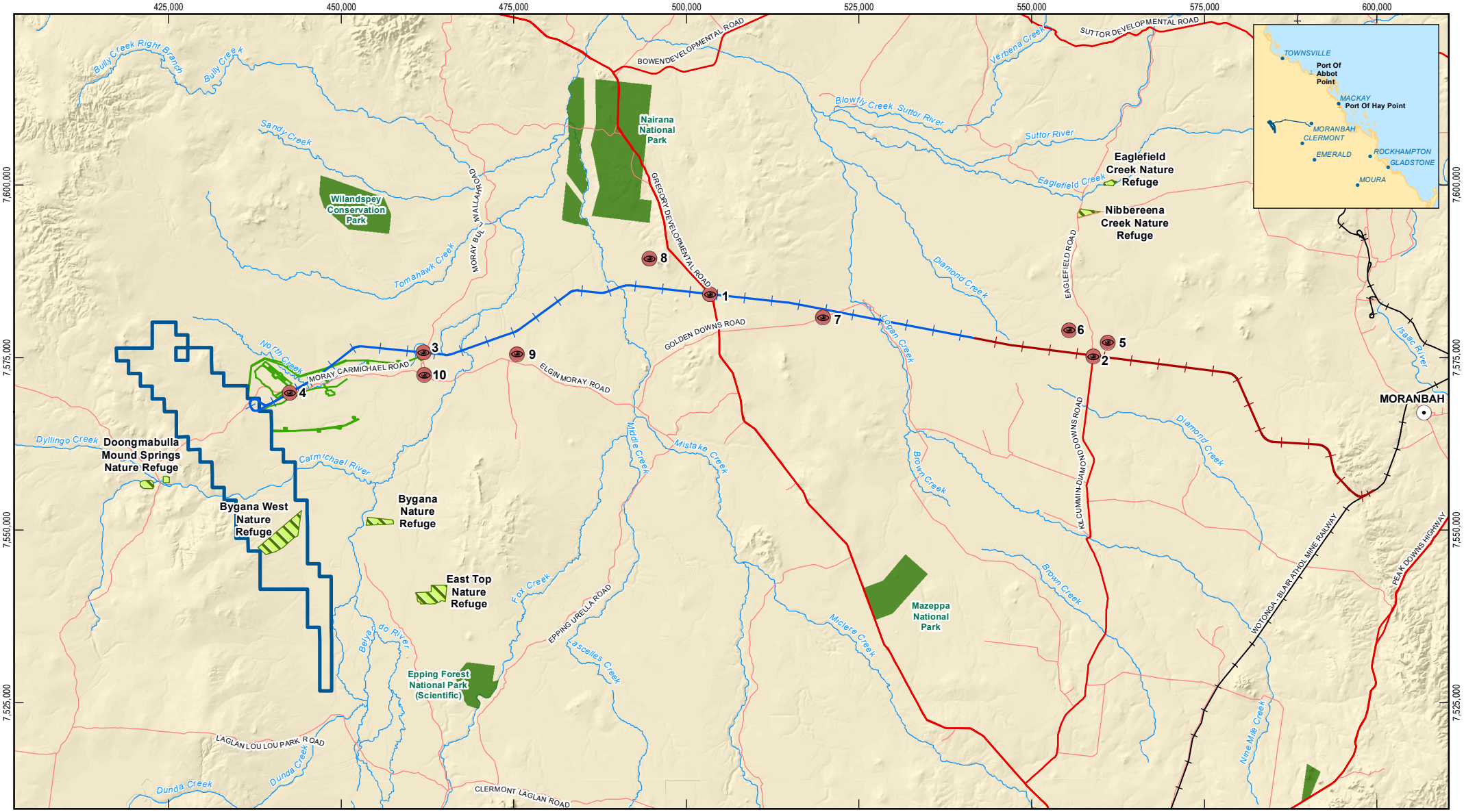
The presence of vegetation within the Study Area primarily provides the rural (agricultural) landscape character. There are two distinct vegetation patterns that dominate, which are described in further detail in Section 4.5. The first type displays modification to the natural landscape through open, broad acre paddocks of rough native grass and scattered acacias/ eucalypt clumps and woodlands. Native stands of trees are also evident between paddocks. The second type exhibits dense and open acacia woodlands, with understories of native grasses.

The vegetation structure, height and form are valuable in contributing to landscape character (local and regional).

4.4 Landscape Features

The Project (Rail) corridor is generally flat to undulating, without distinctive topographical features. However, a river and a number of creeks dissect the Project (Rail) corridor, predominately in a north-south direction. These are named Belyando River, Mistake Creek, Eight Mile Creek, North Creek and Logan Creek, and there are also a number of unnamed creeks which are assumed to be ephemeral.

Additional landscape features include Wilandspey Conservation Park and Nairana National Park, located approximately 17 km and 10 km north from the Project (Rail) corridor respectively.



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0 5 10 15 20 25

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Town
- Viewing Location
- Watercourse
- Other Rail Network
- Northern Missing Link
- State Road
- Local Road
- Rail (West)
- Rail (East)
- Mine (Onsite)
- Mine (Offsite)
- Nature Refuge
- National Park

Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision B
Date 31-08-2012

Viewing Locations

Figure 4-1

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Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

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Data source: DERM: DEM (2008), Nature Refuge (2011); DME: EPC1690 (2010), EPC1080 (2011): © Commonwealth of Australia (Geoscience Australia): Localities, Railways, Roads (2007); Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012); GHD: Northern Missing Link (2011), View Locations (2012). Created by: NR, CA

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4.5 Landscape Character Units

The Study Area has been divided into Landscape Character Units (LCUs) to identify those areas that share common landscape features and visual characteristics. Whilst in reality the landscape and views surrounding the Project (Rail) vary continuously by way of land use, orientation and degree of visual exposure, this categorisation allows a number of general descriptions to be applied to these landscape types and subdivides the landscape into areas of differing sensitivity on which the Project (Rail) would have differing impacts.

The elements that contribute to the identification of LCUs include landform, vegetation, water form, land use, significant features and views of the area.

The LCUs recognised for this assessment are:

- LCU 1 - Lowland Agricultural – Open;
- LCU 2 - Lowland Agricultural – Enclosed.

Even though these LCU's are not mapped due to their interwoven nature within the broader area the expected balance of the landscape character would be approximately 65 per cent LCU 1 to 35 per cent LCU 2. For each of the view locations described in section 4.6 the LCU in which it is located is specified.

The LCU's are described in detail in Sections 4.5.1 and 4.5.2 below.

4.5.1 LCU 1 –Lowland Agricultural - Open

The Project (Rail) corridor will be constructed through land that, for the purposes of this assessment, has been classified as Lowland Agricultural – Open, as shown in Plate 4-1, Plate 4-2 and Plate 4-3. Landscape character elements and assessment is provided in Table 4-1.

Plate 4-1 Long distance view with close/intermediate views to a native hedge row

Plate 4-2 Typical long distance view

Plate 4-3 Short and intermediate views to scattered vegetation

Table 4-1 LCU 1 Landscape Character Elements and Assessment

Landscape Character Element	Landscape Character Unit Assessment
Location	LCU 1 is the dominant LCU in the Study Area and is evident for most of the corridor. The landscape type can be seen at all viewing locations/ sensitive visual receptors described in Section 4.6.
Landform and Significant Landscape Features	The topography ranges from flat to undulating. There are no prominent landscape features.
Vegetation	◗ Cleared broad acre pasture / grazing land with rough, native grasslands on flatland areas. ◗ Some areas have scattered / clumped acacia / eucalyptus species. Native stands of trees often intersect pastures and line road edges.
Waterform	◗ A number of permanent and ephemeral creeks which include: Mistake, Eight Mile, North and Logan. ◗ Possible flood plains in wet season due to low lying topography. ◗ Drainage lines with riparian zones and degraded non-wooded drainage lines.
Land Use	◗ Agriculture (grazing). ◗ Roads – one principal sealed road, the Gregory Developmental Road running north-south traversing Rail (west). Other roads in the area are gravel. ◗ Sparse rural-residential properties ◗ The main settlements in the area are Moranbah in the north-east and Clermont in the south. ◗ The existing Goonyella rail system (specifically the Wotonga-Blair Athol Mine railway) runs in a north-south direction at the eastern end of Rail (east) within the Study Area.

4.5.2 LCU 2 –Lowland Agriculture – Enclosed

The Project (Rail) corridor will be constructed through land that, for the purposes of this assessment, has been classified as Lowland Agricultural – Enclosed, as shown in Plate 4-4, Plate 4-5 and Plate 4-6. Landscape character elements and assessment is provided in Table 4-2.

Plate 4-4 Enclosed view of remnant vegetation

Plate 4-5 Typical middle ground view

Plate 4-6 Abrupt edge between cleared grazing land (LCU 1) with LCU 2 in the distance

Table 4-2 LCU 2 Landscape Character Elements and Assessment

Landscape Character Element	Landscape Character Unit Assessment
Location	Primarily in the areas of lowest topography (200 m AHD) where surface water dominates.
Landform and Significant Landscape Features	The topography is flat with depressions in the landscape due to water erosion, resulting in creeks and rivers.
Vegetation	◗ Dense acacia woodlands with rough, native grass understories. ◗ Riparian and eucalyptus species along creek banks.
Waterform	◗ A number of permanent and ephemeral creeks which include: Mistake, Eight Mile, North and Logan Creek. ◗ Possible flood plains in wet season due to low lying topography. ◗ Drainage lines with riparian zone and degraded non-wooded drainage lines.
Land Use	◗ Agriculture (grazing) ◗ Possible recreational in lagoons / creeks. ◗ Roads – one principal sealed road, the Gregory Developmental Road running north-south traversing Rail (west). Other roads in the area are gravel. ◗ Sparse rural-residential properties.

4.6 Viewing Locations and Sensitive Visual Receptors

People are mobile and therefore could potentially experience views of the Project (Rail) from many different locations. In order to undertake an assessment of visual impacts, a series of key viewing locations have been selected to represent the points from which the Project (Rail) is likely to be viewed by the greatest number of visual receptors and from where the most sensitive visual receptors are likely to perceive the Project (Rail).

Residential properties likely to be impacted by the Project (Rail) have also been identified through desktop study, generation of a zone of theoretical visibility and site assessment. Residential properties, within 5 km of the Project (Rail) corridor, have been identified.

Representative visual sensitivity receptor locations have been illustrated in Figure 4-1, are summarised in Table 4-3 relative to the Project (Rail) component and described in Sections 4.6.1 to 4.6.10. A zone of theoretical visibility has been calculated for each of the viewing locations and these are included in Appendix A.

Table 4-3 Sensitive Visual Receptors

Viewing Location	Project (Rail) Component	Description
1	Rail (west)	Gregory Developmental Road
2	Rail (east)	Kilcummin Diamond Downs Road / Eaglefield Road junction
3	Rail (west)	Moray Bulliwallah Road
4	Rail (west)	Moray Carmichael Road
5	Rail (east)	Residential property/homestead
6	Rail (east)	Residential property/homestead
7	Rail (west)	Residential property/homestead
8	Rail (west)	Residential property/homestead
9	Rail (west)	Residential property/homestead
10	Rail (west)	Residential property/homestead

4.6.1 Viewing Location 1: Gregory Developmental Road

The Gregory Developmental Road is the only principal road within the Study Area as shown in Plate 4-6, Plate 4-7 and described in Table 4-4. It is used to travel between Clermont (in the south) and Charters Towers (in the north).

Table 4-4 Viewing Location 1: Gregory Developmental Road

Viewing Location 1

Plate 4-7 View looking east on the Gregory Developmental Road

Plate 4-8 View looking south-east on the Gregory Developmental Road

Landscape/Visual Element	Baseline Description
Location	Gregory Developmental Road.
Landform and Significant Landscape Features	The topography is flat in the vicinity of the view location gently rising to high points in the north, east and south.
Vegetation	A combination of broad acre pastures of rough native grassland with scattered shrubs (LCU 1), and areas of dense acacia woodlands (LCU 2).
Water	Low lying plains, may be flooded in wet season. Creeks are located approximately 2 km to the north-east and south-west of the road.
Land Use	Primarily agricultural, used for broad acre cattle grazing. The road is a primary road, used for travel between Clermont (south) and Charters Towers (north).
Visual Context	The scattered vegetation allows for long and wide views to low lying hills. The dense woodlands provide enclosed, immediate views. Views are experienced by regional and local road users.

4.6.2 Viewing Location 2: Kilcummin Diamond Downs Road

The Kilcummin Diamond Downs Road is a minor road running from north to south as shown in Plate 4-8, Plate 4-9 and described in Table 4-5.

Table 4-5 Viewing Location 2: Kilcummin Diamond Downs Road

Viewing Location 2	

Plate 4-9 View north on Kilcummin Diamond Downs Road.

Note the tall stands of trees along the road.

Plate 4-10 Short views across pastures, north-east on Kilcummin Diamond Downs Road

Landscape/Visual Element	Baseline Description
Location	Kilcummin Diamond Downs Road.
Landform and Significant Landscape Features	Topography ranges from flat to undulating.
Vegetation	Scattered and clumped eucalypts species and shrubs, surrounded by rough native grassland (LCU 1). Road edge often boarded by dense native stands of trees.
Water	Low lying flat plains, may be flooded in wet season.
Land Use	Primarily agricultural used for cattle grazing. There is one homestead within 4 km of this intersection.
Visual Context	Views from the road are short to native hedge rows and wire fences adjacent to lot boundaries. There are intermittent long sweeping views through to agricultural broad acre paddocks of native grasslands and sparsely scattered trees. Views are experienced by local road users.

4.6.3 Viewing Location 3: Moray Bulliwallah Road

The Moray Bulliwallah Road runs in a north-south alignment across the Project (Rail) as shown in Plate 4-10 and described in Table 4-6.

Table 4-6 Viewing Location 3: Moray Bulliwallah Road

Viewing Location 3

Plate 4-11 View looking north on the Moray Bulliwallah Road

Landscape/Visual Element	Baseline Description
Location	Moray Bulliwallah Road.
Landform and Significant Landscape Features	The topography is generally flat to gently sloping.
Vegetation	There is a combination of broad acre pastures of rough native grassland with scattered shrubs (foreground – LCU 1) and areas of dense acacia woodlands (middle ground – LCU 2).
Water	Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Primarily agricultural use, broad acre grazing for cattle.
Visual Context	Closed, short to middle views consisting of vegetation. Electricity poles and wires in view along the road. Views are experienced by local road users.

4.6.4 Viewing Location 4: Moray Carmichael Road

The Project (Rail) intersects Moray Carmichael Road, a minor road running north-west/south-east as shown in Plate 4-11, Plate 4-12 and described in Table 4-7.

Table 4-7 Viewing Location 4: Moray Carmichael Road

Viewing Location 4	
Plate 4-12 View looking south-east on Moray Carmichael Road	**Plate 4-13 View looking east on Moray Carmichael Road**
	

Landscape/Visual Element	Baseline Description
Location	Moray Carmichael Road.
Landform and Significant Landscape Features	The topography is flat.
Vegetation	Open paddocks of native grassland with scattered/ clumped trees and shrubs (LCU 1).
Water	Low lying plains, may be flooded in wet season.
Land Use	Primarily agricultural use for cattle grazing and unmodified natural areas.
Visual Context	Views from this viewpoint are experienced by local road users, which include: ◗ Flat topography and sparse vegetation allows open, long views over broad pastures to low woodlands. ◗ Some short, intermediate vistas to nearby shrubs.

4.6.5 Viewing Location 5: Residential Property

View location 5 is a residential property accessed by private track from Kilcummin Diamond Downs / Eaglefield Road. This property was not accessible at the time of the site investigation and therefore views have been estimated from the desktop study, assessment from the nearest publicly accessible area and discussions with GHD's noise technical team who accessed the site. The viewing location is shown in Plate 4-13 and described in Table 4-8.

Table 4-8 Viewing Location 5: Residential Property

Viewing Location 5

Plate 4-14 View south at homestead.

Landscape/Visual Element	Baseline Description
Location	Approximately 2 km east of Kilcummin Diamond Downs Road.
Landform and Significant Landscape Features	Low flat to sloping topography. The residential property is located at approximately 220 m AHD.
Vegetation	Primarily open paddock of native grassland with scattered/ clumps of shrubs or trees (LCU 1). Ornamental and native planting around homestead.
Water	The non-perennial Sullivan Creek is located to the immediate south of this residential property. Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Farming and agricultural use, primarily broad acre cattle grazing.
Visual Context	Views are generally characterised by the topography and presence of local vegetation. Vistas range from short to middle distance and are of clumped vegetation or views across lowland cleared pasture land. Views are experienced by residents.

4.6.6 Viewing Location 6: Residential Property

Viewing location 6 is a residential property accessed by private track from Kilcummin Diamond Downs / Eaglefield Road. This property was not directly accessible and therefore views have been estimated from the desktop study and assessed from the nearest publicly accessible area as described in Table 4-9.

Table 4-9 Viewing Location 6: Residential Property

Viewing Location 6	
Landscape/Visual Element	**Baseline Description**
Location	Approximately 3.2 km west of Kilcummin Diamond Downs Road.
Landform and Significant Landscape Features	Topography is flat to undulating. The residential property is located at approximately 216 m AHD.
Vegetation	Primarily open pastures of native grassland with scattered/ clumps of shrubs or trees (LCU 1).
Water	The non-perennial Sullivan Creek is located in the immediate vicinity of this residential property. Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Farming and agricultural use, primarily broad acre cattle grazing.
Visual Context	Views are generally characterised by the topography and presence of local vegetation. Vistas range from short to middle distance and are of clumped vegetation or open views across lowland cleared pasture land. Views are experienced by residents.

4.6.7 Viewing Location 7: Residential Property

Viewing location 7 is a residential property located on the Golden Downs Road as shown in Plate 4-14 and described in Table 4-10.

Table 4-10 Viewing Location 7: Residential Property

Viewing Location 7

Plate 4-15 View looking south to Homestead

Landscape/Visual Element	Baseline Description
Location	The residential property is located on Golden Downs Road. It is situated at approximately 209 m AHD.
Landform and Significant Landscape Features	Low flat landscape, slightly sloping to the north-north-west.
Vegetation	Primarily open pastures of native grassland with clumps or isolated shrubs/trees (LCU 1).
Water	Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Farming and agricultural use, primarily broad acre cattle grazing.
Visual Context	Views are generally characterised by the topography and limited presence of local vegetation. Vistas range from middle to long distance and are of clumped vegetation to open views across lowland cleared pasture land. Views experienced by residents and road users for local access.

4.6.8 Viewing Location 8: Residential Property

Viewing location 8 is a residential property accessed by private track from Gregory Developmental Road. This property was not directly accessible at the time of the site investigation and therefore views have been estimated from the desktop study, assessment from the nearest publicly accessible area and discussions with GHD noise technical team who had accessed the site. Viewing location 8 is described in Table 4-11.

Table 4-11 Viewing Location 8: Residential Property

Viewing Location 8	
Landscape/Visual Element	**Baseline Description**
Location	The property is located approximately 3.2 km west of the Gregory Developmental Road.
Landform and Significant Landscape Features	Topography is flat to the south with raised hilly areas to the north and east. The residential property is located at approximately 205 m AHD.
Vegetation	Primarily native grassland with low storey clumps or isolated shrubs/ trees.
Water	Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Farming and agricultural use, primarily broad acre cattle grazing.
Visual Context	Views are generally characterised by the topography and presence of local vegetation. Vistas range from middle to long distance and are of clumped vegetation to open views across lowland cleared pasture land. Views are experienced by residents.

4.6.9 Viewing Location 9: Residential Property

Viewing location 9 is a residential property accessed by private track from the Elgin Moray Road. This property was not accessible and therefore views have been estimated from the desktop study and assessment from the nearest publicly accessible area as shown in Plate 4-15 and described in Table 4-12.

Table 4-12 Viewing Location 9: Residential Property

Viewing Location 9

Plate 4-16 View looking north from Elgin Moray Road. This is south-west of the property.

Landscape/Visual Element	Baseline Description
Location	Property is located 1.4 km north of Elgin Moray Road.
Landform and Significant Landscape Features	Topography is flat to undulating. The residential property is located on the north-western slope of a hill. The residential property is located at approximately 210 m AHD.
Vegetation	Primarily native grassland with low storey clumps or isolated shrubs/ trees.
Water	Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Farming and agricultural use, primarily broad acre cattle grazing.
Visual Context	Views are generally characterised by the topography and presence of local vegetation. Vistas range from middle to long distance and are of clumped vegetation to open views across lowland cleared pasture land. Views experienced by residents.

4.6.10 Viewing Location 10: Residential Property on Elgin Moray Road

Viewing location 10 is a residential property accessed by private track from the Elgin Moray Road. This property was not accessible and therefore views have been estimated from the desktop study and assessment from the nearest publicly accessible area as shown in Plate 4-16 and described in Table 4-13.

Table 4-13 Viewing Location 10: Residential Property

Viewing Location 10

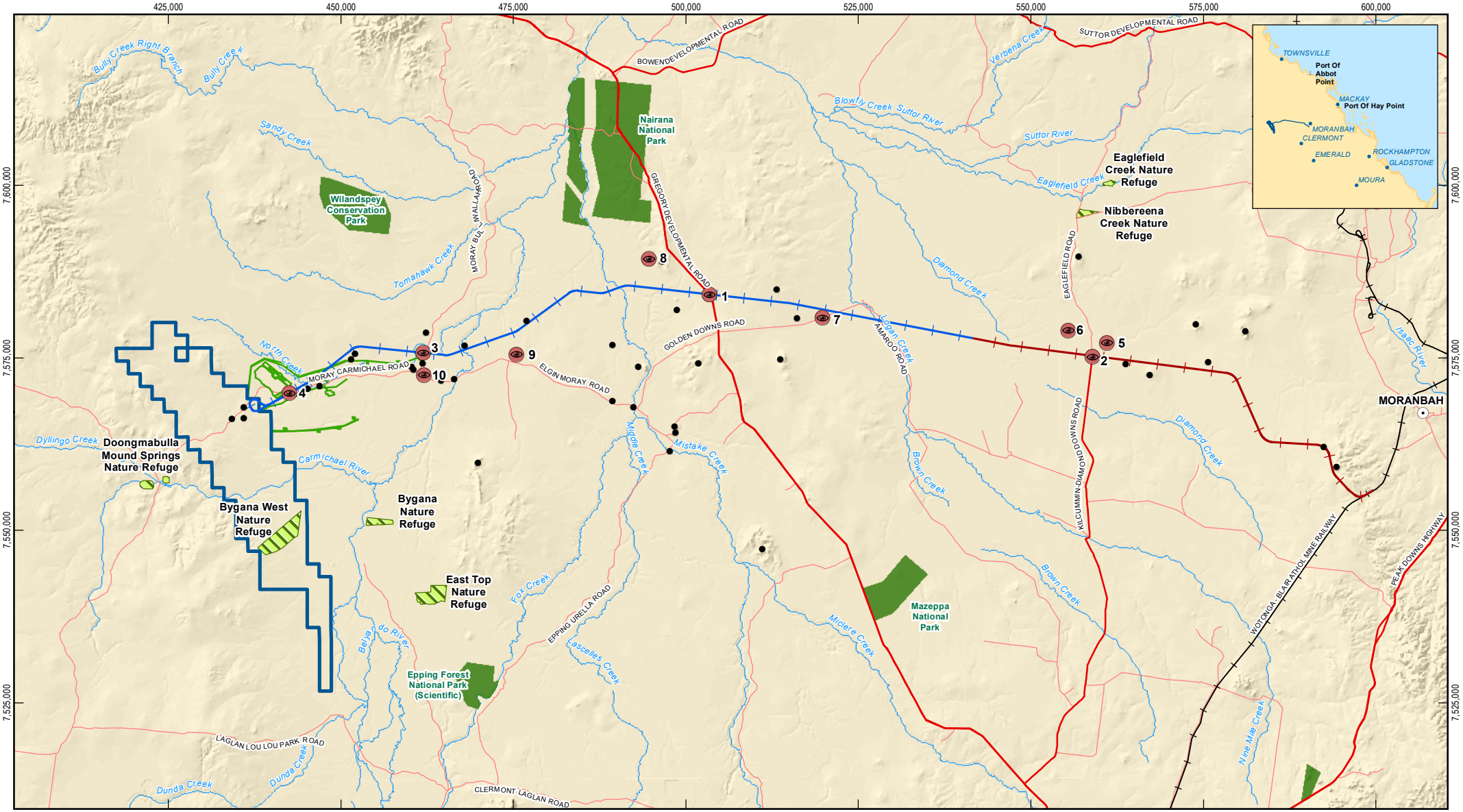
Plate 4-17 View looking south, north of the residential property on Elgin Moray Road.

Landscape/Visual Element	Baseline Description
Location	Residential property on Elgin Moray Road approximately 1.5 km south of road intersection.
Landform and Significant Landscape Features	Topography is flat to undulating. The residential property is located at approximately 203 m AHD.
Vegetation	Primarily native grassland with low storey clumps or isolated shrubs/ trees. Denser vegetation along the drainage line to the north. A mix of exotic and native vegetation surrounds the homestead.
Water	Riparian wooded (native/indigenous) drainage lines and/or degraded non-wooded drainage lines.
Land Use	Farming and agricultural use, primarily broad acre cattle grazing.
Visual Context	Views are generally characterised by the topography and presence of scattered vegetation. Vistas range from middle distance of clumped vegetation to open views across low cleared pasture land. Views experienced by residents and road users.

4.7 Potential Quarries and Borrow Areas

A number of potential quarries and/or borrow areas have been identified within the landscape to potentially provide resource materials to the Project as shown in Figure 4-2. Adani is currently undertaking investigations to prove the resources at each site and determine suitability for use. Resources targeted include ballast, capping material, sub-base material and select fill.

Desktop assessment indicates that potential source locations are generally elevated within the wider landscape in areas mapped as habitat for remnant vegetation. Some areas traverse the Project (Rail), while others are in close proximity to the Gregory Developmental Road. Proximity to potential sensitive visual receptors ranges from less than one km to more than five km in distance.



1:750,000 (at A4)

0 5 10 15 20 25

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Town
- Viewing Location
- Investigation Areas
- Watercourse
- Other Rail Network
- Northern Missing Link
- State Road
- Local Road
- Nature Refuge
- National Park
- Rail (West)
- Rail (East)
- Mine (Onsite)
- Mine (Offsite)

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Potential Quarry and Borrow Locations — Figure 4-2

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Data source: DERM: DEM (2008), Nature Refuge (2011); DME: EPC1690 (2010), EPC1080 (2011): © Commonwealth of Australia (Geoscience Australia): Localities, Railways, Roads (2007); Adani: Alignment Opt9 Rev3, Investigation Areas (2012); Gassman/Hyder: Mine (Offsite) (2012); GHD: Northern Missing Link (2011), View Locations (2012). Created by: NR, CA

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5. Potential Impacts and Mitigation Measures

5.1 Potential Impacts

The potential visual impacts of the construction and operation of the Project (Rail) are considered in the context of the sensitivity of the surrounding visual environment and the potential for viewing of the Project (Rail) during the construction and operational phases. The impacts of the Project (Rail) at each viewing location is assessed in Table 5-1 to Table 5-10.

Table 5-1 Viewing Location 1 Potential Impacts

Viewing Location 1 (Gregory Developmental Road)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 1 is located at the intersection of the proposed rail line and Gregory Developmental Road. The area consists of relatively flat terrain with scattered low vegetation. The elements of Rail (west) that are likely to be seen during the construction and operational phases include: **Construction Phase** ◗ Clearing of vegetation prior to construction ◗ Earthworks; ◗ Large machinery, trucks and other vehicles in and around construction zone ◗ Fence surrounding construction zone ◗ Lighting from construction camps and construction personnel **Operational Phase** ◗ A grade separated (rail under road)crossing and associated infrastructure ◗ Freight trains carrying coal ◗ Fence surrounding Rail (west) area.
Landscape and visual Impact	The receptor sensitivity is assessed as low due to short term views by road users. During the construction phase the landscape was assessed as being moderately reduced due to the nature of the construction activities. The construction works are expected to be short term. The quality of the impacts would be negative. During the operational phase there would be a small modification of the landscape. The operational phase is expected to be long term. The quality of the impacts would be negative. Regrowth of vegetation and the implementation of mitigation measures would reduce the impacts.
Significance of Impact	Construction Phase: Minor significance Operational Phase: Not significant

Table 5-2 Viewing Location 2 Potential Impacts

Viewing Location 2 (Kilcummin Diamond Downs Road)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 2 is located at the intersection of the proposed Rail (east) rail line and Kilcummin Diamond Downs Road. The area consists of flat to slightly undulating terrain with scattered low vegetation. The elements of Rail (east) likely to be seen during the construction and operational phases include: **Construction Phase** ◗ Clearing of vegetation prior to construction ◗ Earthworks ◗ Large machinery, trucks and other vehicles in and around construction zone ◗ Fence surrounding construction zone ◗ Construction personnel **Operational Phase** ◗ An at grade (active) crossing and associated infrastructure ◗ Freight trains carrying coal ◗ Fence surrounding Rail (east) area.
Landscape and visual Impact	The receptor sensitivity is assessed as low due to short term views by road users. During the construction phase the landscape was assessed as being moderately reduced due to the nature of the construction activities. The construction works are expected to be short term. The quality of these impacts would be negative. During the operational phase there would be a small modification of the landscape. The operational phase is expected to be long term. The quality of the impacts would be negative. Regrowth of vegetation and the implementation of mitigation measures would reduce the impacts over time.
Significance of Impact	Construction Phase: Minor significance Operational Phase: Not significant

Table 5-3 Viewing Location 3 Potential Impacts

Viewing Location 3 (Moray Bulliwallah Road)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 3 is located at the intersection of the proposed Rail (west) rail line and Moray Bulliwallah Road. The area consists of flat to slightly undulating terrain with scattered low vegetation. The elements of Rail (west) likely to be seen during the construction and operational phases include: **Construction Phase** ◗ Clearing of vegetation prior to construction ◗ Earthworks ◗ Large machinery, trucks and other vehicles in and around construction zone ◗ Fence surrounding construction zone ◗ Construction personnel **Operational Phase** ◗ At grade (active) rail crossing and associated infrastructure ◗ Freight trains carrying coal ◗ Fence surrounding Rail (west) area ◗ Lighting associated with the maintenance facility
Landscape and visual Impact	The receptor sensitivity is assessed as low due to short term views by road users. During the construction phase the landscape was assessed as being moderately reduced due to the nature of the construction activities. The construction works are expected to be short term. The quality of these impacts would be negative. During the operational phase there would be a small modification of the landscape. The operational phase is expected to be long term. The quality of the impacts would be negative. Regrowth of vegetation and the implementation of mitigation measures would reduce the impacts over time.
Significance of Impact	Construction Phase: Minor significance Operational Phase: Not significant

Table 5-4 Viewing Location 4 Potential Impacts

Viewing Location 4 (Moray Carmichael Road)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 4 is located at the intersection of the proposed Rail (west) rail line and Moray Carmichael Road. The area consists of flat terrain with open paddocks of native grassland with scattered/ clumped trees and shrubs. The elements of Rail (west) that are likely to be seen during the construction and operational phases, include: **Construction Phase** ◗ Clearing of vegetation prior to construction ◗ Earthworks ◗ Large machinery, trucks and other vehicles in and around construction zone ◗ Fence surrounding construction zone ◗ Construction personnel **Operational Phase** ◗ Freight trains carrying coal ◗ Fence surrounding Rail (west) area ◗ Lighting associated with the maintenance facility
Landscape and visual Impact	The receptor sensitivity is assessed as low due to short term views experienced by road users. During the construction phase the landscape was assessed as being moderately reduced due to the nature of the construction activities. The construction works are expected to be short term. The quality of these impacts would be negative. During the operational phase there would be a small modification of the landscape. The operational phase is expected to be long term. The quality of the impacts would be negative. Regrowth of vegetation and the implementation of mitigation measures would reduce the impact over time.
Significance of Impact	Construction Phase: Minor significance Operational Phase: Not significant

Table 5-5 Viewing Location 5 Potential Impacts

Viewing Location 5 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 5 is located approximately 2 km north of the proposed Rail (east) alignment. The area consists of flat terrain with open paddocks of native grassland with scattered/ clumped trees and shrubs in all directions. No elements of Rail (east) are likely to be seen during the construction and operational phases.

Viewing Location 5 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Landscape and visual Impact	The receptor sensitivity is assessed as negligible due to the fact that there will be no views from this location. During the construction and operational phases the landscape was assessed as having no perceivable reduction of quality due to the activities of both phases. The quality of these impacts would be neutral.
Significance of Impact	Not Significant

Table 5-6 Viewing Location 6 Potential Impacts

Viewing Location 6 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 6 is located approximately 3.2 km north of the proposed Rail (east) alignment. The area consists of flat terrain with open paddocks of native grassland with scattered/ clumped trees and shrubs in all directions. No elements of Rail (east) are likely to be seen during the construction and operational phases.
Landscape and visual Impact	The receptor sensitivity is assessed as negligible due to the fact that there will be no views from this location. During the construction and operational phases the landscape was assessed as having no perceivable reduction of quality due to the activities of both phases. The quality of these impacts would be neutral.
Significance of Impact	Not Significant

Table 5-7 Viewing Location 7 Potential Impacts

Viewing Location 7 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 7 is located approximately 1.1 km south of the proposed Rail (west) alignment. The area consists of flat terrain with open paddocks of native grassland with scattered/ clumped trees and shrubs in all directions. No elements of Rail (west) are likely to be seen during the construction and operational phases.
Landscape and visual Impact	The receptor sensitivity is assessed as medium, as views are from a place of residence and the Project (Rail) is unlikely to be visible. During the construction and operational phases the landscape was assessed as having no perceivable reduction of quality due to the activities of both phases. The quality of these impacts would be neutral.
Significance of Impact	Not Significant

Table 5-8 Viewing Location 8 Potential Impacts

Viewing Location 8 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 8 is located approximately 4 km north of the proposed Rail (west) alignment. The topography is gently sloping down in elevation to the south. The land area between viewing location 8 and the proposed Rail (west) line consists of flat open paddocks of native grassland with scattered/ clumped vegetation. The elements of Rail (west) that are likely to be seen during the construction and operational phases, include: **Construction Phase** ◗ Clearing of vegetation prior to construction ◗ Earthworks ◗ Large machinery, trucks and other vehicles in and around construction zone ◗ Fence surrounding construction zone ◗ Construction camp lighting and construction personnel **Operational Phase** ◗ Freight trains carrying coal ◗ Fence surrounding Rail (west) area
Landscape and visual Impact	The receptor sensitivity is assessed as medium as there may be views of Rail (west) albeit at a distance of approximately 4 km. During the construction phase the impact to the landscape was assessed as being moderately reduced due to the nature of the construction activities. The construction works are expected to be short term. The quality of these impacts would be negative. During the operational phase there would be a small modification of the landscape. The operational phase is expected to be long term. The quality of the impacts would be negative. Regrowth of vegetation and the implementation of mitigation measures would reduce the impacts over time.
Significance of Impact	Construction Phase: High significance Operational Phase: Moderate significance

Table 5-9 Viewing Location 9 Potential Impacts

Viewing Location 9 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 9 is located approximately 3.2 km south of the proposed Rail (west) alignment at 210 AHD. The area between viewing location 9 and Rail (west) consists of flat terrain with open paddocks of native grassland with scattered/ clumped trees and shrubs. Rail (west) is likely to be seen during the construction and operational phases.

Viewing Location 9 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Landscape and visual Impact	The receptor sensitivity is assessed as being medium due to the topographical features within the area. Viewing location 9 is located at 210 AHD while Rail (west) runs on land that is approximately 200 AHD (refer to the zone of theoretical visibility in Appendix B). During the construction and operational phases the landscape was assessed as having moderate reduction of quality due to the activities of both phases. The quality of these impacts would be negative.
Significance of Impact	Construction: Moderate significance Operation: Minor significance

Table 5-10 Viewing Location 10 Potential Impacts

Viewing Location 10 (Residential Property)	
Key visual factors	**Description of potential impacts during construction and operation stages**
Visible Project Elements	Viewing location 10 is located approximately 3.5 km south of the proposed Rail (west) alignment. The area consists of flat terrain with open paddocks of native grassland with scattered/ clumped trees and shrubs. No elements of the Project (Rail) are likely to be seen during the construction and operational phases.
Landscape and visual Impact	The receptor sensitivity is assessed as negligible due to the fact that there will be no views from this location. During the construction and operational phases the landscape was assessed as having no perceivable reduction of quality due to the activities of both phases. The quality of these impacts would be neutral.
Significance of Impact	Not Significant

5.2 Mitigation Measures

5.2.1 Overview

The aim of this section is to identify mitigation measures that will reduce and / or manage potential adverse impacts of both the construction and operation stages of the Project (Rail) on the landscape character and visual amenity. Site specific mitigation measures for sensitive visual receptors will be identified and implemented on a case by case basis with the impacted sensitive receptors.

5.2.2 Construction Phase

The Project (Rail) would aim to achieve construction without causing undue visual disruption to existing receptors. The following controls will facilitate the reduction and management of impacts:

- Only necessary vegetation clearing is to be undertaken with all areas not required for site operations remaining uncleared

- Temporary boardings, barriers, traffic management and signage to be removed when no longer required.
- Develop and implement a Dust Management Plan.
- Materials and machinery to be stored tidily during the works.
- Minimise security lighting to reduce additional sky glow.
- Limit night time activities as far as is practicably possible.
- Co-locate construction facilities as far as is practicably possible with the Project (Mine), for example the western construction camp.
- Co-locate temporary activities, for example, construction camps, batch plants and laydown areas.
- Roads providing access to the site and work areas to be maintained free of dust and mud as far as reasonably practicable.
- Develop and implement a traffic management plan to control road usage routes and traffic speed to reduce the visual impact of vehicle movements and dust generation.
- Progressive rehabilitation of temporary infrastructure sites and non-operational areas. This will assist in providing texture and contrast in the visual landscape.

5.2.3 Operational Phase

Mitigation of landscape and visual impacts as a result of the Project (Rail) seeks to achieve a balance between the site use requirements and achieving an optimal visual outcome. The mitigation strategy for the Project (Rail) is to minimise the detrimental effects on the landscape and visual character. Operations phase mitigation measures are:

- Removal of boarding, barriers, traffic management and signage when no longer required.
- Co-locate infrastructure together with the Project (Mine) where possible, for example, maintenance yards, balloon loop/terminus facility.
- Designated access points to the rail corridor to minimise direct access and therefore disturbance to properties.
- Vegetation plantings around maintenance facilities and adjacent the Project (Rail) corridor in sensitive locations where landowner permission is granted
- Rehabilitation of quarry areas to provide texture and contrast in the visual landscape
- Mitigation of light pollution through:
  - Specifying appropriate luminaires to reduce light spill, sky glow and glare
  - Sensitive placement and specification of lighting to minimise any potential increase in light pollution within the natural environment.

6. Conclusion

In summary, the mitigated landscape and visual impacts of the Project (Rail) are of moderate and / or minor significance to not significant for the ten viewing locations assessed. The remaining receptors are either at a reasonable distance from or have good screens of vegetation / topography in the direction of the view to the Project (Rail). Due to the nature of the Project (Rail) there will be a permanent impact on the visual landscape and amenity for some viewing locations within the Project (Rail) area.

The landscape and visual impacts of the Project (Rail) will occur during both the construction and operational phases and measures to minimise these impacts will be required.

A summary of the outcomes of this assessment are detailed in Table 6-1 and Table 6-2 for the construction and operational phases, respectively.

Classifications are presented as:

- Negligible landscape impact / Negligible visual sensitivity / No significant impact
- Small landscape impact / Low visual sensitivity / Minor significant impact
- Moderate landscape impact / Medium visual sensitivity / Moderate significant impact
- Large landscape impact / High visual sensitivity / High significant impact
- Major significance of impact

Table 6-1 Summary of Landscape and Visual Impacts – Construction Phase

Viewing Location	Visual Modification	Visual Sensitivity	Significance of Impact
VL1 (Gregory Developmental Road)	Moderate	Low	Minor
VL2 (Kilcummin Diamond Downs Road)	Moderate	Low	Minor
VL3 (Moray Bulliwallah Road)	Moderate	Low	Minor
VL4 (Moray Carmichael Road)	Moderate	Low	Minor
VL5 (Residential Property)	Negligible	Negligible	None
VL6 (Residential Property)	Negligible	Negligible	None
VL7 (Residential Property)	Negligible	Negligible	None
VL8 (Residential Property)	Moderate	Medium	Moderate
VL9 (Residential Property)	Moderate	Medium	Moderate
VL10 (Residential Property)	Negligible	Negligible	None

Table 6-2 Summary of Landscape and Visual Impacts – Operational Phase

Viewing Location	Visual Modification	Visual Sensitivity	Significance of Impact
VL1 (Gregory Developmental Road)	Small	Low	None
VL2 (Kilcummin Diamond Downs Road)	Small	Low	None
VL3 (Moray Bulliwallah Road)	Small	Low	None
VL4 (Moray Carmichael Boundary Road)	Small	Low	None
VL5 (Residential Property)	Negligible	Negligible	None
VL6 (Residential Property)	Negligible	Negligible	None
VL7 (Residential Property)	Negligible	Negligible	None
VL8 (Residential Property)	Small	Medium	Minor
VL9 (Residential Property)	Moderate	Medium	Moderate
VL10 (Residential Property)	Negligible	Negligible	None

7. References

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Appendix A

Terms of Reference Cross-reference

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Terms of Reference Requirement/Section Number	Section of this Report
Section 3.2.1 Scenic Amenity and Lighting	
Description of Environmental Values	
Describe in general terms the existing character of the landscape and the general impression that would be obtained while travelling through and around it.	Section 0 of this report.
Outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community.	Section 4.4 and 4.6 of this report.
Provide information in the form of maps and photographs, particularly where addressing the following issues:	Sections 4.6 and 4.7 Figure 4-1 and Figure 4-2
◗ major views, view sheds, outlooks and features contributing to the amenity of the area, including assessment from private residences	
◗ focal points, landmarks, waterways (e.g. rivers, streams, creeks other bodies of water and wetlands) and other features contributing to the visual quality of the area and the project site(s)	
◗ character of the local and surrounding areas including vegetation and land use	
At a level of detail appropriate to the scale of the project, describe the relevant geomorphology supported by illustrative mapping highlighting any significant features and associated environmental values.	Section 0 of this report and Volume 4 Appendix Y
Potential Impacts and Mitigation Measures	
Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area.	Section 2.4 of this report
Provide details about measures to be undertaken to mitigate or avoid the identified impacts	Section 2.5 of this report
Assess and describe all potential impacts of the project's lighting, during all stages, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid, such as:	Section 5.1 of this report and Volume 4 Appendix AA Rail Ecology Report for potential impacts upon fauna.
◗ the visual impact at night	
◗ night operations/maintenance and effects of lighting on fauna and residents	
◗ the potential impact of increased vehicular traffic	
◗ the changed habitat conditions for nocturnal fauna and associated impacts	

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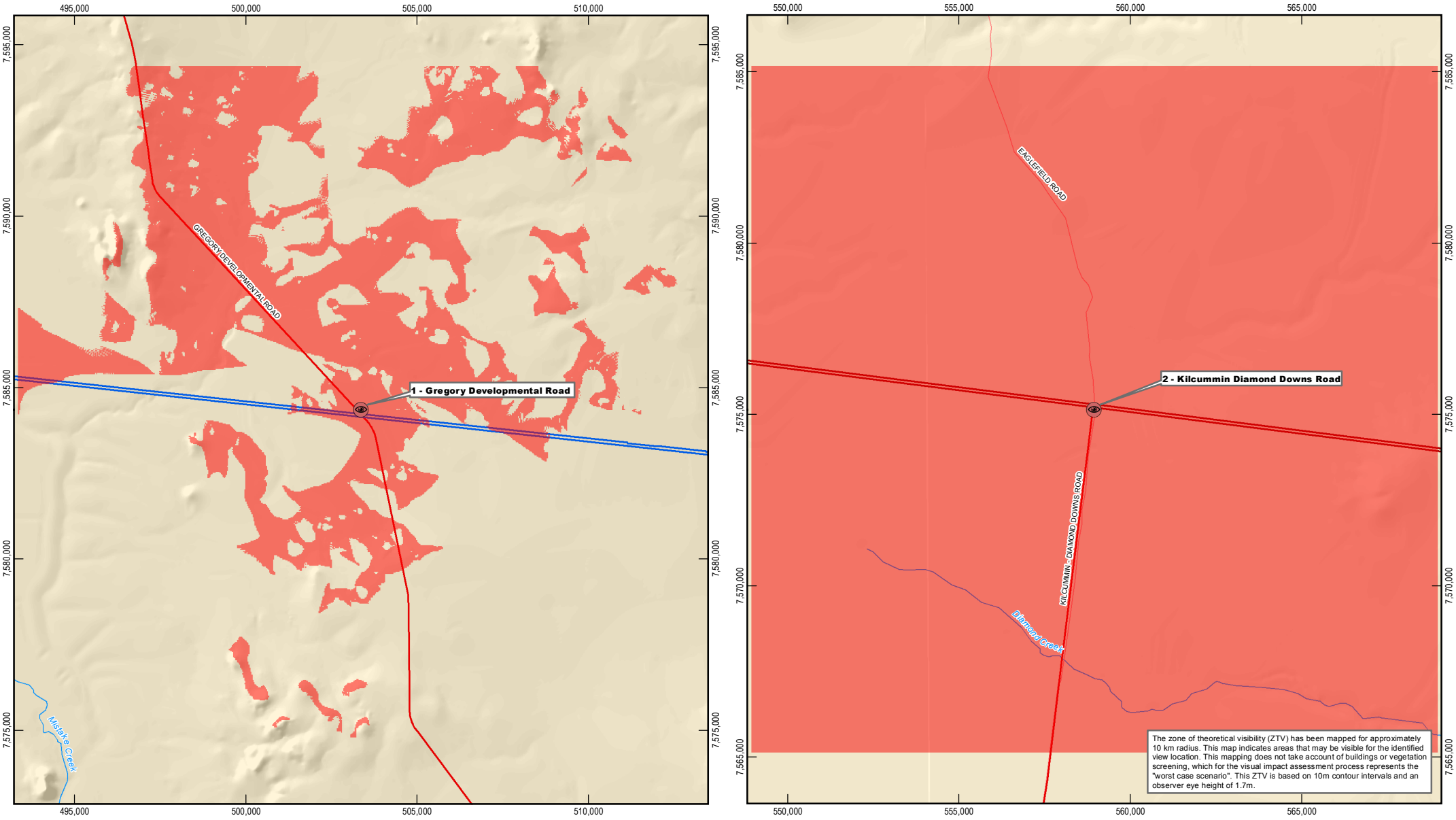
Appendix B

Zone of Theoretical View

Viewing Locations 1 to 10



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- View Location
- State Road
- Local Road
- Watercourse
- Other Railway
- Rail (West)
- Rail (East)
- Zone of theoretical visibility (ZTV)
- Visible

Adani Mining Pty Ltd
Carmichael Coal Mine and Rail Project

Landscape and Visual Impact Assessment - Viewing Locations 1 and 2

Job Number	41-25215
Revision	B
Date	03-09-2012

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Data source: DME: EPC1690 (2010), EPC1080 (2011); © Commonwealth of Australia (Geoscience Australia): Railways, Roads, Waterways (2007); Adani: Alignment Opt9 Rev3 (2012); GHD: View Locations, Zone of Theoretical Visibility (2011). Created by: LF, CA

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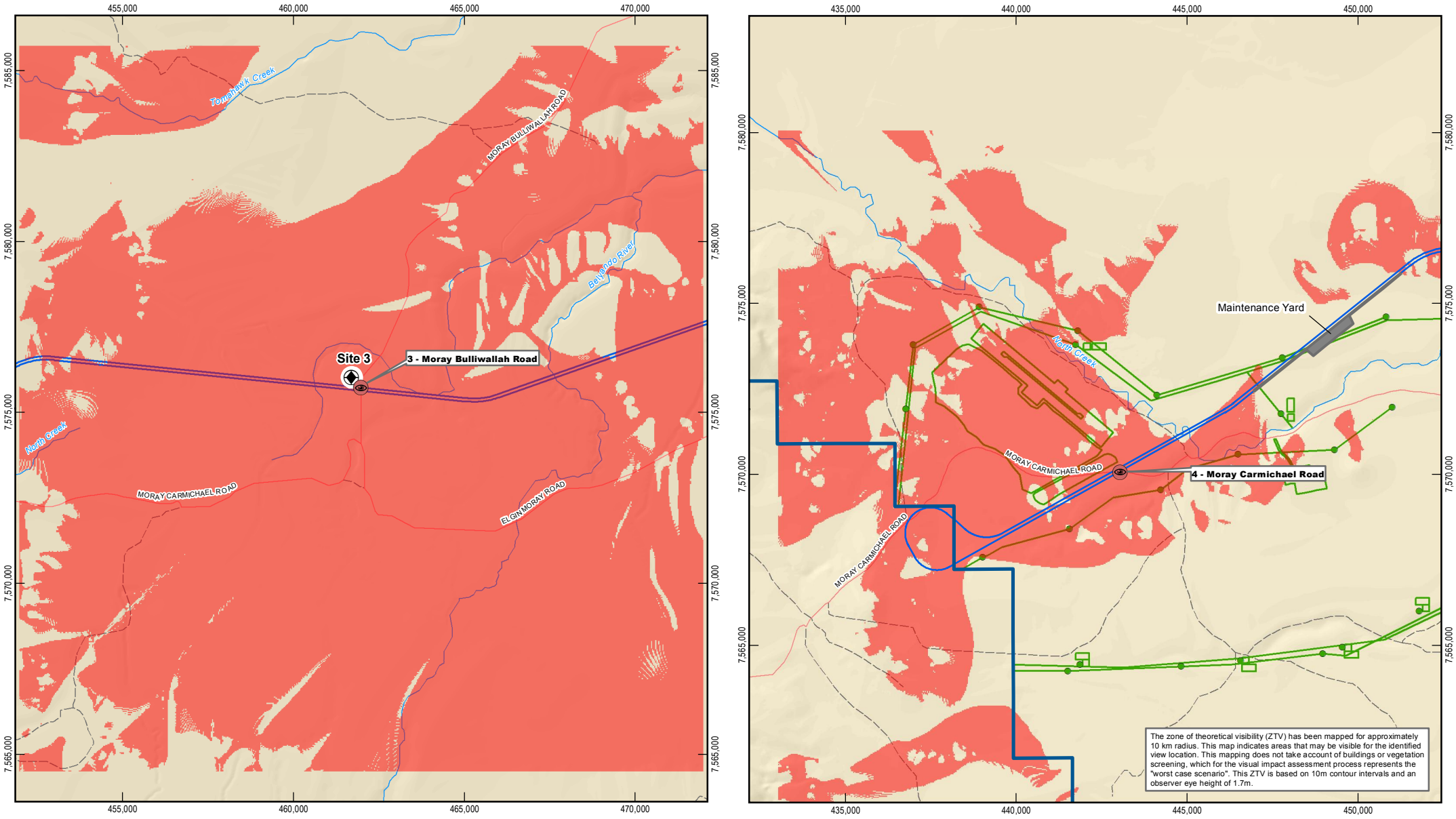

1:150,000 (at A4)

0 1 2 3 4 5

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Viewing Location
- Construction Camp
- Watercourse
- State Road
- Local Road
- Track
- Other Railway
- Maintenance Yard
- Mine (Onsite)
- Mine (Offsite)
- Mine (Offsite)
- Rail (West)
- Rail (East)
- Zone of theoretical visibility (ZTV)
- Visible

Adani Mining Pty Ltd
Carmichael Coal Mine and Rail Project

Landscape and Visual Impact Assessment - Viewing Locations 3 and 4

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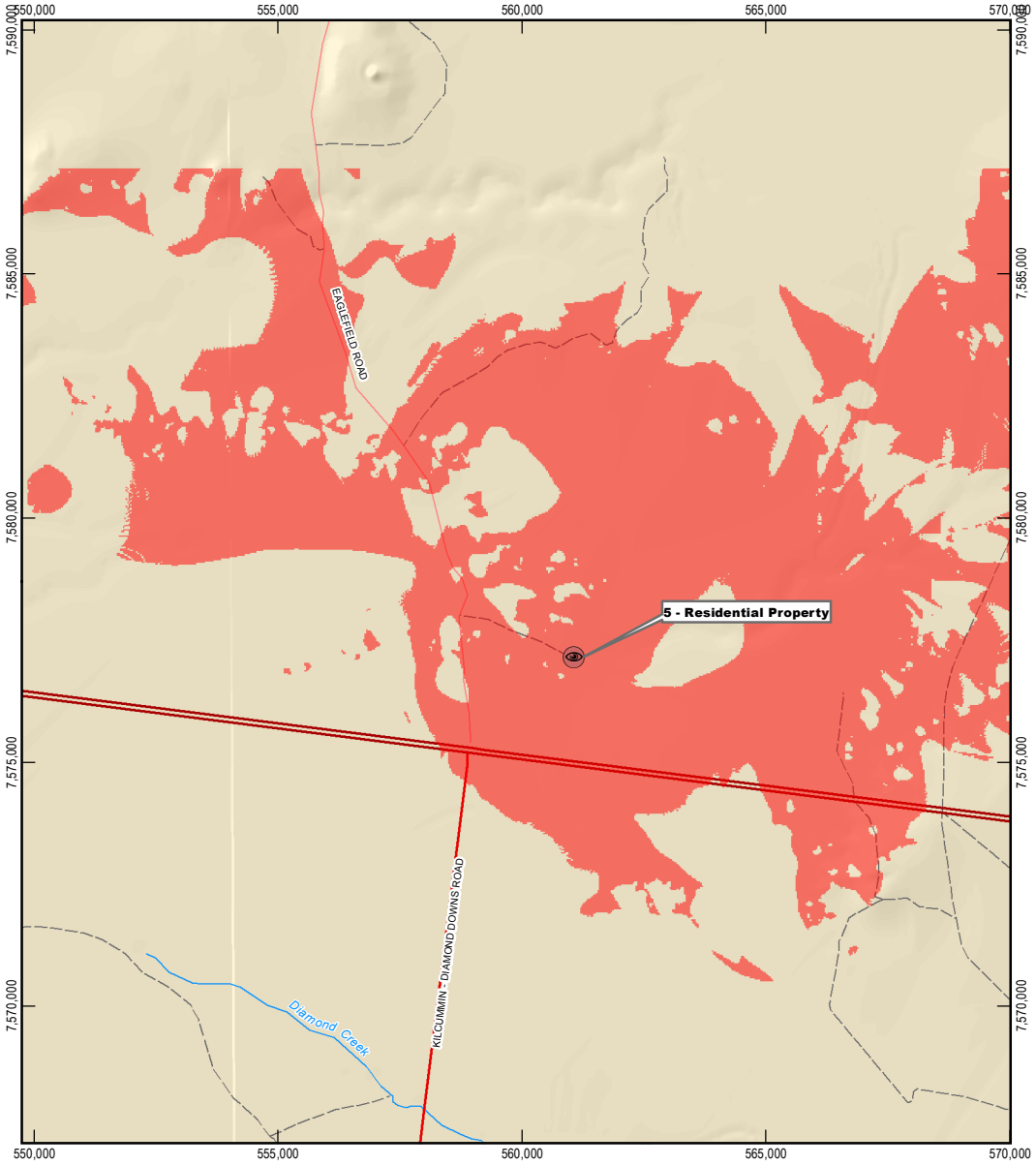

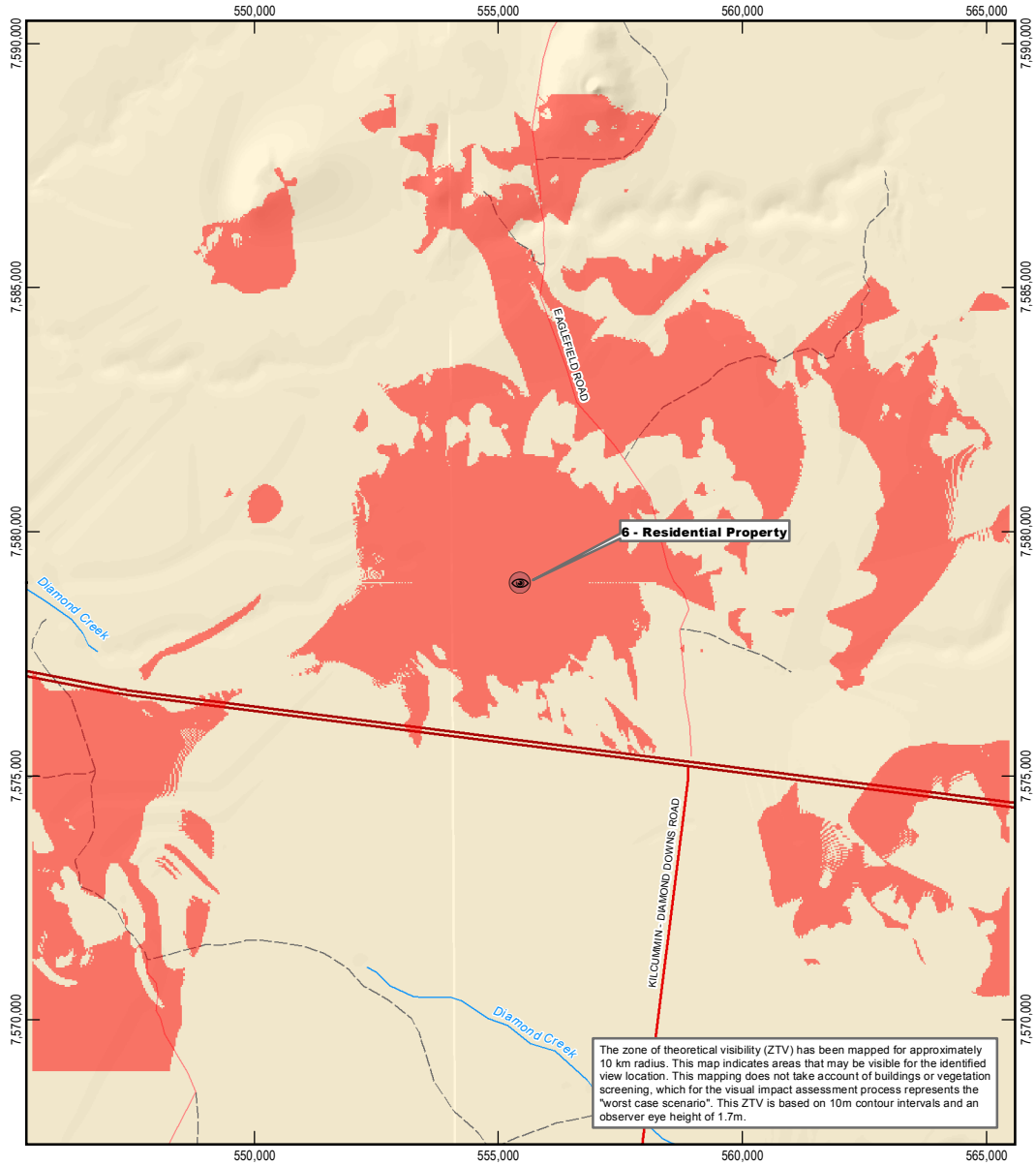

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0 1 2 3 4 5

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Viewing Location
- Watercourse
- Other Railway
- State Road
- Local Road
- Track
- Rail (West)
- Rail (East)
- Zone of theoretical visibility (ZTV)
- Visible

Adani Mining Pty Ltd
Carmichael Coal Mine and Rail Project

Landscape and Visual Impact Assessment - Viewing Locations 5 and 6

Job Number	41-25215
Revision	B
Date	03-09-2012

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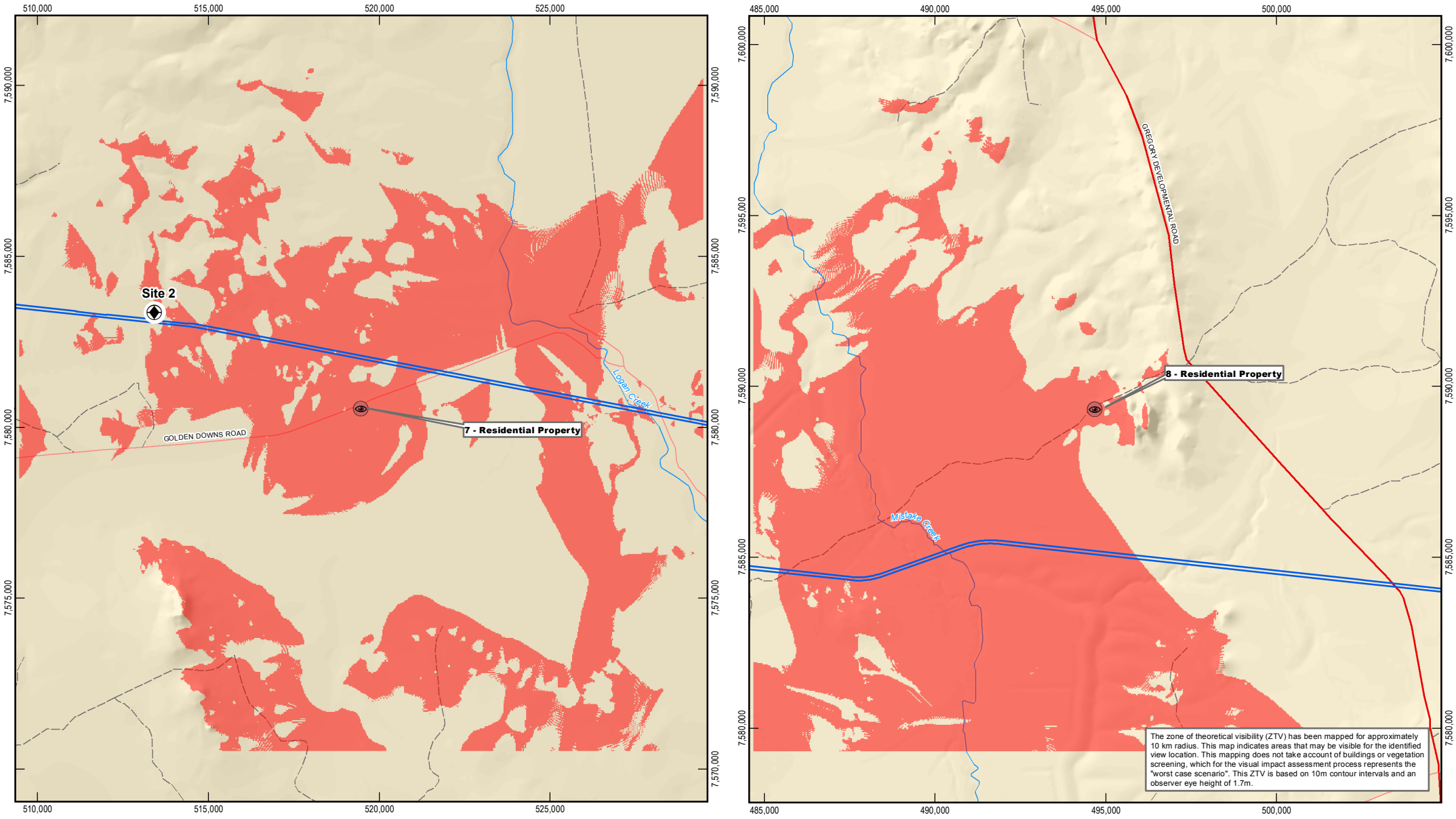

1:150,000 (at A4)

0 1 2 3 4 5

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Viewing Location
- Construction Camp
- Watercourse
- State Road
- Local Road
- Track
- Rail (West)
- Rail (East)
- Zone of theoretical visibility (ZTV)
- Visible

Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Landscape and Visual Impact Assessment - Viewing Locations 7 and 8

Job Number	41-25215
Revision	B
Date	03-09-2012

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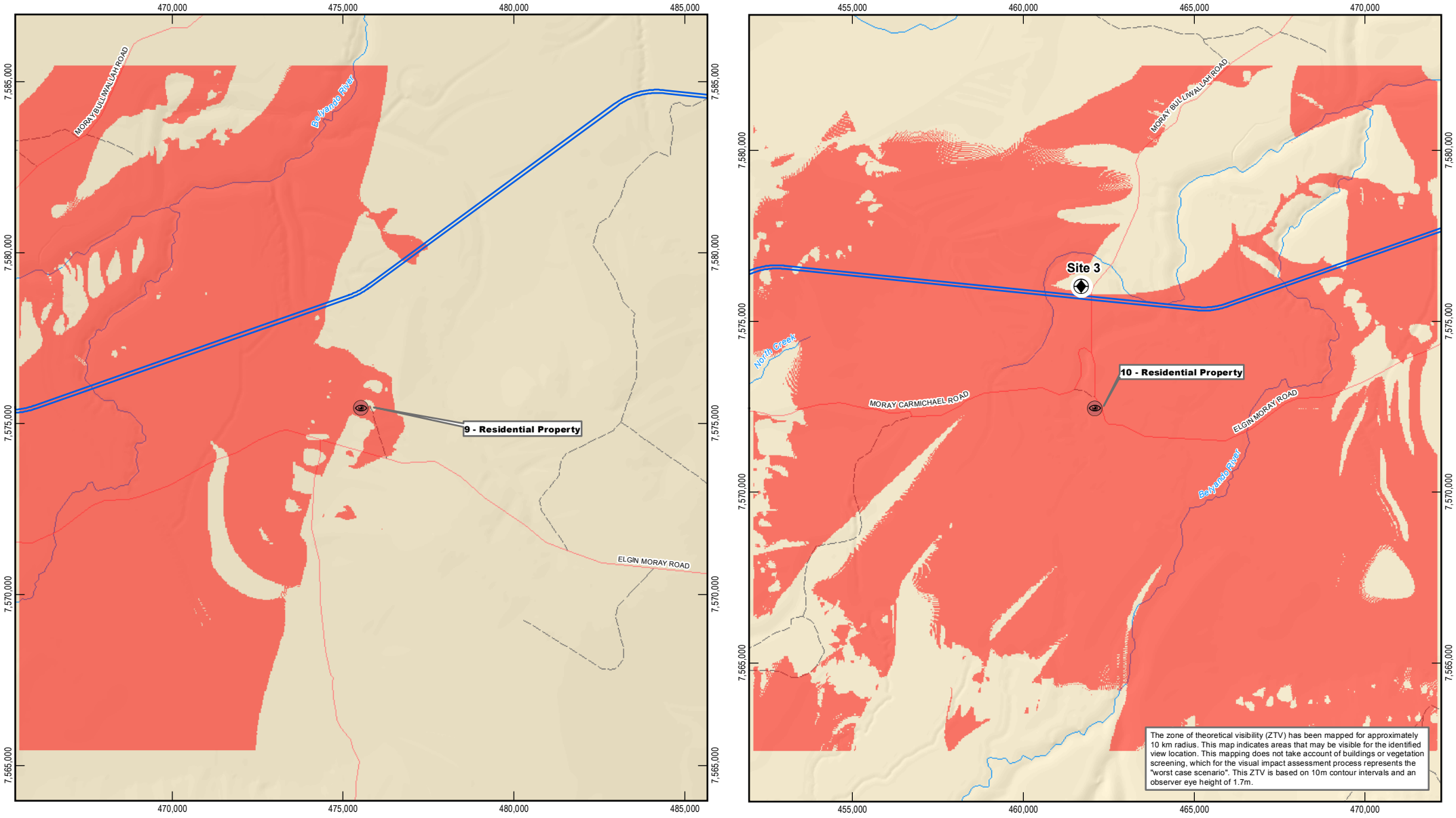

1:150,000 (at A4)

0 1 2 3 4 5

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Viewing Location
- Construction Camp
- Watercourse
- Other Rail Network
- State Road
- Local Road
- Track
- Rail (West)
- Rail (East)
- Zone of theoretical visibility (ZTV)
- Visible

Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Landscape and Visual Impact Assessment - Viewing Locations 9 and 10

Job Number	41-25215
Revision	B
Date	03-09-2012

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	L Farrell	G Squires	On file	J Scott	On file	24/01/2012
1	G Vidovic	G Squires	On file	J Scott	On file	20/02/2012
2	L Farrell	S Graham / G Squires	On file	J Keane	On file	20/09/2012