Australian Government

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ARTC InlandRail

Inland Rail Programme

Narrabri to North Star Project

Environmental Impact Statement

Technical Report 9: **Non-Aboriginal Heritage Impact Statement**

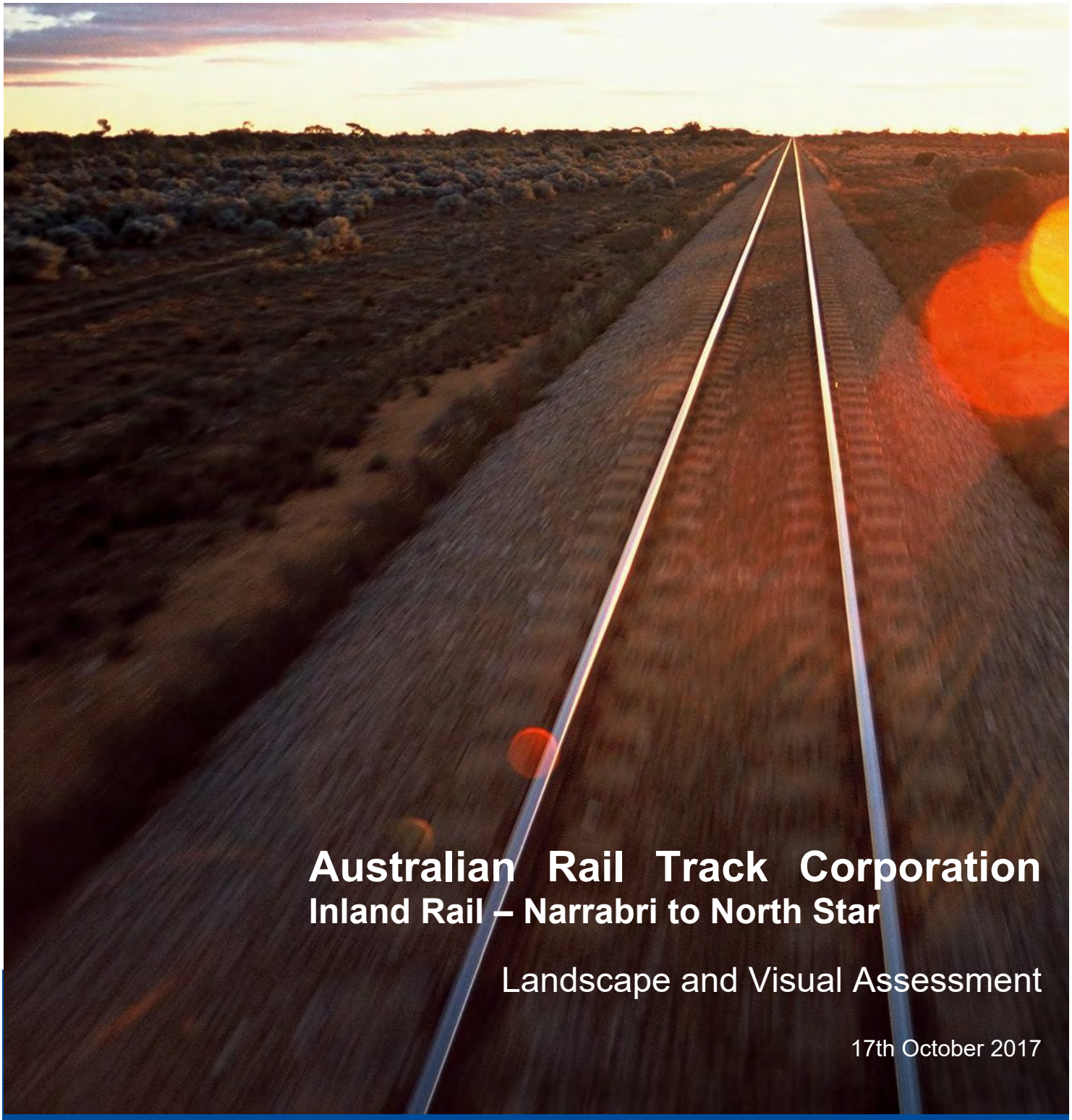
Technical Report 10: **Landscape and Visual Assessment**

Technical Report 11: **Socio-economic Assessment**

Image: Newell Highway north of Narrabri, NSW

Technical Report 10:
Landscape and Visual Assessment

Image: Railway near Edgeroi, NSW



Australian Rail Track Corporation
Inland Rail – Narrabri to North Star

Landscape and Visual Assessment

17th October 2017

urbis

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

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Executive summary

This Landscape and Visual Impact Assessment has been prepared by Urbis Pty Ltd as part of an Environmental Impacts Statement for the Inland Rail Project between Narrabri and North. The Inland Rail proposal ('Inland Rail') is a major national project that will enhance Australia's existing national rail network and serve the interstate freight market.

Australian Rail Track Corporation Ltd (ARTC) is seeking approval to construct and operate the Narrabri to North Star section of Inland Rail which extends approximately 188 kilometres, consisting of upgraded track and associated facilities.

The elements of the proposal that are relevant to this assessment include the:

- Upgrade of existing track, track formation, and culverts within the existing rail corridor for a distance of 188 kilometres.
- Constructing five new crossing loops at Bobbiwaa, Waterloo Creek, Tycannah Creek, Coolleearllee and Murgo.
- Constructing overbridges along the Newell Highway near Ballata, and Jones Avenue in Moree.
- Constructing replacement bridge crossings over the Mehi River, Gwydir River and Croppa Creek.
- Constructing 1.6 kilometres of new track to bypass existing hairpin curve at Camurra.
- Creation of permanent spoil mounds with a maximum height of 2 metres (about 1 metre above the height of the rails).
- Presence of double stacked trains, with a height of 6.5 metres.

The alignment begins north of the civic centre of township Narrabri, traveling north to the township of Moree via the small villages Edgeroi, Bellata and Gurley. After passing through Moree, the alignment continues north-east to North Star, via the village of Croppa Creek. Between these settlement areas, the proposal traverses through a landscape that has historically been subject to change, experiencing high levels of clearing and cultivation as a result of agricultural activities.

The alignment traverses land typically defined by flat floodplains, gently undulating plains and low rolling hills. Overall, the landform could be described as flat. The proposal crosses approximately 90 watercourses including the Mehi and Gwydir rivers, creeks such as Croppa Creek, Mulgate Creek, Bobbiwa Creek, Gehan Creek, TookeyCreek and Gil Gil Creek and other numerous intermittent watercourses.

The locations with a resulting high visual impact include the:

- Newell Highway overbridge
- Jones Avenue overbridge
- new track alignment to create new turn to North Star at Moree (Camurra bypass)

While the urban areas and outskirts of townships and villages contain the highest visual impact locations, as they are mostly comprised of residential uses, there are few highly sensitive viewpoints located between these more heavily settled locations. Residences and homesteads between the settlements are typically scattered in single holdings or small dispersed clusters of three to four dwellings.

Generally, a low level of visual impact was recorded throughout the agricultural areas between Narrabri and Moree. The adjacent, and often parallel Newell Highway results in a moderate visual sensitivity level between these towns. North of Moree, the Newell Highway is offset some distance from the proposal. As a result, visual impacts are typically very low to low throughout the agricultural areas, only rising to moderate to high where residences were proximate.

Moderate levels of visual impact resulted where one or a number of high sensitivity residences were located in the local setting (0 – 0.35 kilometres). Moderate levels of visual sensitivity also resulted where a proposed crossing loop was adjacent to the Newell Highway.

High levels of visual impact were mostly related to major components of the proposal. These include the Newell Highway overbridge, Jones Avenue overbridge, and the construction of new track to bypass existing hairpin curve at Camurra (Camurra bypass). Generally, a moderate to high visual impact was recorded through Moree due to the townships highly sensitive viewpoints of residential and civic uses. Furthermore, the crossing loop at Bobbiwaa also results in a moderate to high visual impact. This is due to the highway being assessed as a moderate visual sensitivity combined with a moderate to high level of visual modification resulting from the implementation of new rail infrastructure in this location.

Overall, the proposed upgrades to existing railway tracks, with height increases of between 0.3 metres and 1.0 metre and crossing loops adjoining existing railway infrastructure, would generally have a low level of visual modification.

During construction, the presence of spoil mounds with their raw earth coloured appearance would result in an increased level of visual modification. However, following mitigation and the establishment of a grassed covering, they are likely to contribute to visual screening of the proposal. As a result, the visual modification level would reduce and, consequently, also the level of visual impact. As the extent of spoil mounds is not as yet known, it has been assumed that they would occur along the majority of the proposal.

In conclusion, it is unlikely that the proposed works would result in a high visual impact once construction has been completed, given the proposal predominately entails the reinstatement of an existing rail corridor. The proposal to primarily upgrade existing railway tracks would result in changes to the existing setting which would be difficult to perceive, given they are such a small component within the wider landscape, in both agricultural and urban areas.

Quality information

Document Inland Rail Narrabri to North Star- LVIA

Ref ND1605

Date 17th October-2017

Prepared by Rachel Smithers

Reviewed by Peter Haack

REVISION HISTORY

REVISION	REVISION DATE	DETAILS	AUTHORISED	
FINAL	15 August 2017	For distribution	Peter Haack	
FINAL	17 October 2017	For distribution	Peter Haack	

Glossary of abbreviations/technical terms

TERM	DEFINITION	ABBREVIATION
Absorptive capability	Absorptive capability relates to the ability of the landscape character zones to absorb the proposal within the existing landscape setting.	
Background	The area that forms the most visibly distinct setting for the proposal with a distance typically greater than 2 kilometres. Also, referred to as the regional setting.	
Canopy tree	A tree with a minimum height of approximately 10 metres with an average crown spread of at least 8 metres to 10 metres in width	
Chainage	A distance measured along the centreline of the rail corridor.	
Foreground	The area that immediately surrounds the proposal up to a distance of 0.5 kilometres. Also, referred to as the local setting.	
Landscape	Is about the relationship between people and place. Landscapes are recognised as special or valuable and can range from wastelands to mountain ranges.	
Landscape and visual impact assessment	The assessment of the impacts of the proposal on landscape and visual features.	**LVIA**
Landscape character assessment	The process of mapping, describing and evaluating landscapes on the basis of the presence and arrangement of various landscape features. It also includes reference to policy or designations as an indicator of recognised value, including specific features or characteristics that justify the designation of the area.	**LCA**
Local government authority		**LGA**
Middleground	An intermediate area that is 0.5 kilometres to 2 kilometres' distance from the proposal. Also, referred to as the sub-regional setting.	

Mitigation	The ability to reduce the visual impact of a development through siting design colour or screening.	
Modification level	The degree to which a development contrasts or blends with its setting	
Narrabri to North Star	Narrabri to North Star section of the Inland Rail ('the proposal').	
Parkes to Narromine	Parkes to Narromine section of Inland Rail	
Receptor	A location or type of user for which views of the proposal may be possible.	
Secretary environmental assessment requirements	Environmental assessment requirements issued by the Secretary of the Department of Planning and Environment	**SEARs**
Significant landscape	The designation of a particular landscape as special or important arising from its cultural landscape values, including aesthetic values (both visual and non-visual) historic, environmental, scientific, social or other values such as economic.	
Viewer perception	The way in which people respond to what they are seeing as influenced by things other than purely visual, for example noise and economic benefits.	
Viewpoint	Views to the construction process or components of the proposal may be possible.	
Viewshed	The area visible from a particular viewing location.	
Visual amenity	The qualities of a landscape setting that are appreciated and valued by a viewer.	
Visual impact	The result of assessing the sensitivity level of a viewer and the modification level of a proposal.	
Visual sensitivity	A measure of how critically a change to the existing landscape would be viewed from surrounding land use areas. The visual sensitivity is consistent with the visual management system (United States	

	Department of Agriculture Forest Service, 1995).	
Zone of visual influence	The likely (or theoretical) extent of visibility of the proposal.	**ZVI**

1 Introduction

1.1 Overview

The Australian Government has committed to delivering a major piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane. The Inland Rail programme (Inland Rail) involves the design and construction of a new inland rail connection, about 1,700 kilometre long, between Melbourne and Brisbane. Inland Rail is a transformational rail infrastructure initiative that would enhance Australia's existing national rail network and serve the interstate freight market.

Australian Rail Track Corporation Ltd (ARTC) is seeking approval to construct and operate the Narrabri to North Star section of Inland Rail ('the proposal'), which consists of 188 kilometres of upgraded rail track and associated facilities.

The proposal requires approval from the NSW Minister for Planning under Part 5.1 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The proposal is also a controlled action under the Commonwealth Environment Protection Biodiversity Conservation Act 1999 (EPBC Act), and requires approval from the Australian Minister for the Environment and Energy.

This report has been prepared by Urbis Pty Ltd (Urbis) as part of the environmental impact statement (EIS) for the proposal. The EIS has been prepared to accompany the application for approval of the proposal, and addresses the environmental assessment requirements of the Secretary of the Department of Planning and Environment (the SEARs), issued on 8 November 2016.

1.1.1 Location

The proposal is generally located in the existing rail corridor between the town of Narrabri and the village of North Star, via Moree. The location of the proposal is shown in ***Figure 1***.

1.1.2 Key Features

The key features of the proposal involve:

- upgrading the track, track formation, and culverts within the existing rail corridor for a distance of 188 kilometres between Narrabri and North Star
- realigning the track where required within the existing rail corridor to conform with required platform clearances for Inland Rail trains
- providing five new crossing loops within the existing rail corridor, at Bobbiwaa, Waterloo Creek, Tycannah Creek, Coolleearllee, and Murgo
- providing a new section of rail line at Camurra, about 1.6 kilometres long, to bypass the existing hairpin curve ('the Camurra bypass'). Refer to Appendix A for location and existing site photographs
- removing the existing bridges and reinstating new rail bridges in the same location over the Mehi and Gwydir rivers and Croppa Creek. Refer to Appendix A for location and existing site photographs
- realigning about 1.5 kilometres of the Newell Highway near Bellata, and providing an overbridge across the existing rail corridor ('the Newell Highway overbridge')

- providing an overbridge across the existing rail corridor at Jones Avenue in Moree ('the Jones Avenue overbridge'). Refer to Appendix A for location and existing site photographs.

The key features of the proposal are shown in **Figure 2**.

Ancillary work would include works to level crossings, signalling and communications, signage and fencing, and services and utilities.

1.1.3 Timing

Subject to approval of the proposal, construction is planned to start in early to mid-2018, and is expected to take about 24 months. Existing train operations along the Narrabri to North Star line would continue prior to, during, and following construction. Inland Rail as a whole is expected to be operational in 2025.

1.1.4 Operation

Prior to the operation of Inland Rail as a whole, the proposal would be used by existing rail traffic, which includes trains carrying passengers and grain at an average rate of about four trains per day. It is estimated that the operation of Inland Rail would involve an annual average of about 10 trains per day travelling north of Moree (between North Star and Moree) and 12 trains per day travelling south of Moree (between Moree and Narrabri) in 2025. This would increase to about 19 trains per day north of Moree (between North Star and Moree) and 21 trains per day south of Moree (between Moree and Narrabri) in 2040. The trains would be a mix of grain, intermodal (freight), and other general transport trains.

Once operational in 2020, the proposal would enable increased train running speeds in many areas that are currently the subject of restrictions due to local track conditions. Daily average train volumes are not expected to significantly change until Inland Rail through connection in 2025.

1.2 Purpose and scope of this report

The purpose of this report is to assess potential landscape and visual impact issues from the operation and construction of the proposal, and where required, identify feasible and reasonable mitigation measures.

This report summarises the findings of the Landscape and Visual Impact Assessment of the proposal. It addresses the visual amenity specific requirements of the SEARs, summarised in ***Table 1***.

TABLE 1 – RELEVANT SEARS

REQUIREMENTS FOR VISUAL AMENITY	WHERE ADDRESSED IN THIS REPORT
1. The Proponent must assess the visual impact of the proposal and any ancillary infrastructure on:	
(a) views and vistas;	**Sections 5 and 6**.
(b) streetscapes, key sites and buildings;	**Sections 5 and 6.**
(c) heritage items including Aboriginal places and environmental heritage; and	**Sections 5 and 6**.
(d) the local community.	**Sections 5 and 6.**
2. The Proponent must provide artist impressions and perspective drawings of the proposal to illustrate how the proposal has responded to the visual impact through urban design and landscaping.	Provided in **Section 7.1** and in the EIS.

Evaluation objective

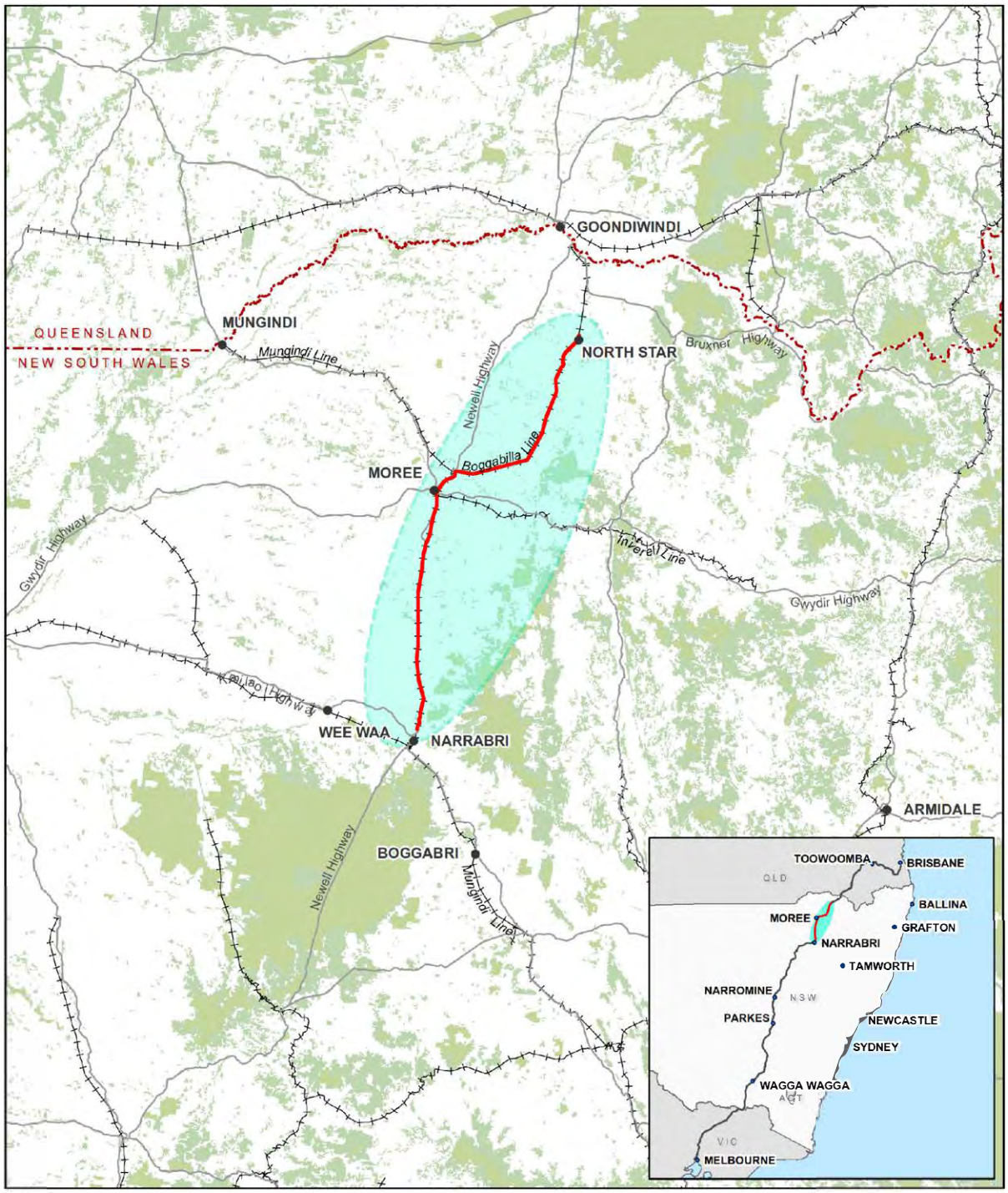
The evaluation objective for visual amenity is to minimise adverse impacts on the built and natural environment (including public open space) and capitalise on opportunities to improve visual amenity.

The relevant SEARs encompass some aspects and potential impacts that are not directly related to landscape and visual issues. Although interactions have occurred across applicable technical specialists such as biodiversity, historical heritage, land use planning, noise and vibration (surface), social, surface water and drainage and transport, the full details are addressed in separate studies, with the interdependences managed through the overall EIS process.

1.3 Structure of this report

The structure of the report is outlined below.

- **Section 1** – provides an introduction to the report.
- **Section 2** – describes the methodology for the assessment.
- **Section 3** – identifies relevant landscape and visual policy and legislation pertinent to the proposal.
- **Section 4** - describes the proposal's features and operation.
- **Section 5** – describes the landscape of the setting.
- **Section 6** – assesses the visual impacts of the proposal.
- **Section 7** – summarises the assessment findings.
- **Section 8** – identifies mitigation actions to reduce initial impacts.
- **Section 9** – the conclusion provides a high-level overview of key findings.



LEGEND

- Proposal site
- Proposal location
- Main road
- Railway
- State border

Paper Size A4

0 10 20 40 60

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Australian Rail Track Corporation
Inland Rail Track Alignment

Job Number 22-17916
Revision 0
Date 02 Jun 2017

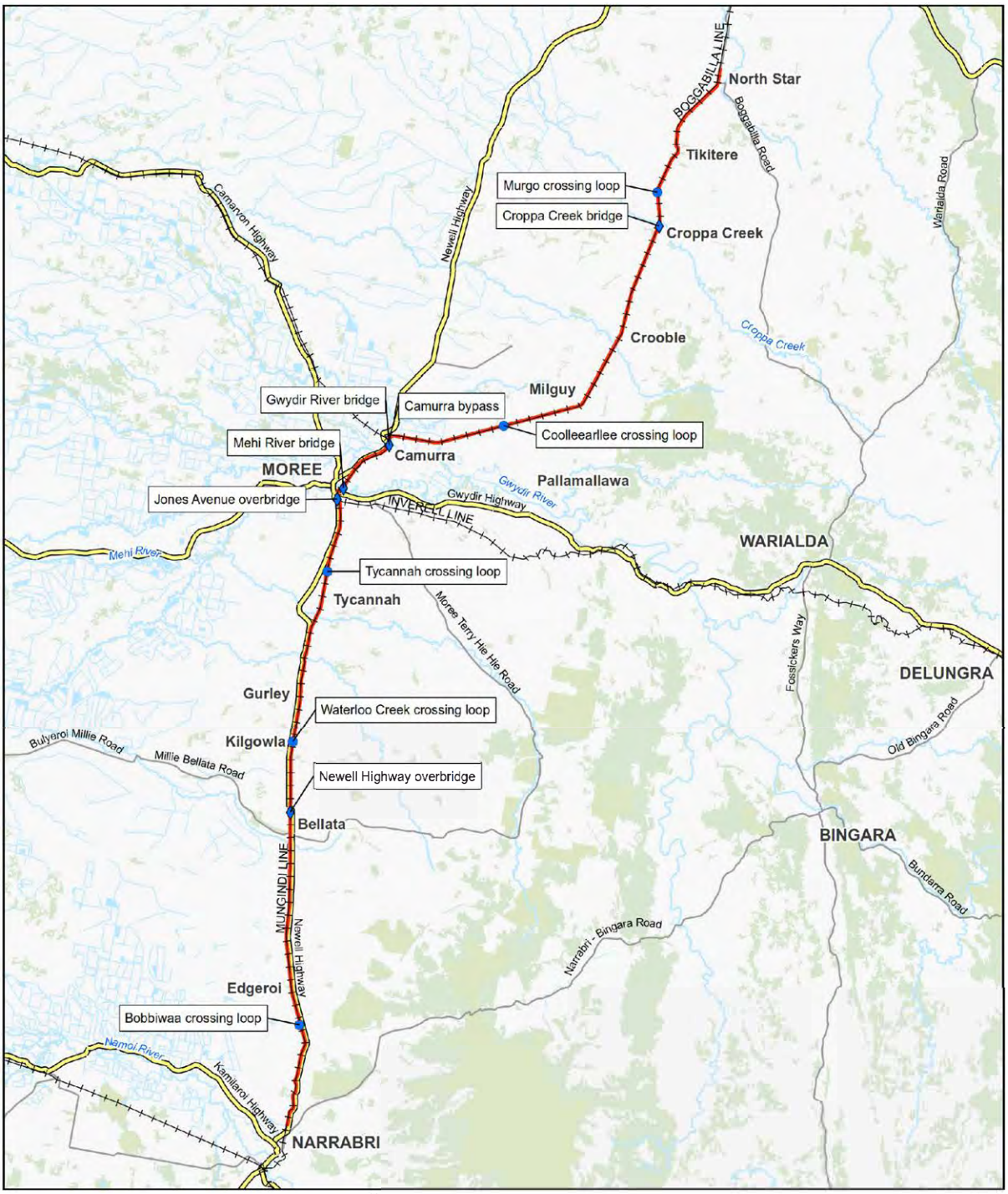
Location of the proposal

Figure 1

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E nlmail@ghd.com W www.ghd.com.au

G:\22\17916\GIS\Maps\Deliverables\N2NS\EIS\Specialist Reports\2217916_EIS001_NNS_Location_0.mxd

Data source: Commonwealth of Australia (Geoscience Australia), 250K Topographic Data Series 3, 2006. Created by: tmorton, kpsroba



LEGEND

- New bridge
- Crossing loop
- The proposal
- Railway
- Highway
- Road

Paper Size A4

0 3 6 12 18 24

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Australian Rail Track Corporation
Inland Rail Track Alignment

Job Number 22-17916
Revision 0
Date 01 Aug 2017

Key features of the proposal

Figure 2

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E nlmail@ghd.com W www.ghd.com.au

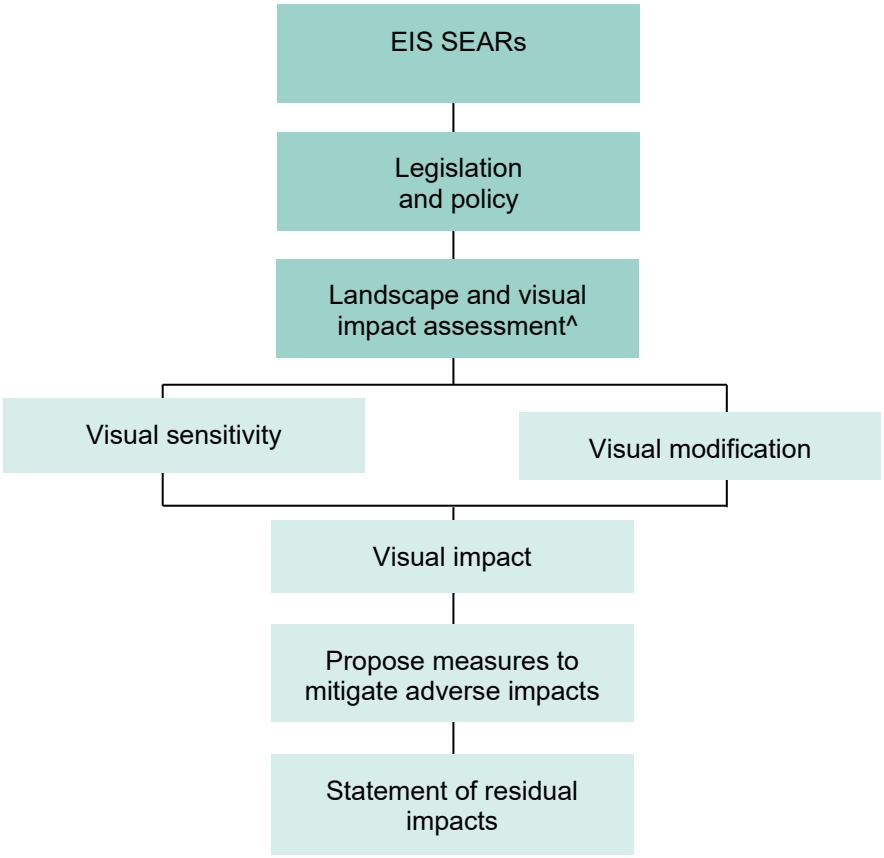
G:\22\17916\GIS\Maps\Deliverables\N2NS\EIS\Specialist Reports\2217916_EIS002_NNS_KeyFeatures_0.mxd

Data source: Commonwealth of Australia (Geoscience Australia), 250K Topographic Data Series 3, 2006. Created by: gmcdiarmid, tmorton, kpsroba

2 Assessment approach and methodology

The methodology for carrying out the landscape and visual assessment of the proposal was drawn from the *Guidelines for Landscape and Visual Impact Assessment*. 3rd Edition (2013)[1] and visual management system (United States Department of Agriculture Forest Service, 1995), *Landscape Aesthetics – A Handbook for Scenery Management*, *Agricultural Handbook No. 701*. ***Figure 3*** illustrates the assessment methodology applied in ***Section 6***.

FIGURE 3 – LVIA METHODOLOGY PROCESS



^ Visual assessment methodology approach to the determination of visual sensitivity is consistent with the visual management system (United States Department of Agriculture Forest Service, 1995), *Landscape Aesthetics – A Handbook for Scenery Management*, Agricultural Handbook No. 701.

The impact assessment entailed the following interrelated tasks:

- Existing conditions assessment of the study area - the existing conditions assessment was used to establish the study area and provided a baseline assessment of visual impacts.
- Landscape character assessment including the ability of the setting to absorb the proposal.

[1] The Landscape Institute and Institute for Environmental Management and Assessment LIIEMA, (2013). Guidelines for Landscape and Visual Impact Assessment. Routledge 3rd Edition.

- Whole of route visual impact assessment - this assessment provides a basis for assessing potential impacts on adjacent land use. The sensitivity level represents the highest adjacent land use.

2.1 Existing conditions assessment

The initial step in any landscape or visual assessment is to review the existing landscape and visual resource in the vicinity of the proposed development – that is the baseline landscape and visual conditions. The data collected forms the basis from which the estimate of magnitude and significance of the landscape and visual effects of the development may be identified and assessed. The purpose of a baseline study is to record and analyse the existing landscape features, characteristics, the way the landscape is experienced, and the value or importance of the landscape and visual resources in the vicinity of the proposal. This requires research, classification and analysis of the landscape and visual resources as follows:

- Research/survey involves both desk and field studies to assemble basic information.
- Classification entailing sorting the landscape into units or groups of distinct and recognisable type and character.
- Analysis involving the detailed examination of the constituent parts of the landscape and visual resources in order to understand how they are made up and experienced. It can also include the process of ascertaining the relative importance of various aspects of the landscaped and visual resource.

2.1.1 Desktop study

A desktop study was undertaken to explore patterns and scale of landform, land cover and built development, to give guidance on the general landscape character of the zone of visual influence. Any special values that may apply, such as designated landscapes, and specific potential sensitive visual receptors and important components of the landscape, as well as locations of residences and visitors travelling through the area, were noted.

2.2 Landscape character assessment

Landscape character assessment, and particularly the stage of characterisation, is the basic tool for understanding the landscape and is the starting point for baseline surveys. The baseline study provided a description of the existing character of the proposal and its surrounding landscape, and the classification of the landscape into distinct character areas or types, which share common features and characteristics. The condition of the landscape i.e. the state of an individual area of landscape was described as factually as possible, and a judgement made on the value or importance of the affected landscape. The assessment of landscape importance includes reference to policy or designations as an indicator of recognised value, including specific features or characteristics that justify the designation of the area. This information establishes why the landscape is considered to be of value at a national, regional or local level (refer to ***Section 5***).

2.2.1 Absorptive capability

Absorptive capability relates to the ability of the landscape character zones to absorb the proposal within the existing landscape setting. Opportunities for screening the proposal within the landscape through vegetation, undulating landforms and integration within previously modified settings were considered in determining the absorptive capability level (refer to ***Section 5***).

2.3 Whole of route visual impact assessment

The whole of route visual impact assessment uses generic tools to evaluate the level of visual impact. These include visual sensitivity, visual modification, establishing visual threshold distances and the visual impact determination matrix. The details regarding visual sensitivity and visual modification are discussed below in **Sections 2.3.1** and **2.3.2**.

The whole of route assessment is based on identifying the visible proposal components that occur along the adjoining land uses that the proposal traverses (the corridor), to understand what the visual modifications would be because of the proposal. An assessment of the visual interaction between the visible proposal components and the traversing land use is then considered based on the visual sensitivity and the degree of modification.

The overall assessment employs the following process to identify the visual impact:

- Identify visible proposal components along the corridor using chainages.
- Determine the distance from the visible proposal components to any high sensitive receptor within the adjoining land use
- Determine the degree of modification.
- Define the level of visual sensitivity. The sensitivity level represents the highest visual adjacent land use.)
- Determine the level of visual impact resulting from the combination of the degree of modification and level of sensitivity using visual impact determination matrix.

Once the visual impact is established mitigation can be identified and the residual impact agreed.

2.3.1 Visual sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape would be viewed from the surrounding land use areas. Different activities undertaken within the landscape setting have different sensitivity levels. For example, tourists who are using the surrounding landscape as a part of the holiday experience would generally view changes to the landscape more critically than agricultural or industrial workers in the same setting. Similarly, individuals would view changes to the visual setting of their residence more critically than changes to the visual setting of the broader setting in which they travel or work. The approach to the visual assessment to determine the visual sensitivity is consistent with the visual management system (United States Department of Agriculture Forest Service, 1995)[2].

The visual sensitivity of land uses was assessed to assist in determining the visual impact of the proposal. As distance from the viewer to the proposal site increases, the level of sensitivity reduces i.e. the reduction of the impact. As such, the potential visual impact of the proposal would not be prominent at distances greater than one kilometre. Refer to Appendix B for further details. The visual sensitivity levels are defined in ***Table 2*****.**

[2] Landscape Aesthetics – A Handbook for Scenery Management, Agricultural Handbook No. 701

TABLE 2 – VISUAL SENSITIVITY LEVEL

	DISTANCE FROM THE PROPOSAL		
LAND USE	FOREGROUND	MIDDLEGROUND	BACKGROUND
	Local Setting	Sub-Regional Setting	Regional Setting
	0 – 0.35 kilometres	0.35 – 0.7 kilometres	0.7 - <=1 kilometres
Residential / Homestead	H	H	H
Parks and recreational areas	H	H	H
Townships and villages	H	H	M
Newell Highway	M	M	M
Local roads	M	L	L
Rural roads	L	L	VL
Agricultural areas	VL	VL	VL

2.3.2 Visual modification

The degree of visual modification of the proposal is the expression of the visual interaction between the proposal and the existing adjoining visual environment. It can also be expressed as a level of visual contrast that would result from the proposal with the visual setting within which it is placed. This level of contrast is defined by the interaction between the appearance of the proposal, the absorptive capability of the landscape setting in which the proposal is positioned and the distance from which the proposal is viewed.

A high degree of visual modification would result if the proposal is a major element and contrasts strongly with the existing landscape. This contrast is likely to occur if there is little or no natural screening or integration created by vegetation or an undulating topography such as an open plain.

A moderate degree of visual modification would occur if the proposal is visible and contrasts with the landscape or if similar elements are present but is integrated with it to some degree. This would happen if the surrounding vegetation and/or topography provide some measure of visual screening, background or other forms of visual integration of the proposal within the setting.

A low degree of visual modification occurs if there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the proposal and the environment. This would occur if there is a high degree of visual integration of the proposal into the existing landscape or a low level of visual modification of the existing visual setting is achieved.

A very low level of modification would occur where the proposal would be aligned through an environment that is heavily modified (as the result of an existing rail corridor). In such a scenario, the proposal may be barely noticeable and does not markedly contract with the existing landscape.

Throughout the proposal site, the degree of modification is highly dependent on the distance from which the proposal would be viewed. As the distance from the proposal to various land uses increases, the proposal would be less prominent, and would therefore modify the existing visual setting less.

Given the low profile and horizontal form of most of the proposal, the level of visual modification would be confined to a distance relatively close to the area subject to change. The effect of distance on modification levels is incorporated into this assessment applying different modification ratings to foreground (0 to 0.35 kilometres), middleground (0.35 to 0.7 kilometres) and background (0.7 to 1 kilometre) views. The visual modification rating resulting from the proposal would be highest in the foreground, except where foreground vegetation screens the proposal.

Visual modification is also affected by the angle from which the proposal site is viewed (i.e. when the view to the proposal is at a right angle, different elements of the proposal would be visible than when the view is parallel, e.g., the railway track is generally less prominent when the view location is at right angles). The effect of viewing angle is incorporated into this assessment through applying different modification ratings to right angle and parallel views for each visual modification condition. Refer to the tables associated with the development condition within **Figure 4**.

The range of typical conditions and the levels of visual modification of the proposal along the corridor are defined in ***Figure 4***.

FIGURE 4 – PROPOSED VISUAL MODIFICATION CONDITIONS

VISUAL MODIFICATION CONDITIONS FOR NARRABRI TO NORTH STAR ARTC INLAND RAILTRACK ALIGNMENT

CONDITION 1

OVERBRIDGE (NEWELL HIGHWAY) IN MODERATELY DENSE WOODLAND.

VISUAL MODIFICATION	FOREGROUND	MIDDLEGROUND	BACKGROUND
	0 - 0.35KM	0.35 - 0.7KM	0.7 - <= 1KM
PARALLEL	H	H	M
PERPENDICULAR	H	M	L

CONDITION 2

OVERBRIDGE (JONES AVENUE, MOREE) IN URBAN SETTING.

VISUAL MODIFICATION	FOREGROUND	MIDDLEGROUND	BACKGROUND
	0 - 0.35KM	0.35 - 0.7KM	0.7 - <= 1KM
PARALLEL	H	H	M
PERPENDICULAR	H	M	L

CONDITION 3

NEW CROSSING LOOP WITH NO, OR MINIMAL, CLEARING REQUIRED IN LIGHTLY TREED AGRICULTURAL SETTING.

VISUAL MODIFICATION	FOREGROUND	MIDDLEGROUND	BACKGROUND
	0 - 0.35KM	0.35 - 0.7KM	0.7 - <= 1KM
PARALLEL	M-H	M	L
PERPENDICULAR	L-M	L-M	VL

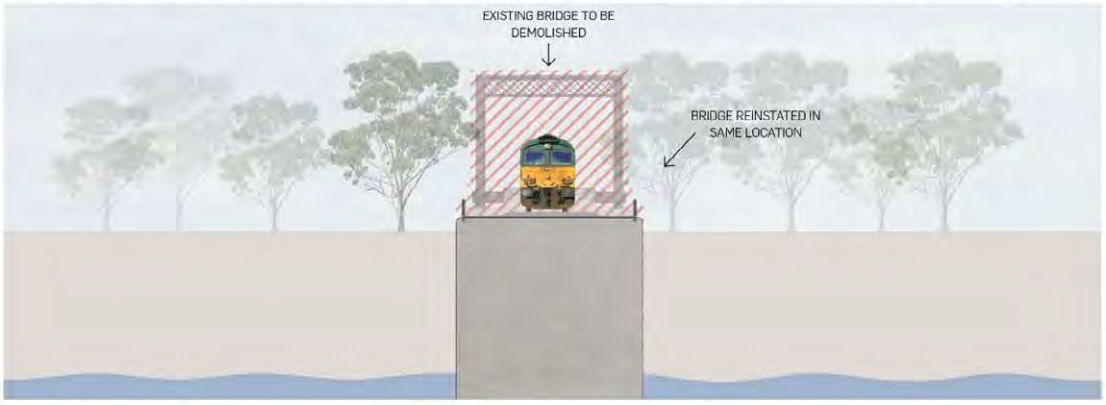
CONDITION 4

RE-INSTATEMENT OF EXISTING TRACK THROUGH OPEN AGRICULTURAL LAND.

VISUAL MODIFICATION	FOREGROUND	MIDDLEGROUND	BACKGROUND
	0 - 0.35KM	0.35 - 0.7KM	0.7 - <= 1KM
PARALLEL	L	L	VL
PERPENDICULAR	L	VL	VL

CONDITION 5

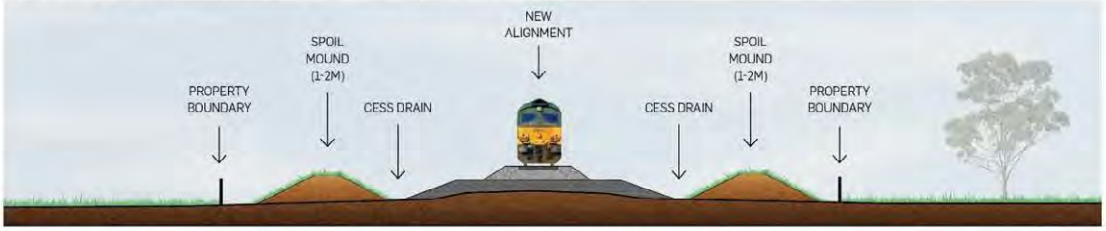
DEMOLITION OF EXISTING BRIDGE & REINSTATEMENT OF NEW IN SAME LOCATION IN WELL TREED RIPARIAN SETTING.



VISUAL MODIFICATION	FOREGROUND	MIDDLEGROUND	BACKGROUND
	0 - 0.35KM	0.35 - 0.7KM	0.7 - <= 1KM
PARALLEL	L	L	VL
PERPENDICULAR	L	VL	VL

CONDITION 6

NEW TRACK ALIGNMENT THROUGH OPEN AGRICULTURAL LAND.



VISUAL MODIFICATION	FOREGROUND	MIDDLEGROUND	BACKGROUND
	0 - 0.35KM	0.35 - 0.7KM	0.7 - <= 1KM
PARALLEL	H	M-H	L
PERPENDICULAR	M-H	M-H	L

2.4 Determination of visual impact

The visual impact resulting from the combination of visual modification and visual sensitivity is illustrated in ***Table 3***. Where an impact falls between two levels, say L and M, the sensitivity levels defines the final rating, i.e., if visual modification is M and visual sensitivity is L, the final visual impact rating would be L.

TABLE 3 – VISUAL IMPACT MATRIX

Visual Sensitivity

Visual Modification	H	M	L	VL
H	H	H	M	L
M	H	M	L	VL
L	M	L	L	VL
VL	L	VL	VL	VL

VL = Very low
L = Low
M = Moderate
H = High
Level of Visual Impact

2.5 Mitigation measures

Mitigation measures are recommended for each assessed viewpoint and are described in ***Section 8***. These actions have been considered in the assessment of the residual impact for representative viewpoints as well as the whole of the proposal site.

A base level mitigation action relating to “making good” or replacing removed vegetation applies to the entire proposal, in addition to specific viewpoint mitigation actions. Site rehabilitation measures are also described in ***Section 8***.

2.6 Residual impact

The residual impact of the proposal is the impact that results following the implementation of mitigations measures. Where vegetation screening is recommended, a period of 10 years’ growth post planting has been determined as appropriate for the purposes of the assessment of residual impact. The residual impact would be lower than the impact immediately following construction.

2.7 Stakeholder consultation

At this point in time no stakeholder engagement has been undertaken as part of this assessment.

2.8 Limitations and Assumptions

2.8.1 Limitations

The limitations associated with this LVIA are:

- This LVIA is based on the proposal.
- The impact assessment has focussed on the current land uses and zoning.

2.8.2 Assumptions

The methodology adopted for this landscape and visual impact assessment assumes that any change to the landscape or views from sensitive receptor locations arising from the proposal would be negative. This is in recognition that people's perception of the visual impact of the proposal would differ both amongst individuals and over time. Accordingly, this report conservatively assumes that all change would generally be regarded as negative.

Furthermore, a full night time visual assessment has not been undertaken, as trains currently do not operate at night along the existing rail corridor.

3 Legislation and policy

The following guidelines referenced in the SEARs are identified as being of relevance to the Landscape and Visual Assessment.

Current guidelines identified in the SEARs:

- AS4282-1997 Control of the obtrusive effects of outdoor lighting
- Beyond the Pavement: urban design policy, procedures and design principles (RMS, 2014)
- Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW (RMS, 2012)
- NSW Sustainable Design Guidelines Version 3.0 (TfNSW, 2013)
- Technical guideline for Urban Green Cover in NSW (OEH, 2015).

4 The proposal

This section provides an overview of the key features of the proposal site and the proposal with respect to the landscape and visual assessment.

4.1 The proposal site

The landscape and visual environment of the proposal site is characterised by its generally rural/agricultural nature, with areas of more concentrated urban development located in towns and villages (Narrabri, Edgeroi, Bellata, Gurley Moree, Camurra and North Star).

The majority of works associated with the proposal would be undertaken within the existing corridors of the Mungindi and Boggabilla rail lines, between Narrabri and North Star.

For much of the proposal site, the existing rail track and associated rail infrastructure forms the main visual feature in the landscape (refer to ***Picture 1***). Features contributing to the visual appearance of the rural/agricultural areas include open rural land interspersed with scattered development, dwellings, buildings and sheds; small stands of native vegetation and scattered trees; watercourses (typically ephemeral); road and rail infrastructure; and agricultural infrastructure such as grain silos. Features contributing to the visual environment of the urban areas include a mix of older commercial and residential buildings among new developments, and general urban infrastructure.

The southern end of the proposal site commences in Narrabri just to the south of Narrabri Station, located on the eastern side of Narrabri. From Narrabri, the proposal site extends along the existing Mungindi line corridor in a north–south direction for a distance of about 94 kilometres, to just south of Moree. In the Narrabri to Moree section, the proposal site is located generally adjacent to the Newell Highway (refer to ***Picture 2***).

From Moree, the proposal site travels in a north-easterly direction to the locality of Camurra, which is about 10 kilometres to the north-east of Moree. In this section, the proposal site is located to the east of the Newell Highway. At Camurra, the proposal site enters the corridor for the Boggabilla rail line at an existing hair pin turn.

From Camurra, the proposal site travels to the east, and then to the north through rural lands and the localities of Crooble and Croppa Creek until it reaches the village of North Star. The existing rail corridor passes to the west of the main residential area of the village. The northern end of the proposal site is located on the western edge of the village of North Star about 2 kilometres north of North Star Road.

PICTURE 1 – EXISTING RAIL TRACK

PICTURE 2 – THE NEWELL HIGHWAY AT MOREE

4.2 The elements of the proposal

The main visible elements of the proposal are summarised below.

4.2.1 Construction

Construction would result in the following changes and activities which would be visible to the sensitive visual receivers described in ***Section 6***:

- exposure of soils where excavation is required
- removal of some vegetation within the proposal site, including some mature trees
- movement of plant and equipment
- presence of partially constructed infrastructure/proposal features

- use of lighting for any night works.

4.2.2 Operation

The following features of the proposal would be visible during operation:

- upgraded track (including rails, sleepers, and ballast), track formation, and culverts within the existing rail corridor for a distance of 188 kilometres
- five new crossing loops within the existing rail corridor, at Bobbiwaa, Waterloo Creek, Tycannah Creek, Coolleearllee and Murgo
- works to some level crossings
- new signalling and communications, signage, and fencing
- constructing overbridges along the Newell Highway near Ballata, and Jones Avenue in Moree
- constructing replacement bridge crossings over the Mehi River, Gwydir River and Croppa Creek
- constructing 1.6 kilometres of new track to bypass existing hairpin curve at Camurra
- spoil mounds, involving stockpiled excavated material shaped into mounds along sections of the existing rail corridor, with a maximum height of two metres (about one metre above the height of the tracks
- movement of double stacked freight trains up to 1,800 metres long, with a height of 6.5 metres (as shown in Picture 3).

PICTURE 3 – EXAMPLE OF DOUBLE STACKED TRAIN

5 The existing landscape

This section describes the existing landscape and defines the ability of the varying landscape units to absorb change. The identification of sensitive viewpoints is included within ***Section 6***.

5.1 Land use and zoning

The proposal site traverses a predominately rural area dominated by agricultural and grazing purposes with substantial cotton, wheat and livestock production as illustrated in **Figure 5**.

Most of the proposal site is located within the existing rail corridor, which is dominated by railway uses and is zoned under the Local Environmental Plans as Infrastructure (SP2). The surrounding area, within 1 kilometre of the proposal, is zoned Primary Production (RU1) as illustrated in **Figure 6**.

Rural properties are located adjacent to the proposal for most of its length. Other key features/land uses in the vicinity of the proposal site include:

- The University of Sydney Plant Breeding Institute adjoins the proposal, about two kilometres north-east of Narrabri.
- A number of grain storage and handling facilities are located in various locations adjacent to the proposal.
- Two state forests are located in the south of the proposal. Killarney State Forest is located about 10 kilometres north-east of Narrabri and 2.2 kilometres east of the proposal at its nearest point. Moema State Forest is located about 33 kilometres north-east of Narrabri and 11 kilometres east of the proposal at its nearest point.

5.2 Topography and landform

As seen in **Figure 7**, the southern half of the proposal site is generally elevated at a level of between 260 and 330 metres Australian Height Datum (AHD). The northern extent which is predominately a flood plain, is generally at a lower elevation of between 240 and 260 metre AHD.

The vertical alignment of the existing rail line closely follows the general shape of the ground surface, with an elevation between about 200 (near Moree) to 310 metres AHD (about 30 kilometres from North Star).

5.3 Landscape features

Watercourses

The proposal site traverses the Gwydir River floodplain and is located within an area that has been subject to significant floods. The southern end of the proposal site (at Narrabri) is located on an embankment above the Namoi River. The northern end of the proposal site is located south of the Macintyre River within the Border Rivers basin. South of North Star, the Borders River basin drains to Whalan Creek and then to the Boomi River and Barwon River.

The proposal crosses about 90 watercourses. These include rivers (Mehi River and Gwydir River), creeks (such as Mulgate Creek, Bobbiwa Creek, Gehan Creek, Tookey Creek and Gil Gil Creek) and other intermittent watercourses and canals constructed to convey irrigation waters.

Geology and soils

The proposal site is characterised by an alluvial flood plain associated with the Mehi River and the Gwydir River. The terrain is typically near level to gently undulating. The proposal site is located in the Gunnedah Basin, crossing the Goondiwindi thrust fault into the New England Fold Belt east of Camurra (GHD, 2014).

The subsurface conditions of the Gunnedah Basin are dominated by Quaternary and Tertiary aged river plain sediments, including black and red clayey silt, and black and yellow brown clay soils. Exceptions to this include the Jurassic aged clayey sandstone unit north of Narrabri and partially consolidated polymictic gravel around Bellata (GHD, 2014).

Vegetation and biodiversity

The proposal site has been subject to substantial disturbance during construction of the existing rail infrastructure and by the surrounding rural land. Consequently, the majority of the proposal site has been cleared of the original vegetation. Scattered patches of remnant vegetation remain, primarily in the vicinity of watercourses, although they are also found within paddocks. The native vegetation comprises woodland communities with the dominant canopy species including Bimbil Box (*Eucalyptus populnea*), Belah (*Casuarina cristata*), White Cypress Pine (*Callitris glaucophylla*), Silver-leaved Ironbark (*Eucalyptus melanophloia*) and Brigalow (*Acacia harpophylla*); as well as natural and derived native grassland. River Red Gum (*Eucalyptus camaldulensis*) dominated forest is located on the banks of some waterways. Patches of Weeping Myall (*Acacia pendula*) also occur.

No conservation areas are known to occur adjacent to the proposal site. However, large linear areas of native remnant vegetation occur adjacent to the existing railway line between Bellata and Moree.

A number of threatened ecological communities and flora species were recorded from desktop searches in proximity to the proposal site. At least five threatened ecological communities and seven threatened flora species were identified as likely to occur within the proposal site: Refer to the Umwelt, 2017, *Australian Rail Track Corporation Inland Rail – Narrabri to North Star Biodiversity Assessment Report* for further details.

Aboriginal heritage

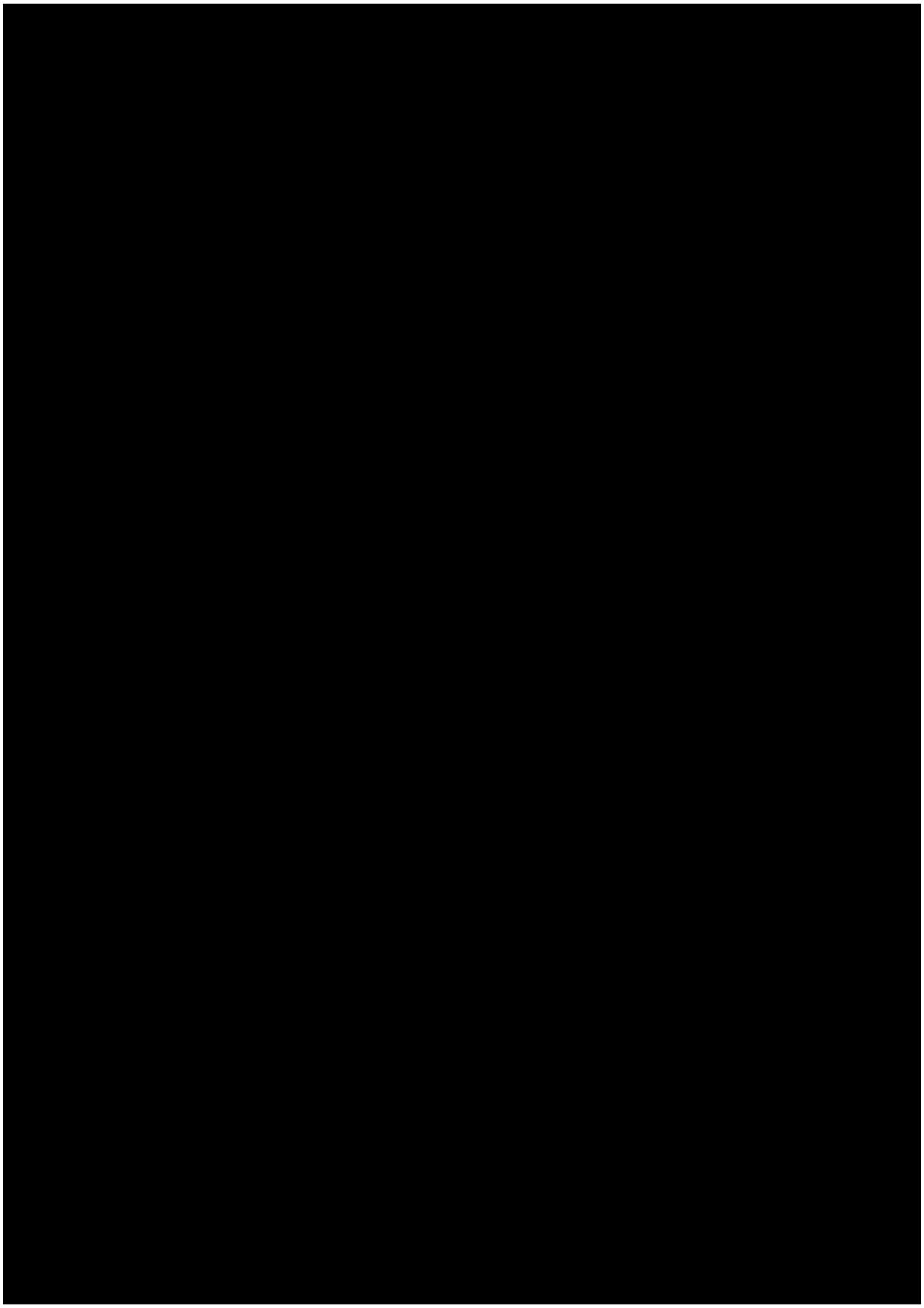
A search of the OEH AHIMS database for a 1 kilometre radius of the proposal site identified 23 previously recorded Aboriginal sites. The sites consisted predominantly of artefact scatters/isolated artefacts, with one stone quarry, five scarred trees one burial, two burials associated with carved trees, one PAD, a habitation structure (Top Camp at Moree) and a bora/ceremonial site.

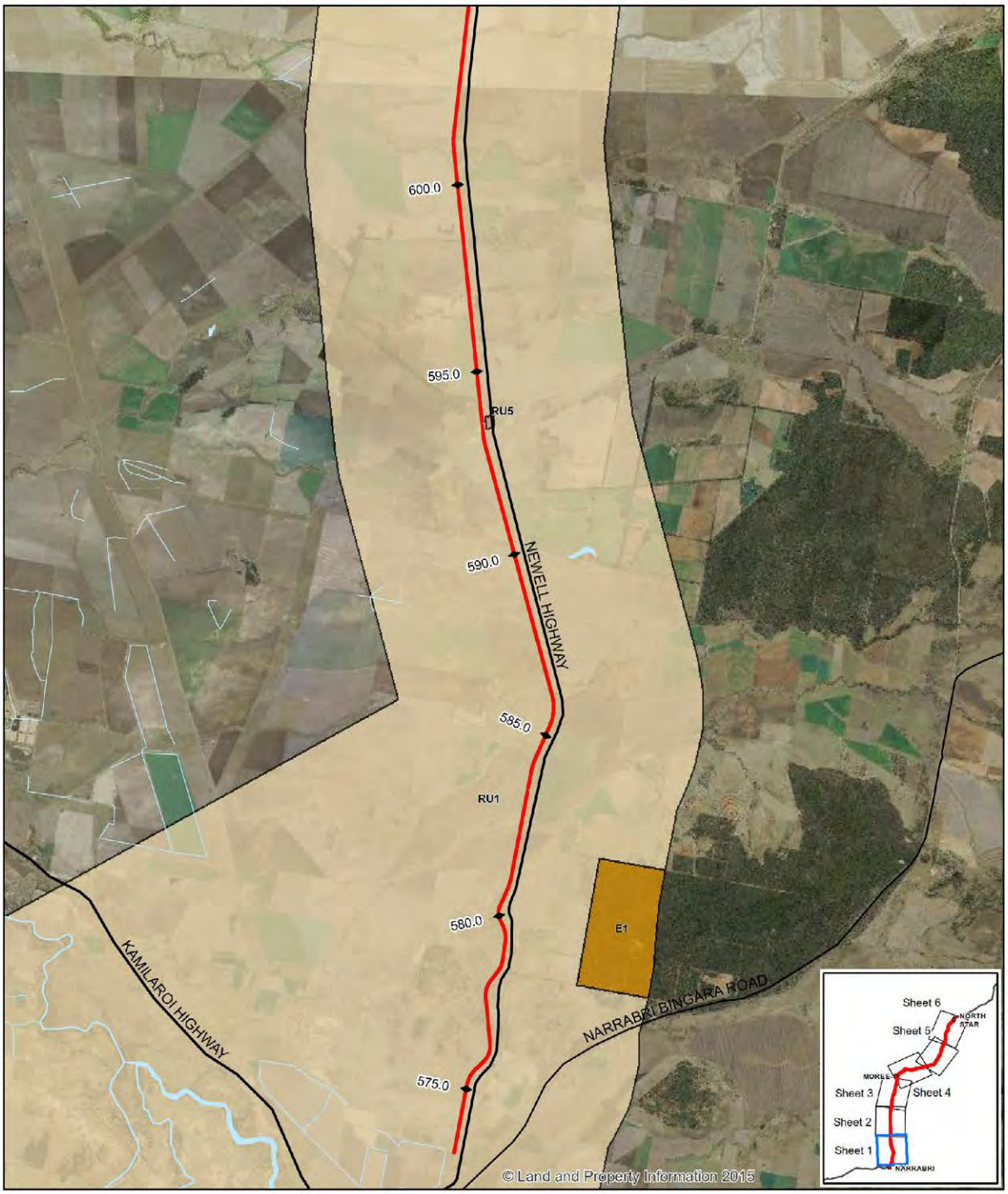
During the field assessment, a number of areas of potential archaeological sensitivity were identified. These are associated with the Gwydir River, Mehi River, Tycannah Creek, Croppa Creek and Yallaroi Creek. These areas have been assessed as part of the EIS. Refer to the Umwelt, 2017, *Australian Rail Track Corporation Inland Rail – Narrabri to North Star Aboriginal Cultural Heritage and Archaeological Assessment for* further details.

Non-Aboriginal heritage

The desktop assessment identified three heritage listed items within the proposal site. These include:

- Mehi River Bridge.
- Gwydir River Bridge.
- Moree Railway Station.





LEGEND

- The proposal
- Principal road
- Secondary road
- Watercourse
- Cadastre

LEP ZONING

- E1 National Parks and Nature Reserves
- RU1 Primary Production
- RU5 Village

Paper Size A4

0 0.5 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Australian Rail Track Corporation
Inland Rail- Narrabri to North Star

Job Number 22-17916
Revision 0
Date 03 May 2017

Land Use

Figure 6a

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

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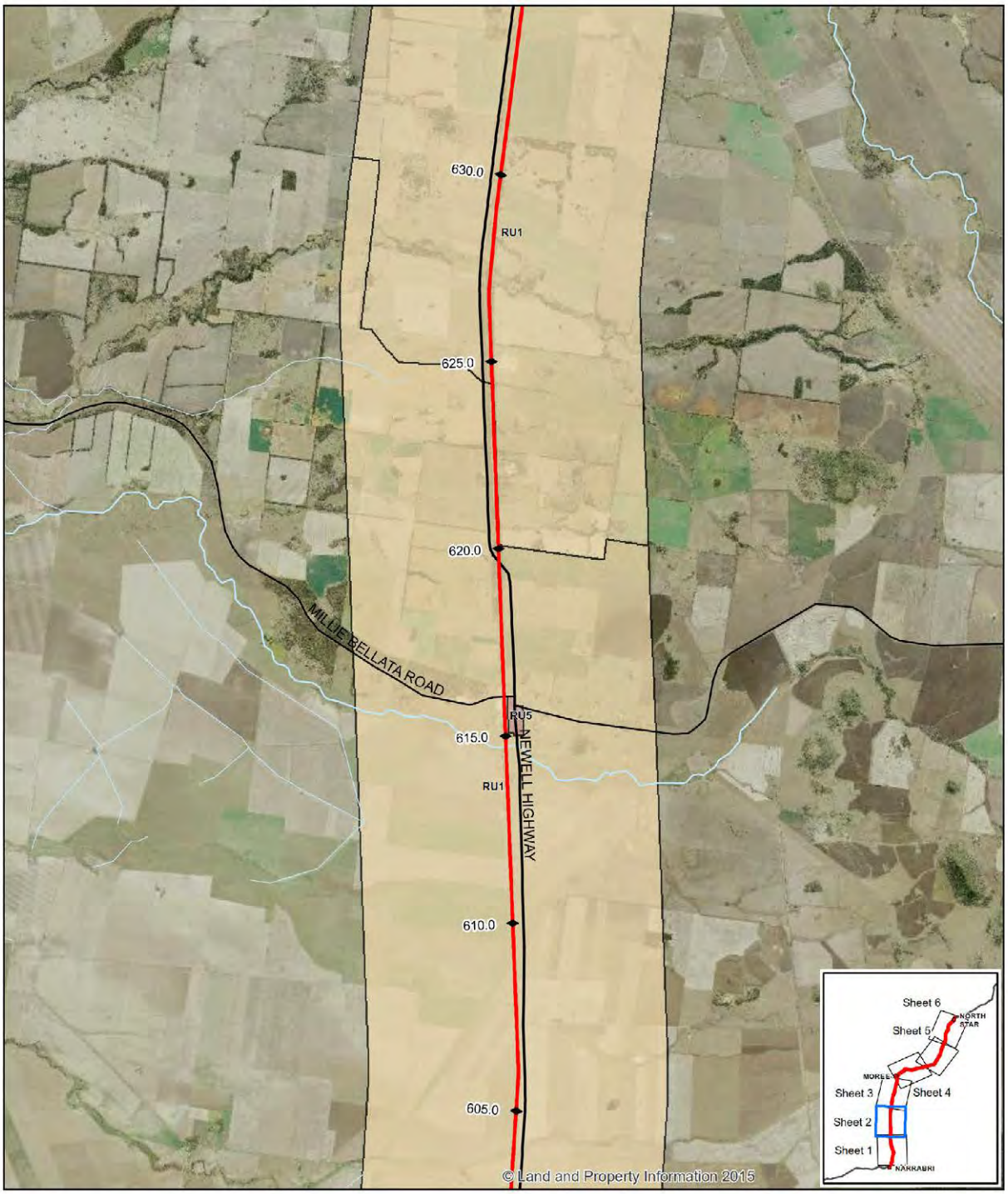
Data source: DoP&I: Land Zoning. 2013. Commonwealth of Australia (Geoscience Australia): 250K Topographic Data Series 3, 2006. LPI, DTDB, Imagery. 2015. Created by: gmcdiarmid, tmorton, kpsroba



LEGEND

- The proposal
- Principal road
- Secondary road
- Watercourse
- Cadastre

LEP ZONING

- RU1 Primary Production
- RU5 Village

Paper Size A4

0 0.5 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Australian Rail Track Corporation
Inland Rail- Narrabri to North Star

Job Number 22-17916
Revision 0
Date 03 May 2017

Land Use

Figure 6b

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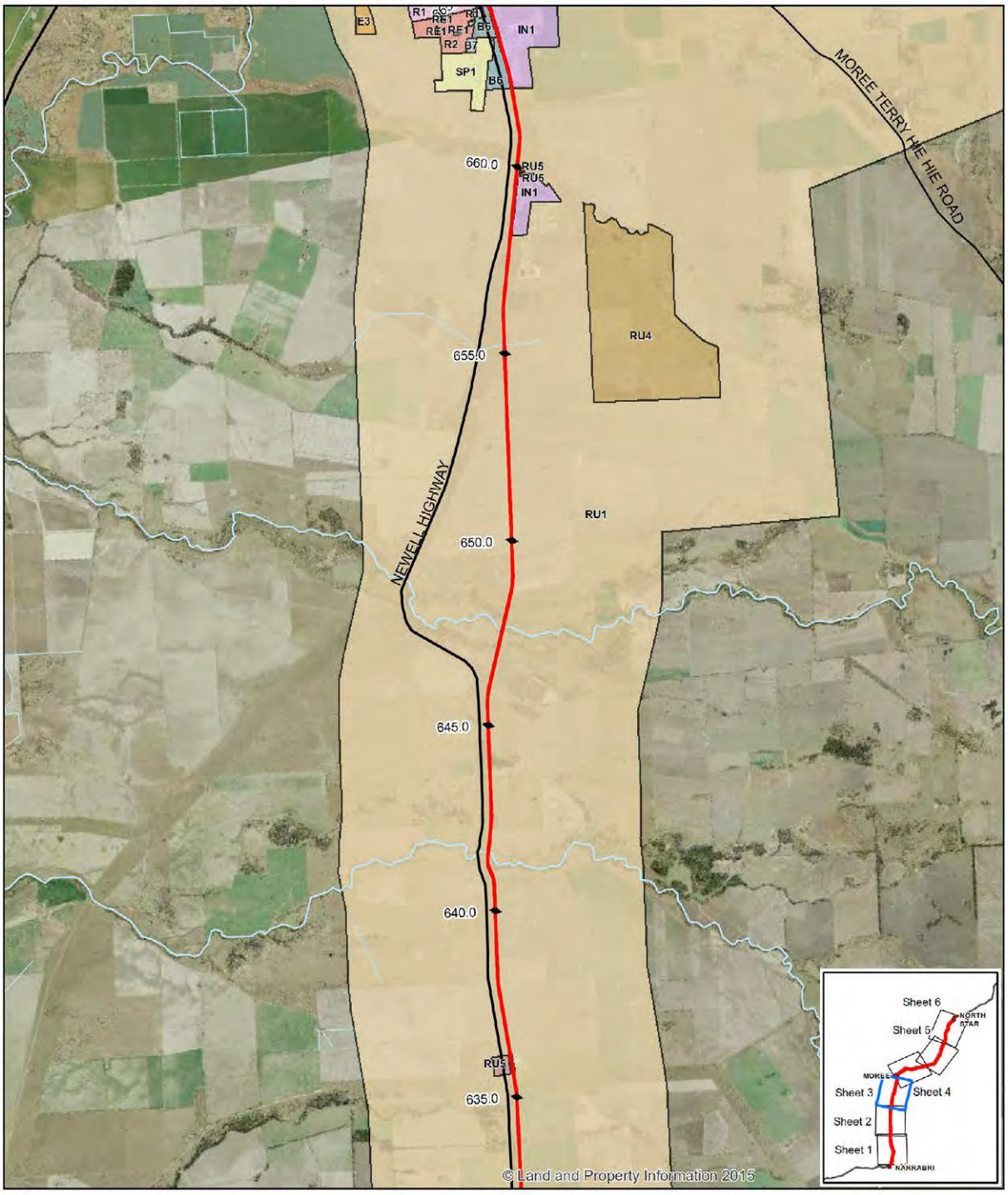

LEGEND

- The proposal
- Principal road
- Secondary road
- Watercourse
- Cadastre

LEP ZONING

- B1 Neighbourhood Centre
- B6 Enterprise Corridor
- B7 Business Park
- E3 Environmental Management
- IN1 General Industrial
- R1 General Residential
- R2 Low Density Residential
- RE1 Public Recreation
- RU1 Primary Production
- RU4 Rural Small Holdings
- RU5 Village
- SP1 Special Activities
- SP2 Infrastructure

Paper Size A4

0 0.5 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Australian Rail Track Corporation
Inland Rail- Narrabri to North Star

Job Number 22-17916
Revision 0
Date 03 May 2017

Land Use

Figure 6c

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

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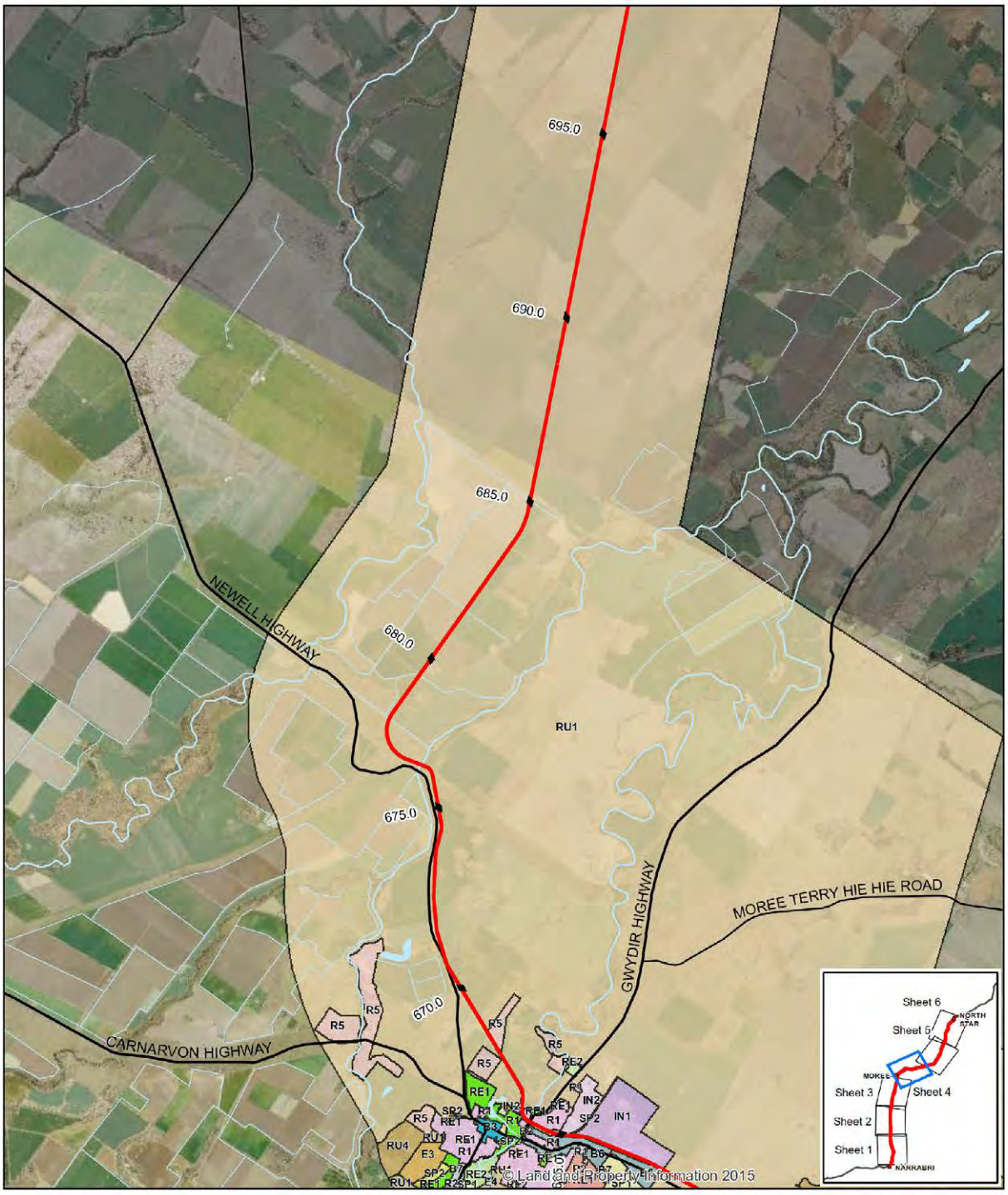
Data source: DoP&I: Land Zoning, 2013. Commonwealth of Australia (Geoscience Australia): 250K Topographic Data Series 3, 2006. LPI, DTDB, Imagery, 2015. Created by: gmcdiarmid, tmorton, kpsroba



LEGEND

- The proposal
- Principal road
- Secondary road
- Watercourse
- Cadastre

LEP ZONING

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B6 Enterprise Corridor
- B7 Business Park
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R2 Low Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU4 Rural Small Holdings
- SP1 Special Activities
- SP2 Infrastructure

Paper Size A4

0 0.5 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Job Number 22-17916
Revision 0
Date 03 May 2017

Land Use

Figure 6d

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

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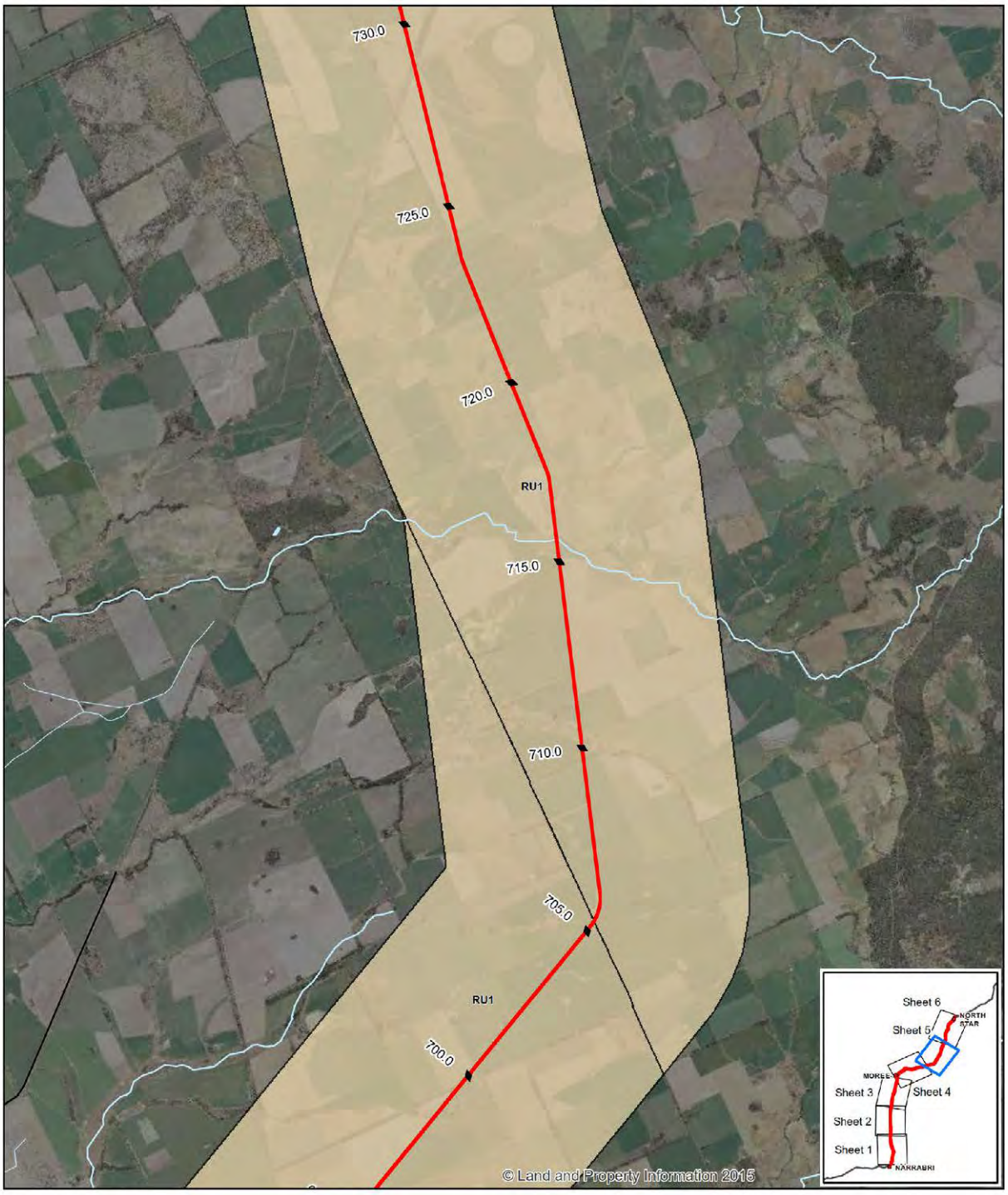

LEGEND

- The proposal
- Principal road
- Secondary road
- Watercourse
- Cadastre

LEP ZONING

- RU1 Primary Production

Paper Size A4

0 0.5 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Inland Rail- Narrabri to North Star

Job Number 22-17916
Revision 0
Date 03 May 2017

Land Use

Figure 6e

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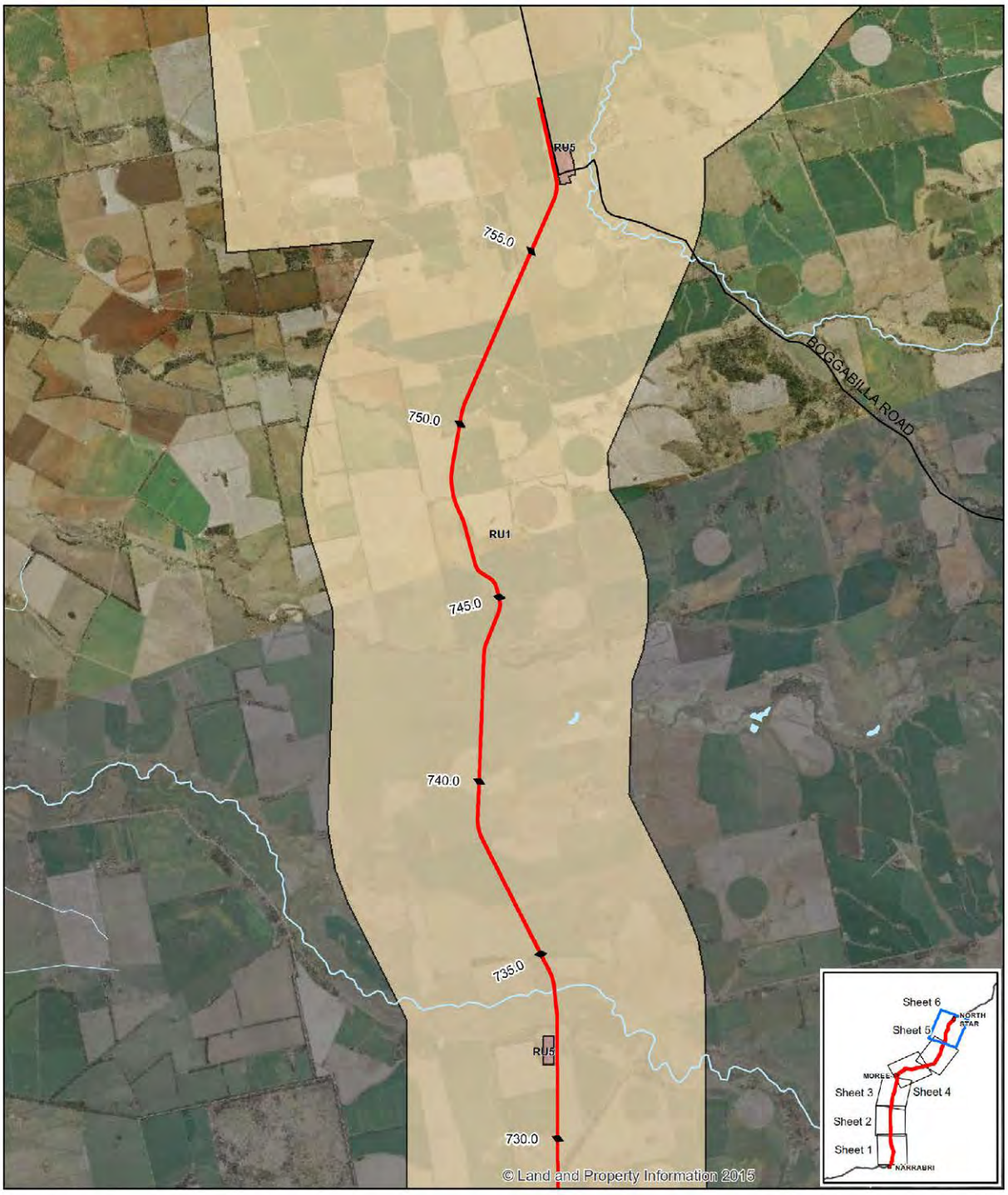

LEGEND

- The proposal
- Principal road
- Secondary road
- Watercourse
- Cadastre

LEP ZONING

- RU1 Primary Production
- RU5 Village

Paper Size A4

0 0.5 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Inland Rail- Narrabri to North Star

Job Number 22-17916
Revision 0
Date 03 May 2017

Land Use

Figure 6f

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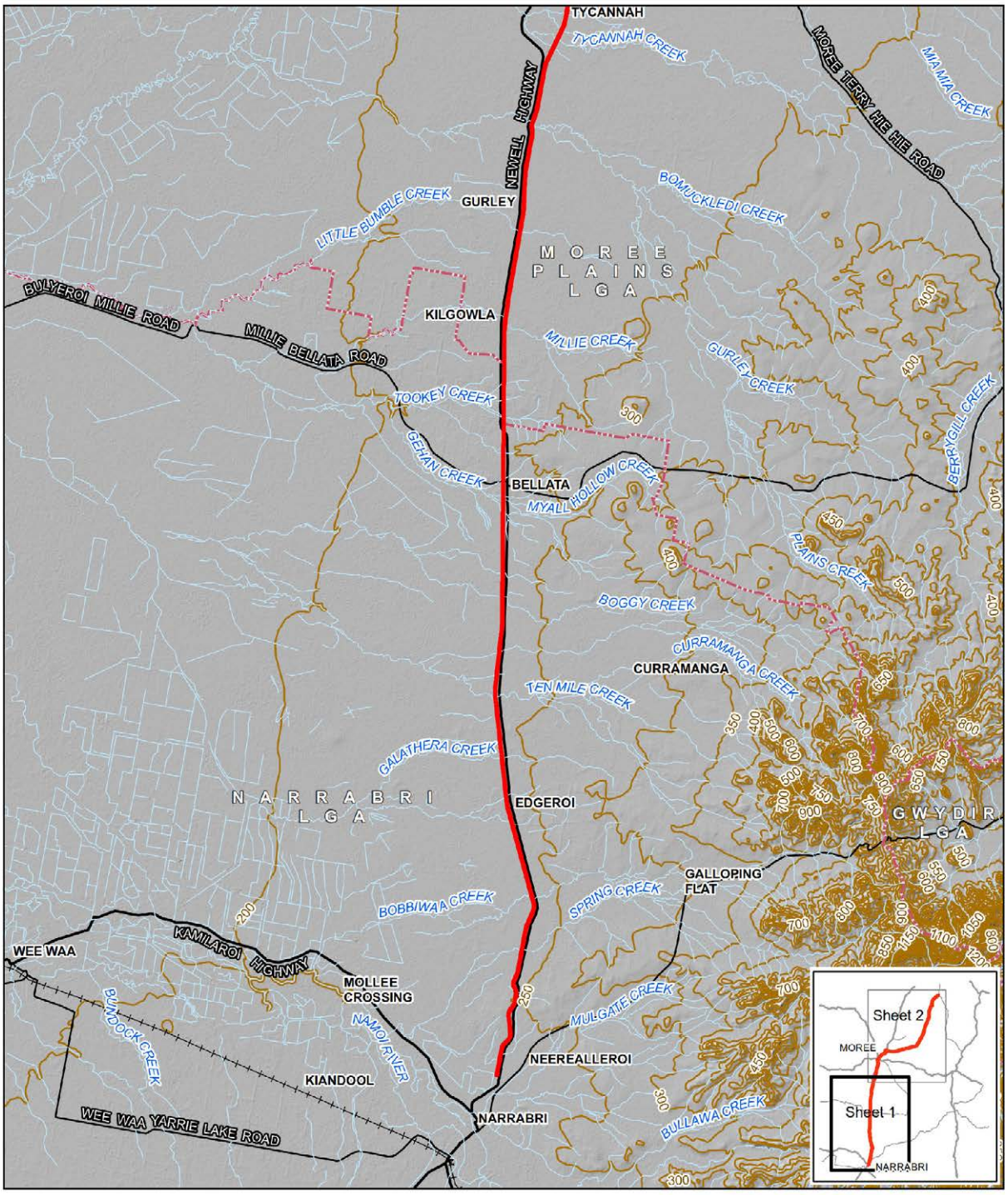

LEGEND

- The proposal
- Local Government Area
- Principal road
- Secondary road
- Railway
- Watercourse

Paper Size A4

0 1.5 3 6 9 12

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 03 May 2017

Topography

Figure 7a

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com.au

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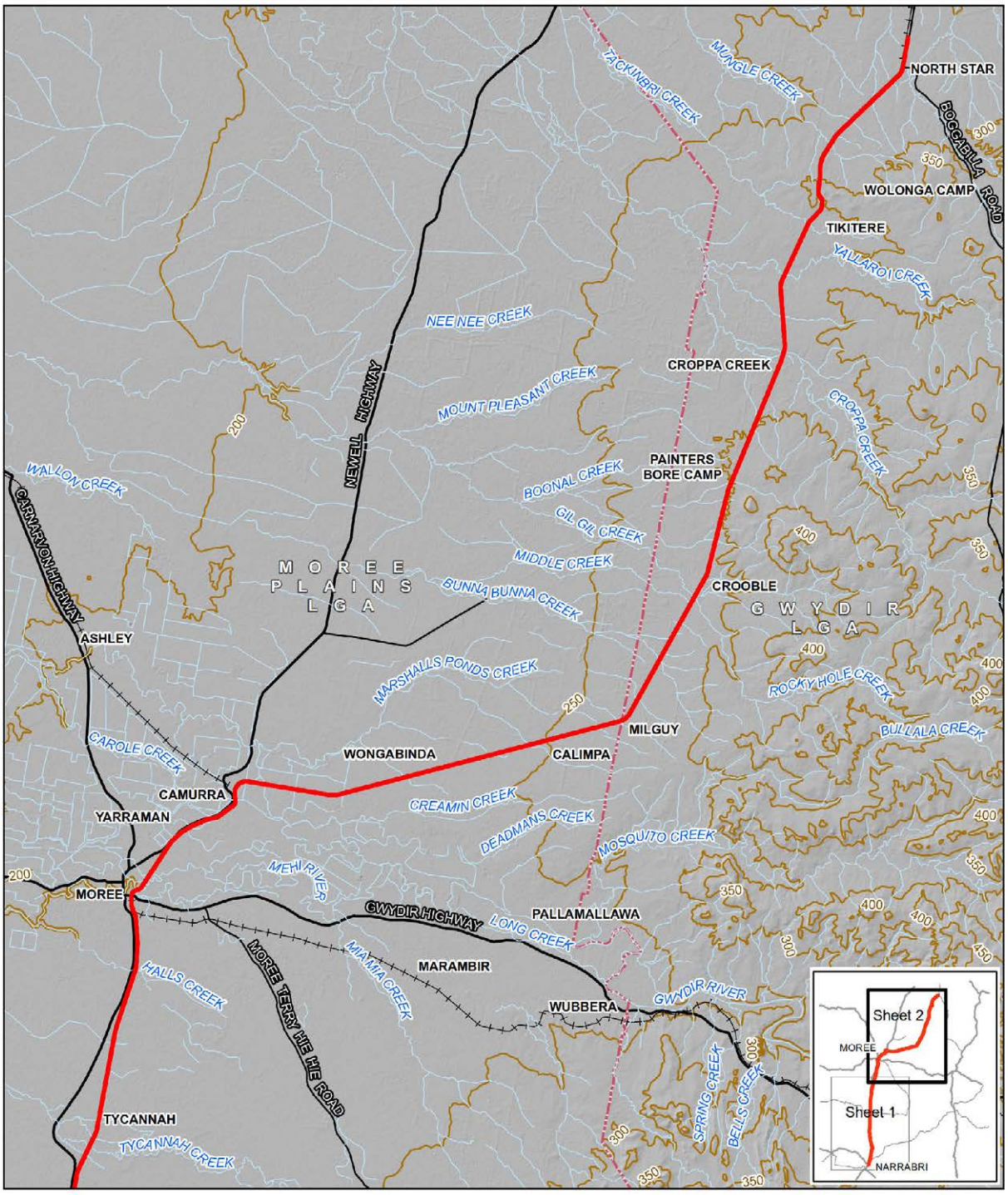

LEGEND

- The proposal
- Local Government Area
- Principal road
- Secondary road
- Railway
- Watercourse

Paper Size A4

0 1.5 3 6 9 12

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

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Topography

Figure 7b

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

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Data source: Commonwealth of Australia (Geoscience Australia), 250K Topographic Data Series 3, 2006. Created by: gmcdiarmid

5.4 Landscape character zones

This section identifies and describes the landscape character zones for the proposal site and assesses the ability of the landscape character zones to absorb the proposal within the existing landscape setting.

There are two primary landscape character types comprising Settlement and Agricultural Landscape Character Zones identified within the proposal site. These primary character zones have been further analysed into sub-character units which are illustrated in ***Figure 8***. The landscape character for each sub-character unit has been identified and assessed within the one kilometre zone of visual influence using the following characteristics:

- land use and built form
- topography and landform
- vegetation patterns
- natural elements
- cultural elements
- national, regional and local landscape significance.

FIGURE 8 – LANDSCAPE CHARACTER PLAN

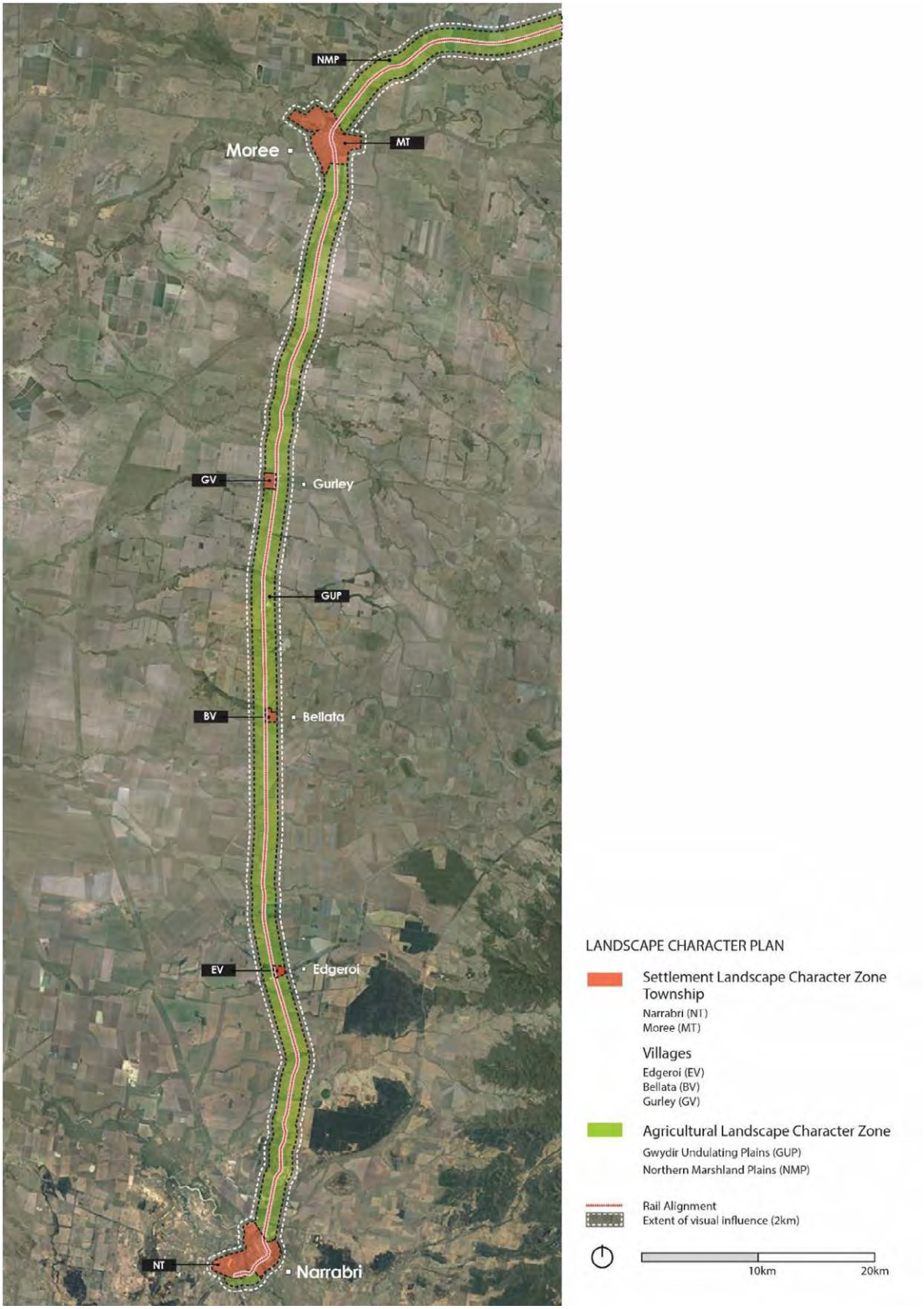


FIGURE 8 cont.

LANDSCAPE CHARACTER PLAN

Settlement Landscape Character Zone

Villages

Croppa Creek (CCV)
North Star (NSV)

Agricultural Landscape Character Zone

Northern Marshland Plains (NMP)

Rail Alignment
Extent of visual influence (2km)

10km 20km

5.4.1 Settlement landscape character zone

5.4.1.1 Township

Located within the Narrabri to North Star section of the proposal are two townships, Narrabri and Moree.

Narrabri, with a population of 5,890 (2011), sits at the southern end of the proposal site. Existing rail infrastructure skirts the township creating an edge between the buildings and the agricultural land. The buildings then continue towards the south west, divided by Narrabri Creek which is a significant landscape feature within the township. The waterways that break the gridded layout of the township are typically lined with trees.

Narrabri Lake is located close to the western edge of the township. It is surrounded by open space, including Gately Field, Cooma Oval, Narrabri Paceway and Reservoir Park. There are also other significant open spaces located throughout Narrabri including Narrabri Golf Club, Collins Park and Narrabri Racecourse.

The density of street tree planting varies, but is typically sparser in the eastern parts of the township (See **Picture 4**).

PICTURE 4 – NARRABRI TOWNSHIP

Moree, with a population of 9,346 (2011), is located just over 100 kilometres north of Narrabri. The existing rail infrastructure enters the township and is initially bordered by light industrial and residential uses before crossing the large public recreational spaces, comprising of a golf course, showgrounds and racecourse, within the town centre. On leaving the township, the alignment then skirts larger lot residential areas before traversing primary production land.

The township has a gridded street layout and is divided by the Mehi River, a significant landscape feature within the township. The Mehi River extends east to west through the township, resulting in northern and southern settlements. The planting of trees along the Mehi River embankment is relatively dense and adds significant character to the area.

The township has wide nature strips with street trees planted right up to the road edge (see **Picture 5**).

The rail bridge crossing the Mehi River has historical significance. It runs parallel to the Newell Highway and although surrounded by dense tree planting is still visually significant in the landscape.

PICTURE 5 – MOREE TOWNSHIP

5.4.2 Village

Three villages are located between Narrabri and Moree. These are, in order from south to north, Edgeroi, Bellata and Gurley.

Edgeroi is a small village servicing the local farming community and is home to a now disused railway station (NSWrail). The village is located to the east of the existing railway line and the Newell Highway. Agriculture is the primary activity in the region. Trees are sparsely scattered throughout the settlement while denser areas of trees are located to the north west of the village. Refer to **Picture 6**.

PICTURE 6 – EDGEROI VILLAGE

Bellata is a village located within a large area of primary production to the east of the Newell Highway and railway line. To the west is infrastructure associated with primary production and light industrial uses including a petrol station (see **Picture 7**). Within the developed area, trees are typically sparse but increase in density to the north west of the village in the vicinity of Millie-Bellata Road.

PICTURE 7 – BELLATA VILLAGE

Gurley is a small village which incorporates a hotel, small petrol station and other limited service related uses. It is located to the west of the railway line, separated from the Gurley Silo to the east (see **Picture 8**). The village is located within an agricultural landscape. Trees are limited throughout the village, apart from a small cluster to the south west.

PICTURE 8 – GURLEY VILLAGE

To the north of Moree are the villages of Croppa Creek and North Star.

Croppa Creek once had a functioning railway station, but the siding is now only used as a seasonal freight loading point. The area surrounding Croppa Creek, including Crooble, has a population of 188 (2006).

North Star, located at the northern extent of the proposal site, has a surrounding population of 327 people (2006 census). The population of the village is about 50 people.

Both Croppa Creek and North Star are surrounded by agricultural land.

5.4.3 Agricultural landscape character zone

5.4.3.1 Gwydir Undulating Plains

The Gwydir Undulating Plains lie between Narrabri to Moree, are bordered by primary production land and centrally traversed by the railway alignment.

The landscape to the north of Narrabri ranges in elevation from between 300 to 350 metres AHD and is comprised of sloping plains and undulating terrain. Further to the north towards Edgeroi, the terrain rises and falls with radiating, finger-like ridges spreading across the landscape. From Edgeroi to Bellata the landform is typically flat, ranging from 220 to 260 metres AHD, with a slight decrease in elevation at Bellata. The character throughout this area consists of westward sloping plains with intermittent creek channels. In the vicinity of Gurley and Moree, the elevation gradually decreases in elevation and the landform is flat to slightly undulating, as seen in ***Picture 9***.

PICTURE 9 – FLAT TO SLIGHTLY UNDULATING TERRAIN BETWEEN BELLATA AND GURLEY

From Narrabri to Moree, the majority of the land between the villages is agricultural, with the occasional residential dwelling, warehouse, shed/ silo and similar agriculture related infrastructure dispersed across the landscape.

North of Narrabri, open grasslands extend across shallow slopes with occasional trees, typically Eucalyptus species. Where the rail corridor crosses Spring Creek and Ten Mile Creek, between Narrabri and Bellata, the vegetation becomes denser. River red gums, river oaks and river paper-barks characteristically line the deeper main channels and waterways. Extending beyond this area are open grassland plains.

Surrounding Edgeori and Gurley are open landscapes, with some scattered shrubs and trees (see ***Picture 10***). However, the landscape has been predominately cleared for crops and grazing.

Bellata is located between Edgeori and Gurley. The landscape is primarily open grassland (***Picture 11***) with patches of Bimble Box (*Eucalyptus populnea*). A dense coppice of trees line the Newall Highway between Bellata to Kilgowla, which, compared to scattered trees in other landscape character zones, creates a distinctive feature in the landscape.

PICTURE 10 – SCATTERED SHRUBS BETWEEN GURLEY AND MOREE

PICTURE 11 – BELLATA OPEN GRASSLANDS

Floodplains and channels cross the landscape between Narrabri and Moree. North of Ten Mile Creek to the Mehi River, meandering intermittent channels, varying in width from 5 to 10 metres, regularly traverse the proposal site.

5.4.3.2 Northern Marshland Plains

The proposal centrally traverses the Northern Marshland Plains, which are located between Moree and North Star. They are bordered by agricultural land.

Between Moree and North Star, the landscape is comprised of westward sloping plains crossed by intermittent waterways before transitioning from Gwydir Alluvial plains, channels and floodplains into the Croppa Clay Plains (Mitchell 2002) in the area surrounding Wongabinda, Calimpa and Milguy. The landform is typically level to gently undulating, see ***Picture 12***. Throughout this area, the elevation ranges between 275 and 230 metres AHD. The landform remains typically flat with elevation gradually increasing towards Crobble.

Between Crobble and Croppa Creek, the rolling hills and downs of Strathmore Sandstones (Mitchell 2002) rise to an elevation of 250 to 400 metres AHD. An undulating landform results from the channels, terraces and lagoons running through the floodplain landscape. Towards North Star, the elevation reduces to between 275 to 200 metres AHD.

PICTURE 12 – NEAR LEVEL TO GENTLY UNDULATING TERAIN

The landscape from Moree to North Star comprises dense areas of woodland lining the Mehi River (See ***Picture 13* and 14**) and associated tributaries. Typical species present include Bimble Box (*Eucalyptus*

populnea) and Belah (*Casuarina cristata*). Further to the north-east are expansive grasslands with patches of Myall (*Acacia pendula*) and rosewood (*Alectryon oleifolium*). However, the majority of the landscape has been extensively cleared.

Croppa Creek and most waterways intercepting the proposal are lined by a narrow band of River Red Gum (Eucalyptus camaldulensis) with surrounding Myall (Acacia pendula), Rosewood (Alectryon oleifolium) and Belah (Casuarina cristata) woodlands. Dense woodland surrounds the western, northern and eastern boundaries of the village of Croppa Creek, creating a distinctive feature in the landscape.

PICTURE 13 – DENSE VEGETATION LINING THE MEHI RIVER

PICTURE 14 – DENSE VEGETATION LINING THE MEHI RIVER

5.5 Absorptive capability

The absorptive capability relates to the ability of the landscape character zones to absorb the proposal within the existing landscape setting. Opportunities for screening the proposal within the landscape through vegetation, undulating landforms and integration within previously modified settings are considered in determining the absorptive capability level.

Table 4 outlines the absorptive capability of each landscape character zone to accommodate the proposal.

TABLE 4 – ABSORPTIVE CAPABILITY OF THE LANDSCAPE CHARACTER ZONES

LANDSCAPE CHARACTER ZONE	ABSORPTIVE CAPABILITY	COMMENT
Settlement landscape character zone		
Township	High	The flat topography, built form and street trees associated with the urban fabric and residential canopy coverage provide opportunities for changes to be absorbed in the existing landscape setting. The proposal includes the removal of the existing bridge over Mehi River and replacement of a new bridge structure in the same location, and the Jones Avenue overbridge at Moree. These components of the proposal would be viewed within the context of the wider landscape setting.
Village	High	The flat topography in conjunction with built form and the canopy coverage provided by street trees provide opportunities for change to be absorbed within the existing landscape setting. The proposal would increase the height of the existing railway tracks by only 200-400 millimetres. This small degree of change would be difficult to perceive within the wider landscape setting.
Agricultural landscape character zone		
Gwydir Undulating Plains	Moderate to High	The landscape is comprised primarily of low lying, open grassland plains with limited tree cover. The proposal would increase the height of the existing railway tracks by only 200-400 millimetres. This small degree of change, as well as the new crossing loops adjoining existing railway infrastructure, would be difficult to perceive within the wider landscape setting. The proposed Newell Highway overbridge is located in the one area within the landscape zone that has tree cover. The trees would screen views to the elevated overbridge, absorbing the associated change to the landscape setting.
Northern Marshland Plains	Moderate to High	The landscape is comprised primarily of low lying, open grassland plains with limited tree cover. The proposal would increase the height of the existing railway tracks by only 200-400 millimetres. This small

LANDSCAPE CHARACTER ZONE	ABSORPTIVE CAPABILITY	COMMENT
		degree of change would be difficult to perceive within the wider landscape setting

6 Visual assessment

The following section outlines the visual impact of the proposal and tables the findings of the whole of route visual impact assessment with associated mapping. A discussion of these results is undertaken in ***Section 7***.

6.1 Determining the visual impact

The process that has been applied to the assessment of visual impacts is consistent with the methodology as described in ***Section 2*** and involves the following tasks:

- Identify high sensitivity viewing locations for each kilometre length. These are typically rural residences, townships and villages, highways and local roads.
- Determine the distance between each closest sensitive viewing location and the proposal.

Ascertain the level of visual sensitivity for the viewing location by applying land use and distance (refer to **Table 2**). Record the visual sensitivity of the highest rating viewpoint (the most sensitive) in order to determine the visual impact.

Assess the type of vegetation cover within the proposal site for each kilometre length (chainage) and check the extent of development existing within the proposal site to determine the development condition (refer to ***Figure 4***). Ascertain the visual modification rating by applying the viewing angle and minimum distance between the most sensitive view point and the proposal to the development condition (refer to tables within **Figure 4**).

Ascertain the visual impact for that particular kilometre of the proposal alignment by combing the visual modification rating with the visual sensitivity rating, consistent with ***Table 2***. Where the sensitivity and modification ratings are identical for consecutive kilometre lengths of the proposal alignment the lengths have been assessed together. In most cases, rural residences have been assessed separately.

6.2 Visual impact assessment

The following section outlines the visual assessment results. ***Table 5*** records the findings of the visual assessment for each chainage length (chainage runs) from south to north.

Figure 9 and ***Figure 10*** depict the chainage, modification condition and viewpoints (and the uses associated with these viewpoints) for the length of the proposal.

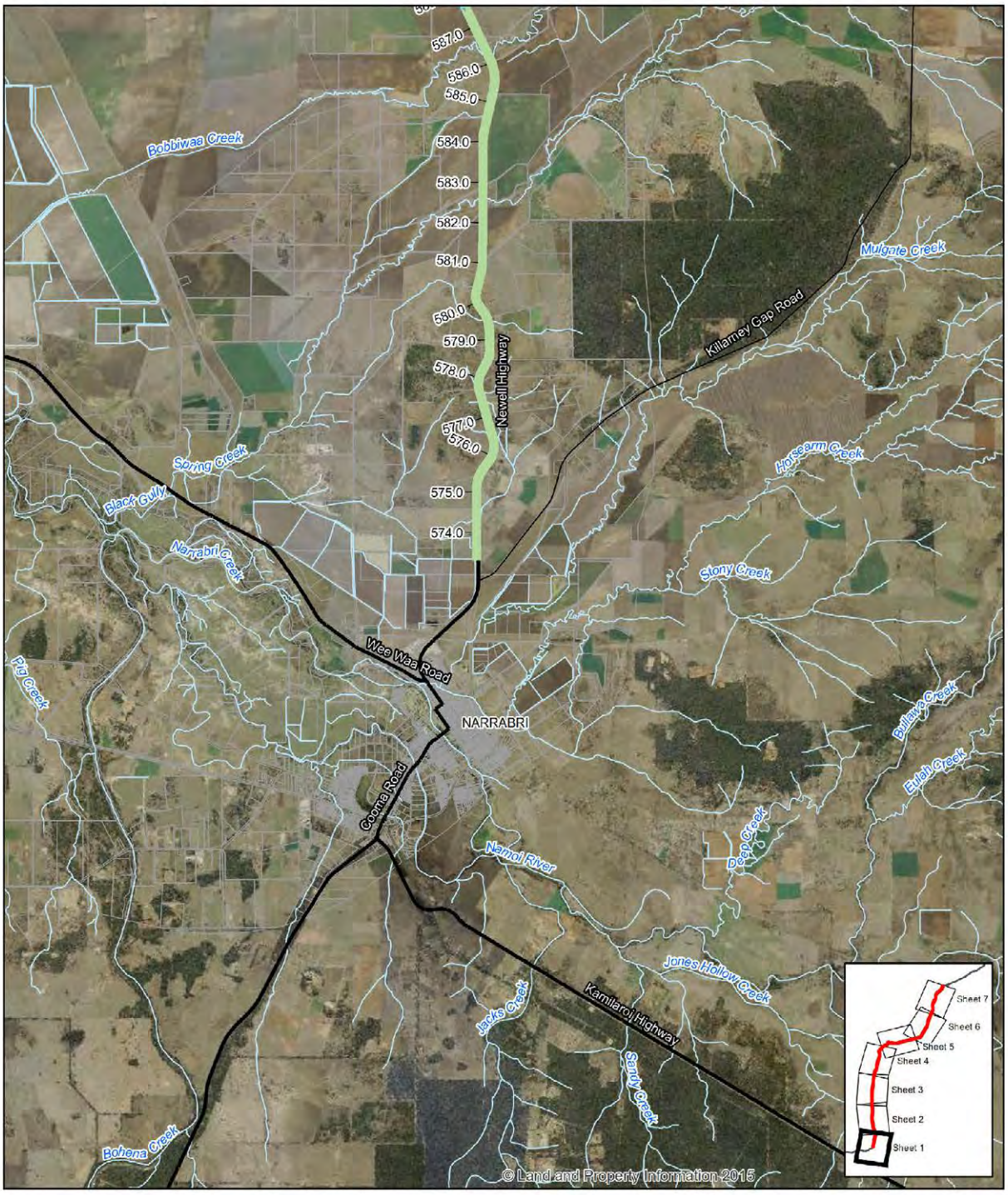
TABLE 5 – SUMMARY OF VISUAL IMPACTS

Chainage (km)	Development Condition #	Distance to most sensitive viewpoint	Most Sensitive Viewpoint	Level of visual modification	Visual sensitivity	Visual impact	Comments
573.3 - 580.5	4	0.16km, 0.10km, 0.30km, 0.55km, 0.45km, 0.35km, 0.22km,	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
580.5 - 585.5	4	0.04km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
585.5 - 587.5	4	0.50km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
587.5 - 590	3	0.02km	Newell Highway	M-H	M	M-H	Crossing loop at Bobbiwaa
590 - 591.5	4	0.35km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
591.5 - 593	4	0.03km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
593 - 602	4	0.04km - 0.5km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
602 - 608.5	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
608.5 - 610	4	0.75km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
610 - 612	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
612 - 618.5	4	0.10km - 1.0km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
618.5 - 620.5	1	0.30km	Residential / Homestead	H	H	H	Newell Highway overbridge; removal of vegetation' cross over. (Refer to Appendix A, Figure 1, Photos A1 & A2)
620.5 - 621	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
621 - 623	4	0.17km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
623 - 624	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
624 - 625	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
625 - 627	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
627 - 628	4	0.90km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
628-630.5	3	0.06km	Newell Highway	M-H	M	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
630.5 - 633.5	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
633.5 - 637	4	0.10km - 0.60km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
637 - 642	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
642 - 644.5	4	0.70km, 0.30km, 0.65km, 1.00km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
644.5 - 646	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
646 - 648	4	0.46km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
648 - 653	4	0km	Rural Road	L	L	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
653-655.5	3	0km	Agricultural Area	M-H	VL	L-VL	Crossing Loop at Moree
655.5 - 656.5	4	0.9km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
656.5 - 658	4	0.40km	Newell Highway	VL	M	VL	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
658 - 660.5	4	0.16km, 0.20km, 0.90km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
660.5 - 662.5	4	0.05km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
662.5 - 664	4	0.10km - 1.0km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
664 - 665.5	2	0.20km	Residential / Homestead	H	H	H	Jones Street overbridge. (Refer to Appendix A, Figure 5, Photos A7 & A8)
665.5 - 666.5	4	0.10km - 1.0km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
666.5 - 667	5	0.06km - 1.0km	Residential / Homestead	H	H	M	Reinstated bridge over Mehi River. (Refer to Appendix A, Figure 3, Photos A4)
667 - 670.5	4	0.10km - 0.80km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre

Table 5 cont.

670.5 - 674.5	4	0.06km	Newell Highway	L	M	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
674.5 - 676	4	0.25km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
676 - 676.5	5	0.40km	Residential / Homestead	H	H	M	Reinstated bridge over the Gwydir River. (Refer to Appendix A, Figure 2, Photo A3 and Figure 4, Photos A5 and A6)
676.5 - 678	6	0.55km	Residential / Homestead	M-H	H	H	Camurra bypass.
678 - 680	4	0.20km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
680 - 684.5	4	0km	Rural Road	L	L	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
684.5 - 686.5	4	0.20km	Rural Road	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
686.5 - 693	4	0km	Rural Road	L	L	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
693 - 695	3	0.50km	Local Road	M	L	L	Crossing loop at Coolleearllee
695 - 699	4	0km	Agricultural Area	L	VL	VL	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
699 - 708	4	0.23km, 0.06km, 0.80km, 0.20km, 0.60km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
708 - 715.5	4	0km	Rural Road	L	L	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
715.5 - 717.5	4	0.10km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
717.5 - 728	4	0km	Agricultural Area	L	L	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
728 - 730	4	0.30km, 0.05km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
730 - 731.5	4	0km	Agricultural Area	L	VL	VL	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
731.5 - 733.5	4	0.10km - 0.30km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
733.5 - 734	5	0.10km	Rural Road	H	L	L	Reinstated bridge at Croppa Creek.
734 - 735.5	4	0km	Agricultural Area	L	VL	VL	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
735.5 - 737	4	0.16km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
737-739.5	3	0km	Rural Road	M	L	L	Crossing loop at Croppa Creek
739.5 - 741	4	0km	Agricultural Area	L	VL	VL	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
741 - 742.5	4	0.80km	Residential / Homestead	VL	H	L	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
742.5 - 748	4	0km	Agricultural Area	L	VL	VL	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre
748 - 758	4	0km - 0.50km	Residential / Homestead	L	H	M	Culvert and track replacement generally raised between 0.3 metres and 1.0 metre

#1	Newell Highway overbridge in moderately dense woodland
#2	Jones Avenue goverbridge in urban setting
#3	New Crossing loop with no, or minimal, clearing required in lightly treed agricultural land
#4	Re-instatement of existing track through open agricultural land
#5	Demolition of existing bridge and reinstatement of new in same location, in well treed riparian setting
#6	New track alignment through open agricultural land



LEGEND

- 3- New crossing loop with no, or minimal, clearing required in lightly treed agricultural land
- 4- Re-instatement of existing track through open agricultural land
- Cadastre
- Watercourse

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD urbis

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 02 Aug 2017

Development conditions along the alignment - Sheet 1

Figure 9

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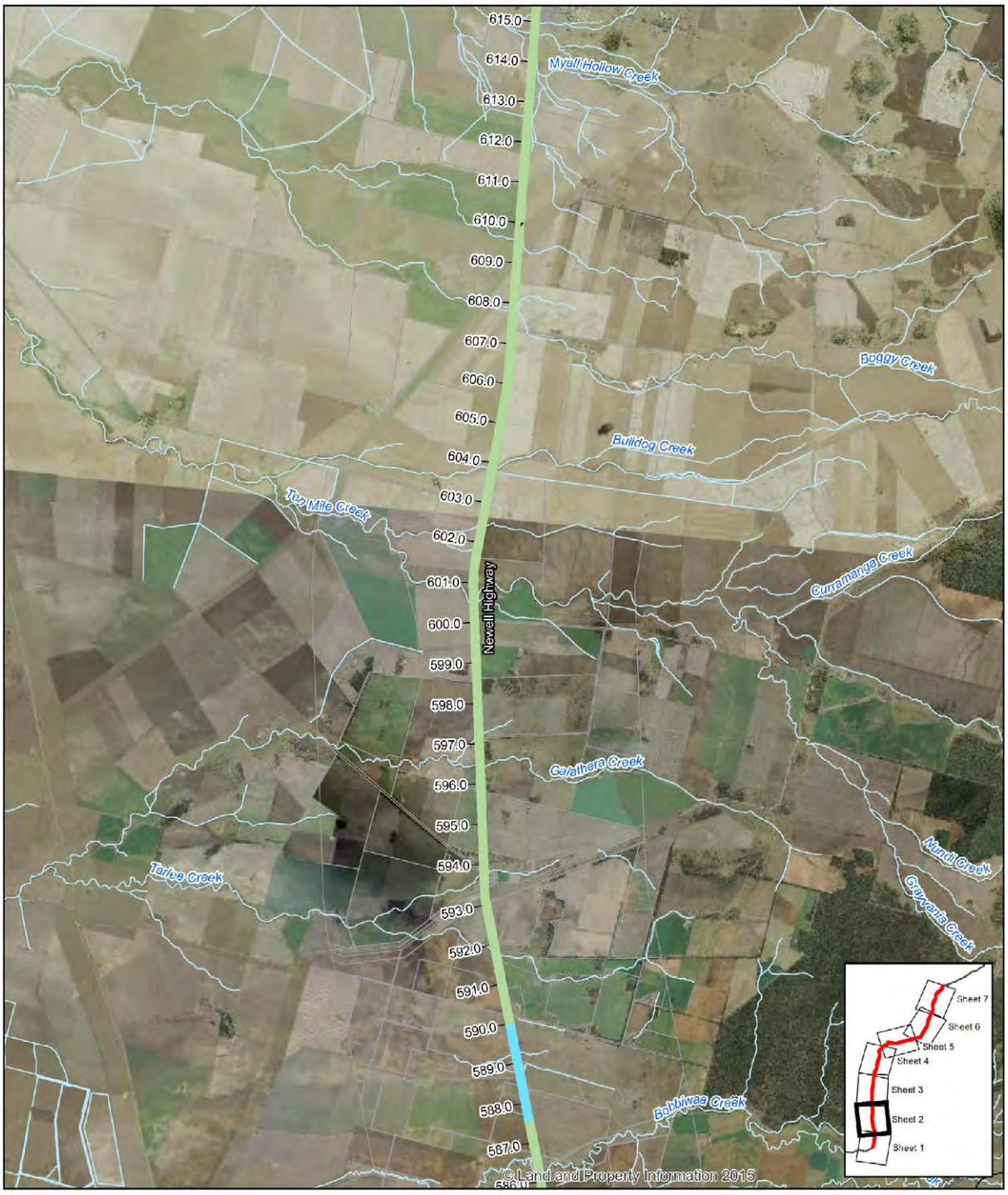
Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



LEGEND

- 3- New crossing loop with no, or minimal, clearing required in lightly treed agricultural land
- 4- Re-instatement of existing track through open agricultural land
- Cadastre
- Watercourse

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 02 Aug 2017

Development conditions along the alignment - Sheet 2

Figure 9

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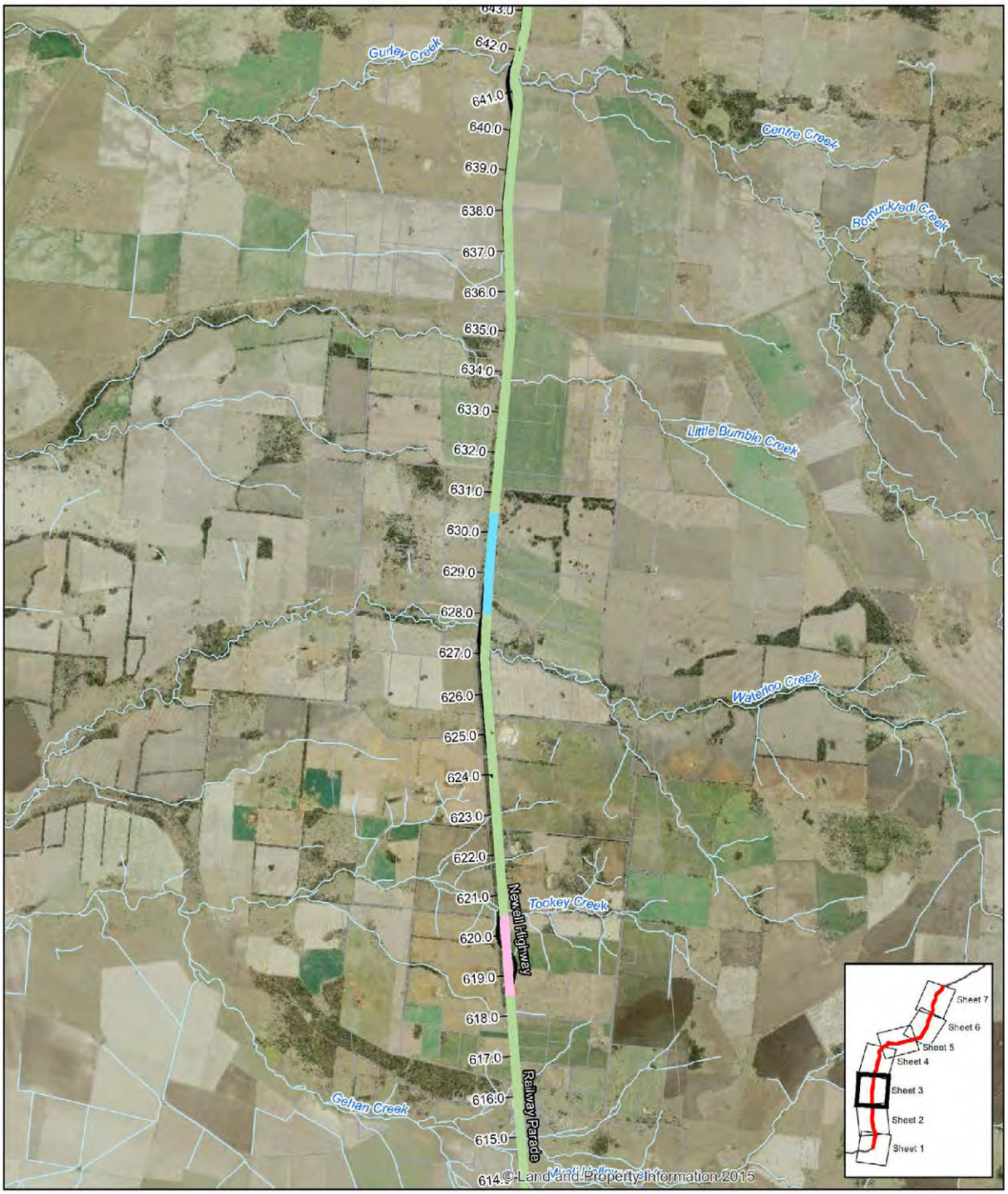
Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



LEGEND

- 1- Newell Highway overbridge in moderately dense woodland
- 3- New crossing loop with no, or minimal, clearing required in lightly treed agricultural land
- 4- Re-instatement of existing track through open agricultural land
- Cadastre
- Watercourse

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 02 Aug 2017

Development conditions along the alignment - Sheet 3

Figure 9

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Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba

LEGEND

- 2- Jones Avenue overbridge in urban setting
- 3- New crossing loop with no, or minimal, clearing required in lightly treed agricultural land
- 4- Re-instatement of existing track through open agricultural land
- Demolition of existing bridge and reinstatement of new in same location, in well treed riparian setting
- Cadastre
- Watercourse

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Development conditions along the alignment - Sheet 4

Figure 9

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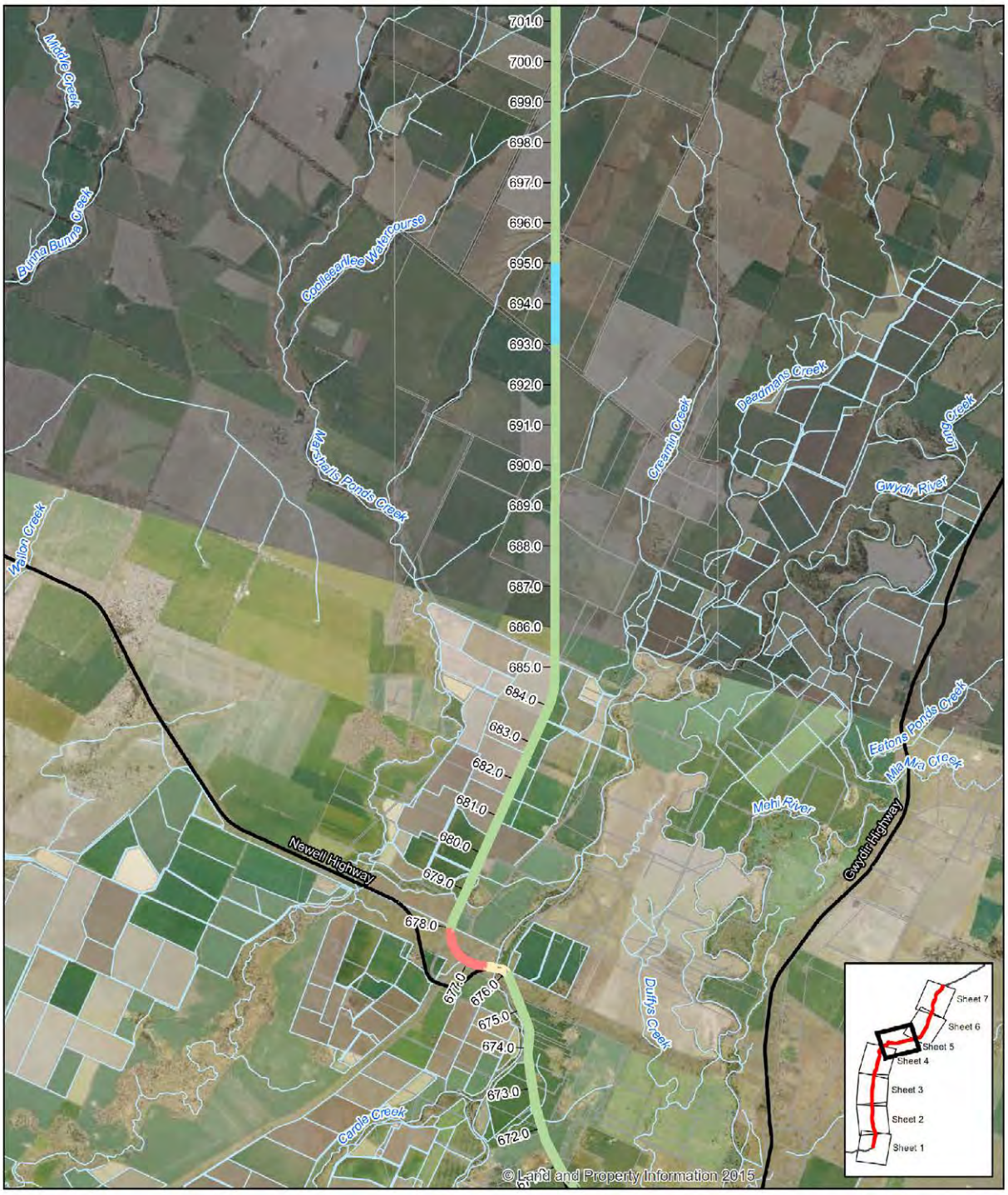

LEGEND

- 3- New crossing loop with no, or minimal, clearing required in lightly treed agricultural land
- 4- Re-instatement of existing track through open agricultural land
- Demolition of existing bridge and reinstatement of new in same location, in well treed riparian setting
- 6- New track alignment through open agricultural land
- Cadastre
- Watercourse

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

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Development conditions along the alignment - Sheet 5

Figure 9

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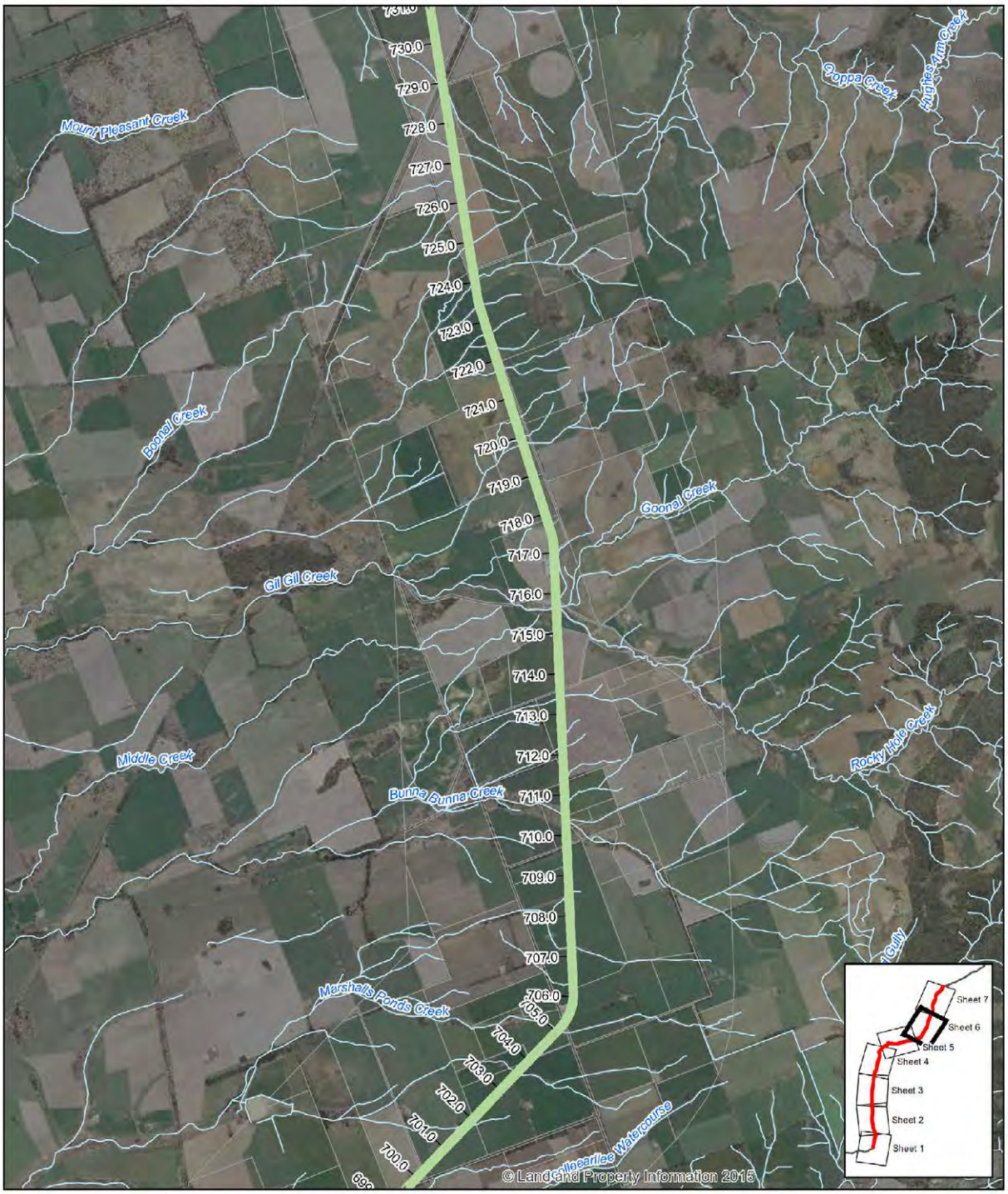

LEGEND

- 4- Re-instatement of existing track through open agricultural land
- Cadastre
- Watercourse

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 02 Aug 2017

Development conditions along the alignment - Sheet 6

Figure 9

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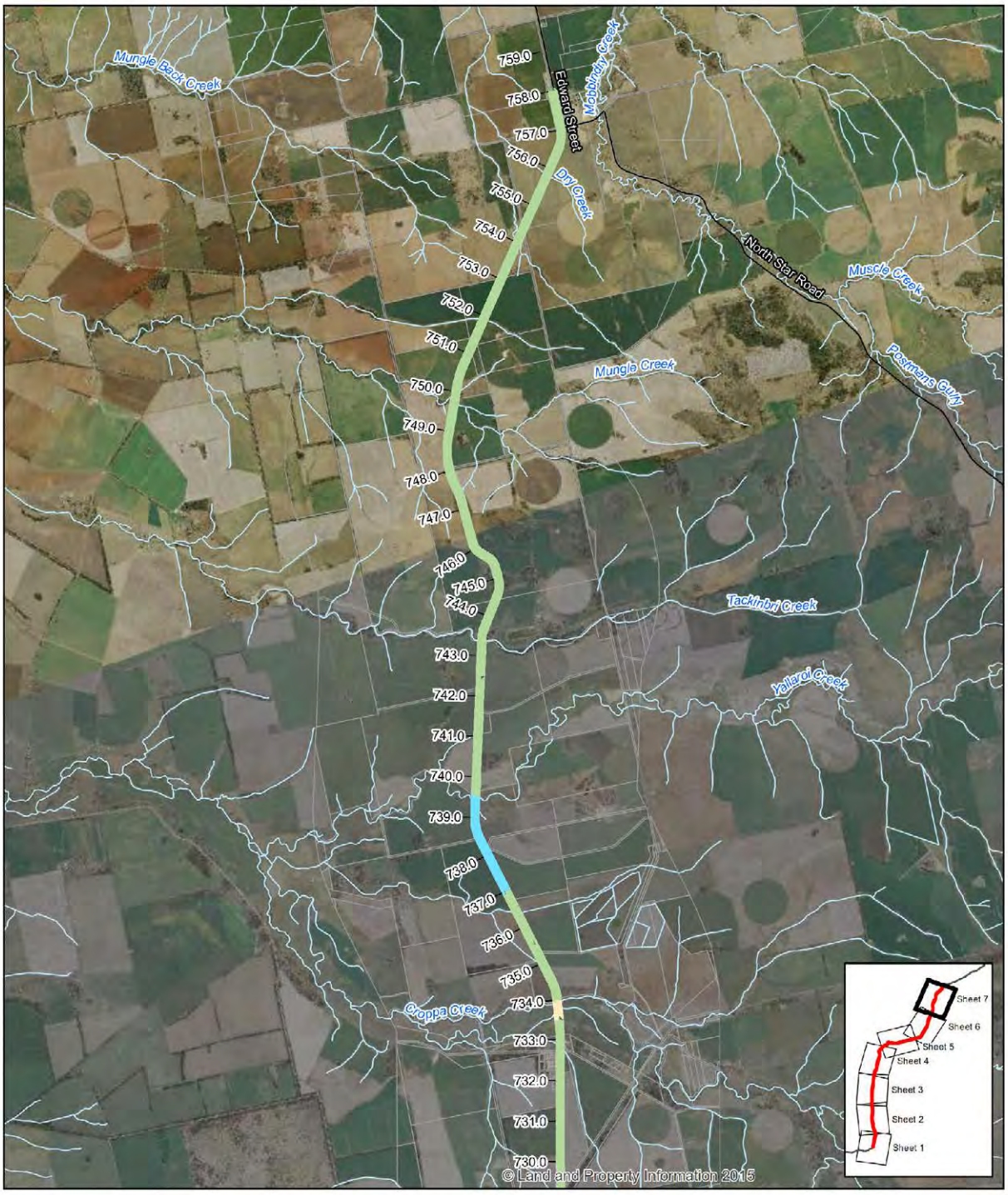

LEGEND

- 3- New crossing loop with no, or minimal, clearing required in lightly treed agricultural land
- 4- Re-instatement of existing track through open agricultural land
- Demolition of existing bridge and reinstatement of new in same location, in well treed riparian setting
- Cadastre
- Watercourse

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

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Revision 0
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Development conditions along the alignment - Sheet 7

Figure 9

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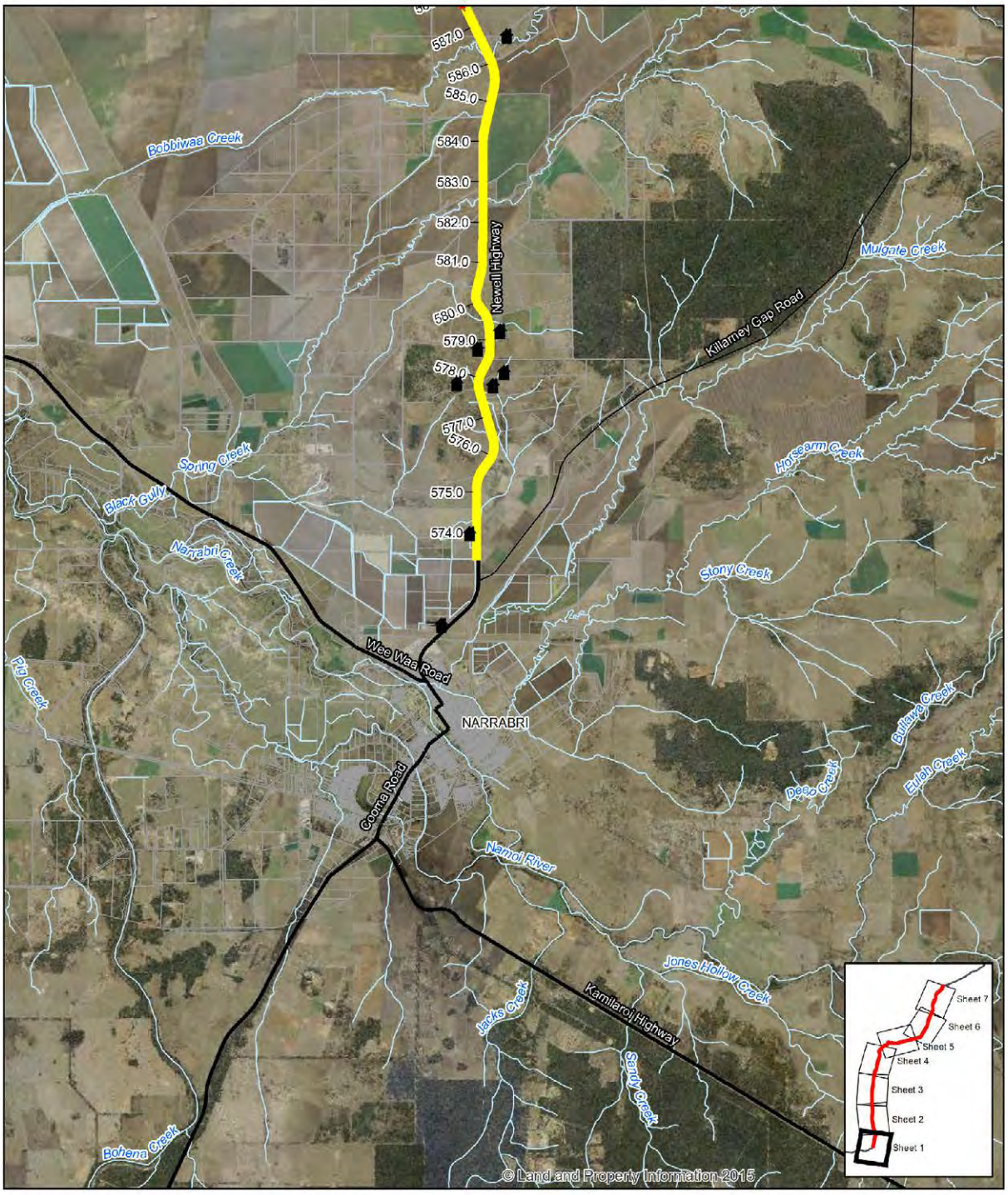

LEGEND

- Residences
- Watercourse
- H
- L
- Cadastre

Paper Size A4

0 750 1,500 3,000 4,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 01 June 2017

Visual Impact within a 1km extent both sides of the alignment - Sheet 1 Figure 10

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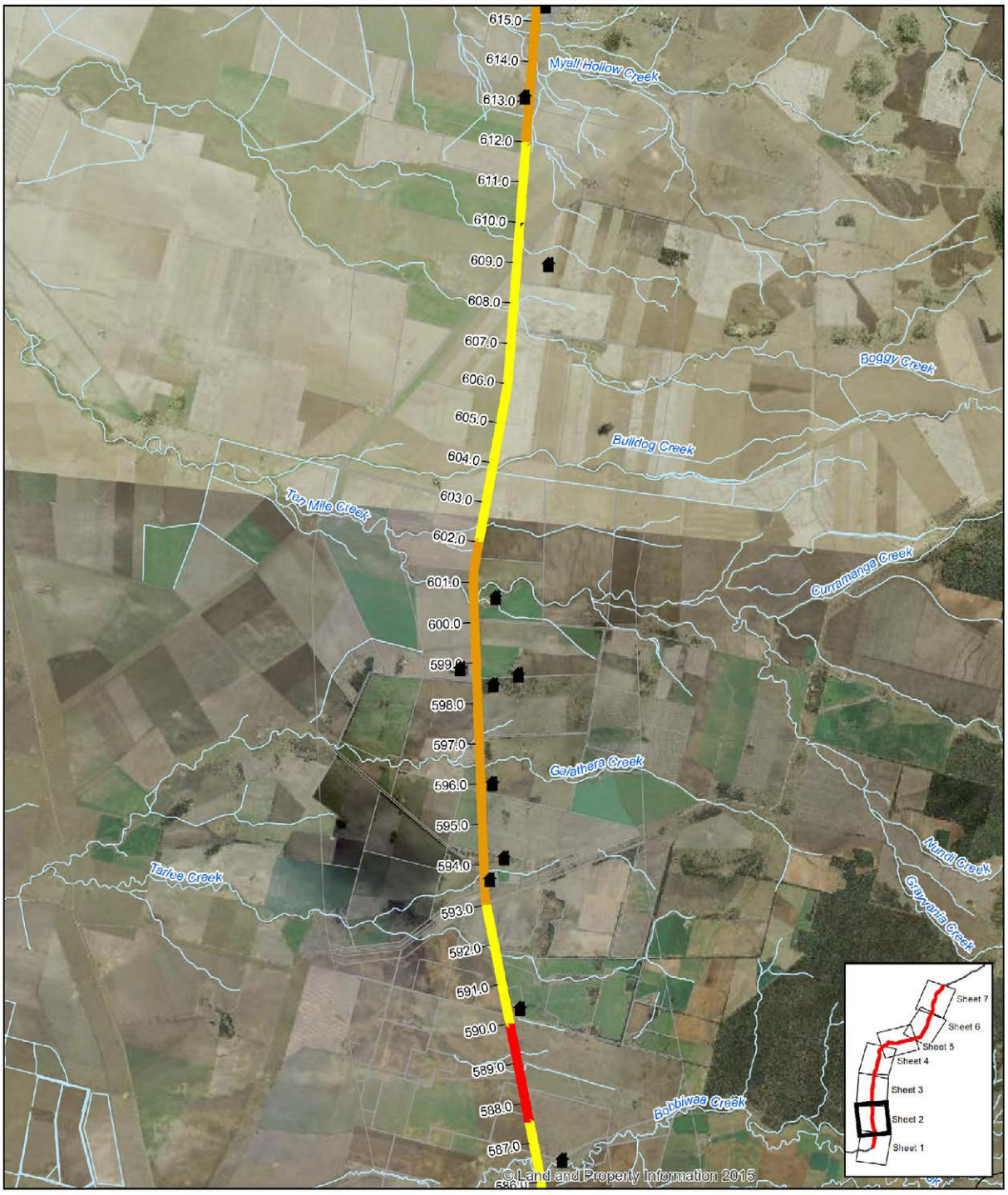
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntimail@ghd.com W www.ghd.com.au

Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 01 June 2017

Visual Impact within a 1km extent both sides of the alignment - Sheet 2 Figure 10

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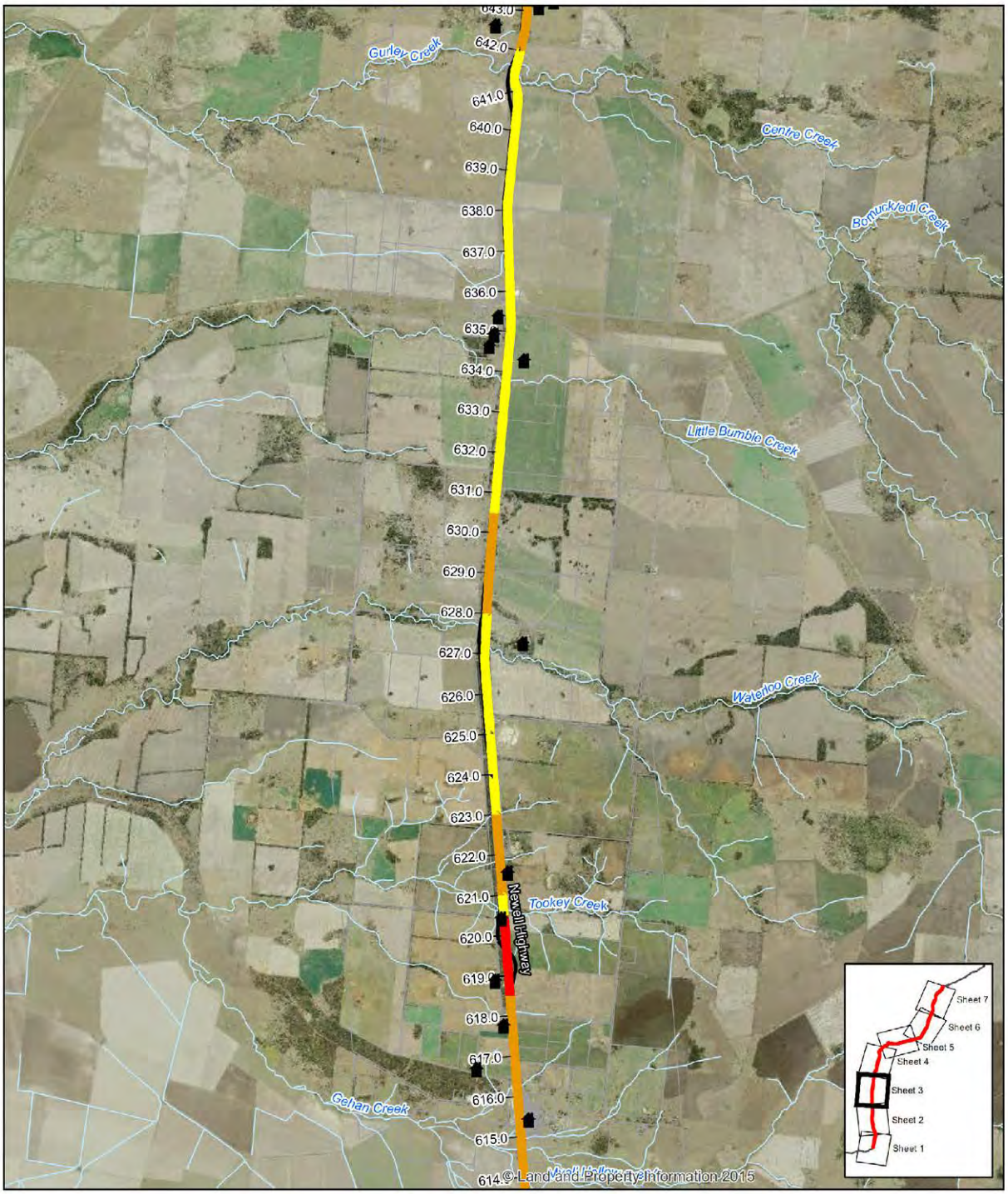
Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



LEGEND

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- Cadastre
- Watercourse

Paper Size A4

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Metres

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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
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Visual Impact within a 1km extent both sides of the alignment - Sheet 3 Figure 10

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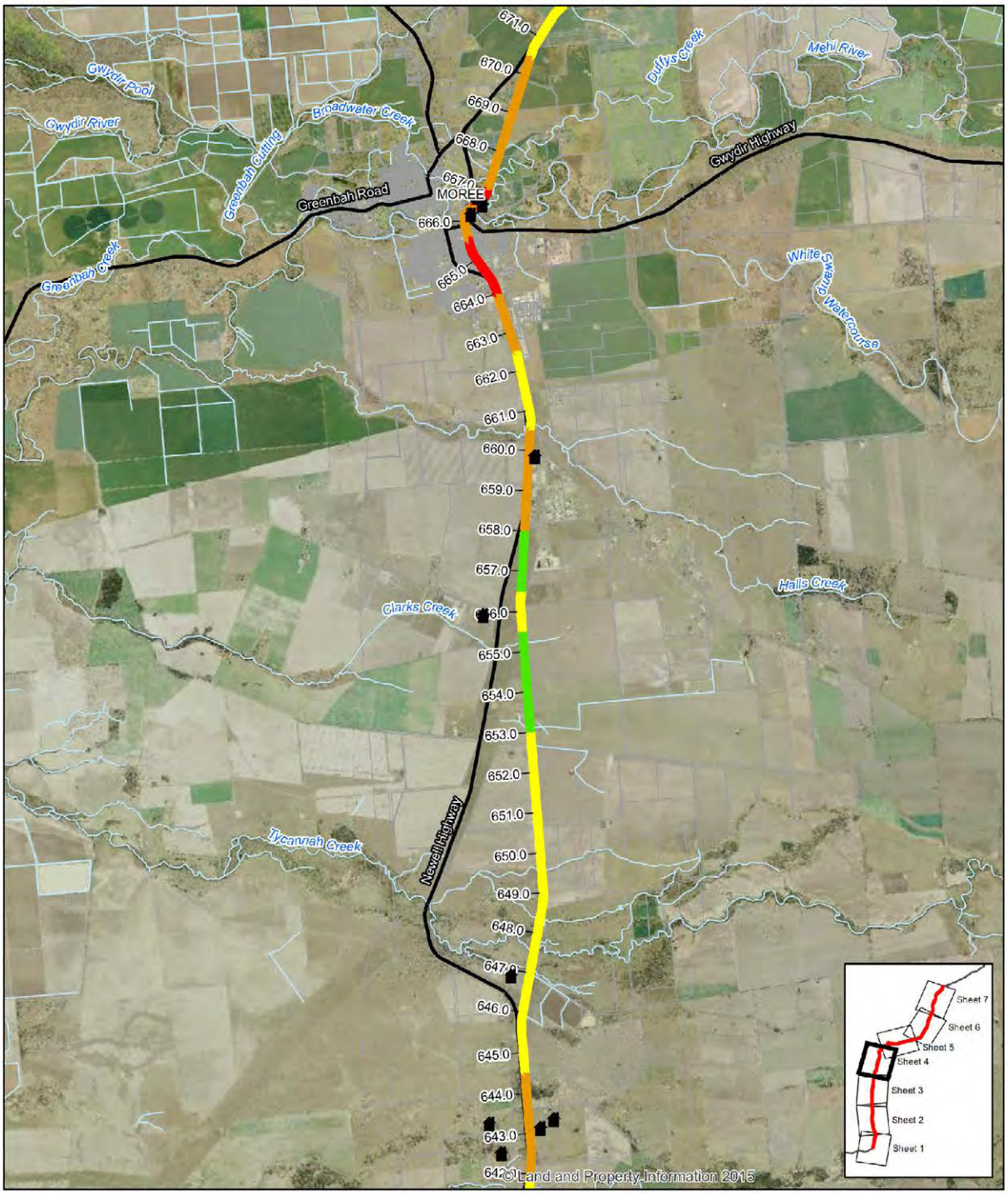
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com.au

Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



LEGEND

- Residences
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- Cadastre
- Watercourse

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

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Date 01 June 2017

Visual Impact within a 1km extent both sides of the alignment - Sheet 4 Figure 10

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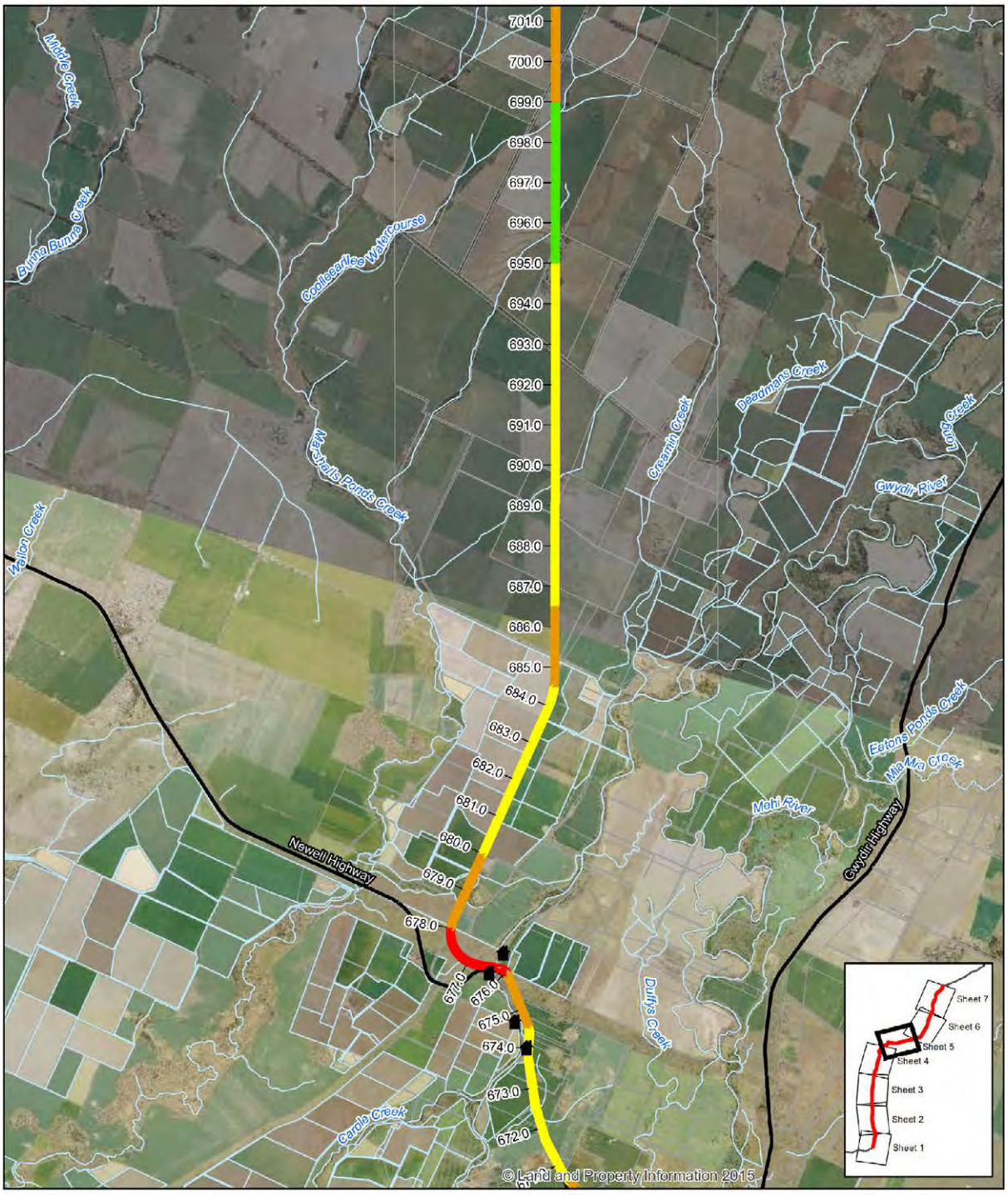
Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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Visual Impact within a 1km extent both sides of the alignment - Sheet 5 Figure 10

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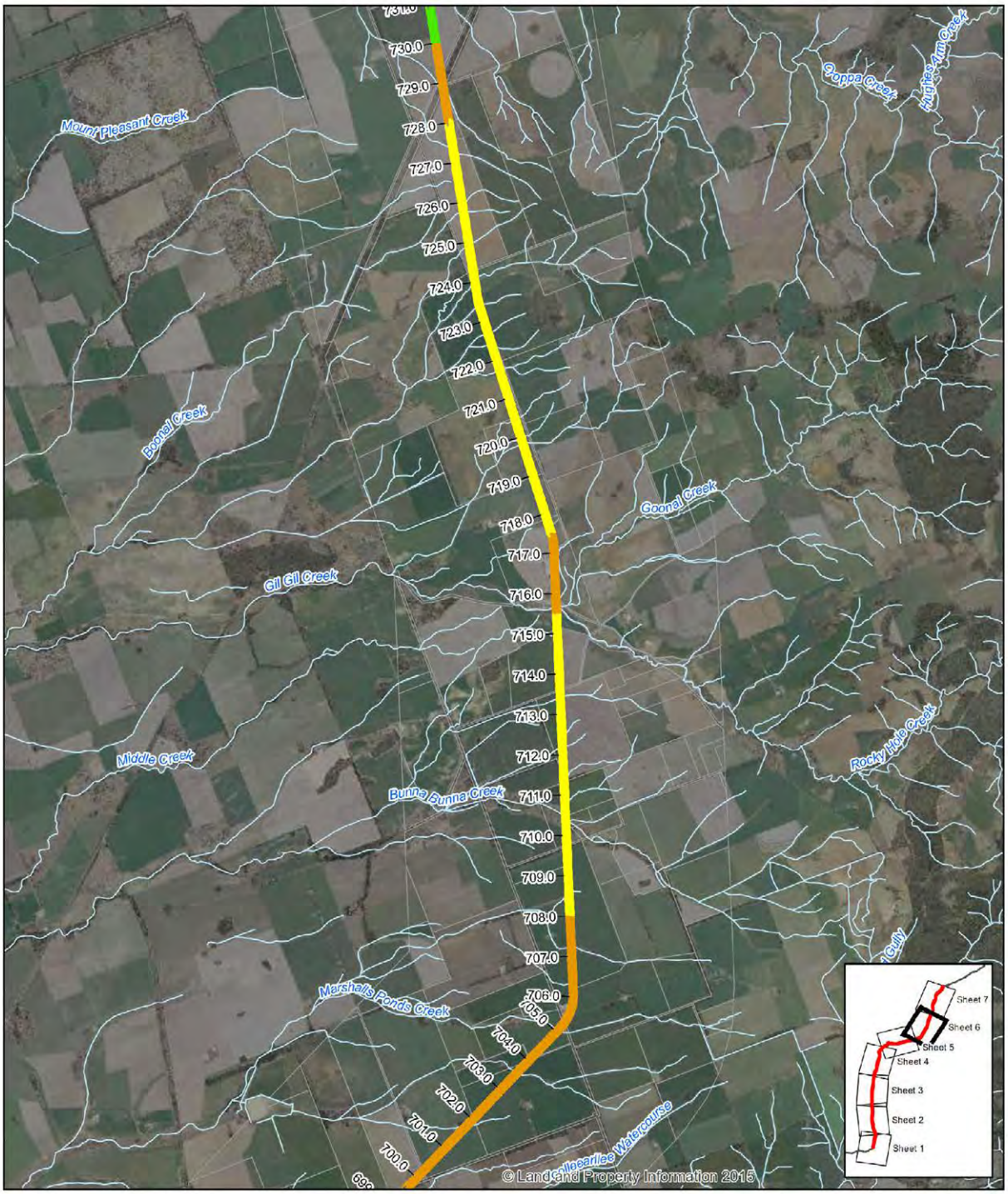
Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
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Visual Impact within a 1km extent both sides of the alignment - Sheet 6 Figure 10

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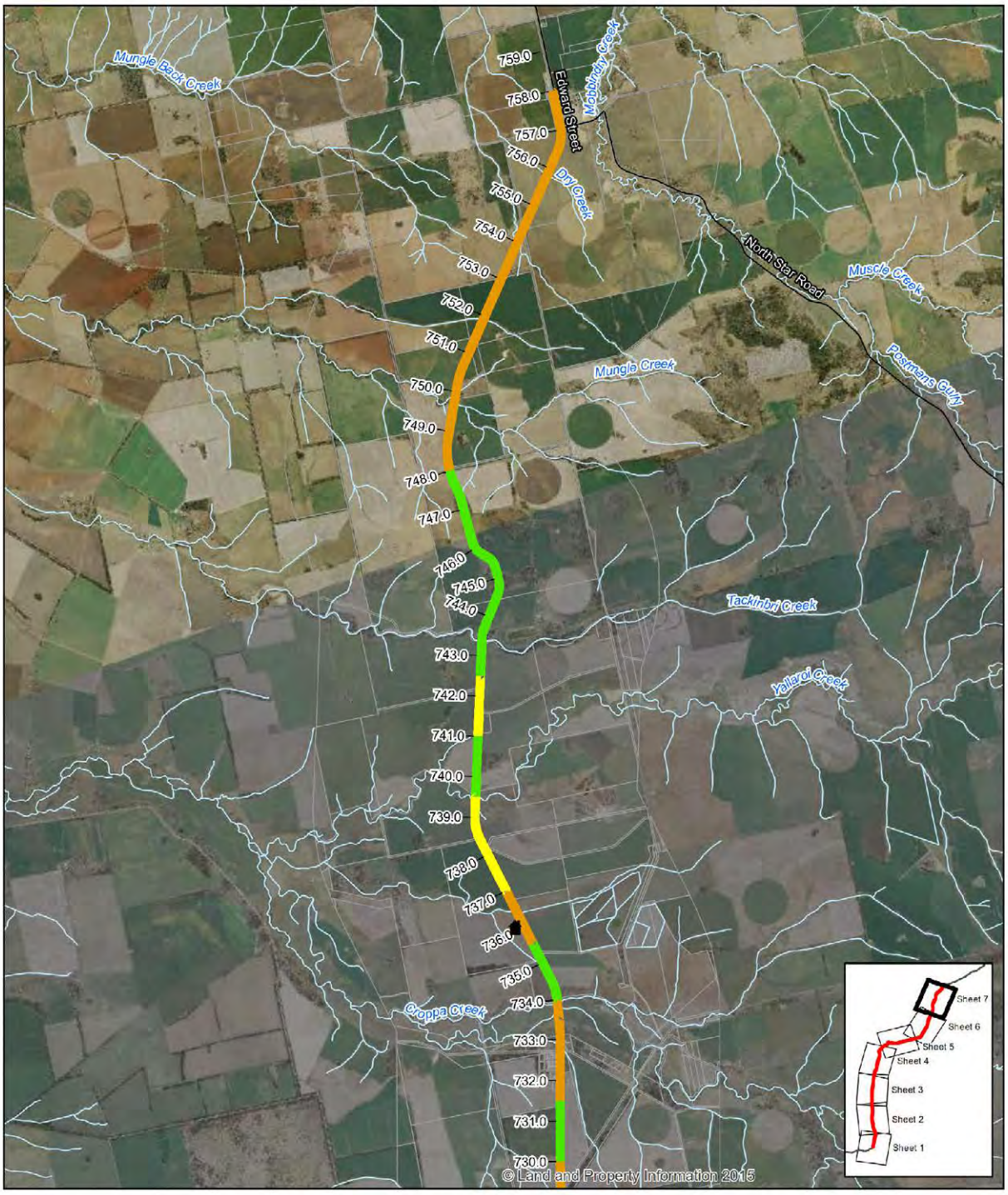
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com.au

Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba



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Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
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Visual Impact within a 1km extent both sides of the alignment - Sheet 7 Figure 10

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Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E nlmail@ghd.com W www.ghd.com.au

Data source: LPI, DCDB, Imagery, 2015. Urbis, Visual Impact, 2016. Created by: gmcdiarmid, tmorton, kpsroba

7 Discussion of proposal impact

7.1 Visual sensitivity

Whilst the proposal primarily passes through broad acre agricultural land, sparsely scattered rural residences typically result in a limited number of highly sensitive receptors being located either in the local or sub-regional settings of the proposal. Moderate sensitivity levels occur where the Newell Highway is located parallel to the proposal within the local setting as is the case for the crossing loop at Bobbiwaa.

Where the proposal passes through settlements such as Edgeroi or Gurley, there is a resulting high visual sensitivity level due to homesteads and residences being located within the local setting of the proposal. Generally, as the proposal approaches towns and villages, the density of settlement increases, and there is a corresponding increase in visual sensitivity as well as an increase in the number of sensitive viewpoints.

Between Moree and North Star the land is agricultural with fewer numbers of residences. Additionally, the Newell Highway is located away from the proposal resulting in significant extents of very low visual sensitivity areas.

North of Moree, a proposed new section of track is located within the subregional setting of a number of residences. As a result, the visual sensitivity is high.

7.1.1 Visual modification

Typically, long sections of the proposal result in a low level of visual modification due to the proposal primarily consisting of the reinstatement and replacement of existing track and culverts. However, there are isolated cases of high visual modification levels where overbridges or new track alignments or crossing loops would result in distinct visual modifications to the landscape.

The Newell Highway overbridge results in a high level of visual modification to views from the roadway, with the immediate proximity of the proposal compounded by the required clearing of trees in the moderately dense woodland setting to facilitate the works.

The Jones Avenue overbridge would result in a high visual modification as it occurs in the township of Moree, in close proximity to residential uses. Despite the overbridge being immediately surrounded by industrial uses, the structure would create a high level of visual modification due to views of the infrastructure from within the township and surrounding residents. Visualisations of the proposed overbridge at Jones Avenue are provided in **Picture 15**.

The removal of the three river crossings and replacement of new bridges in the same locations, would result in a low level of visual modification due to a ‘like for like structure’ being constructed. As such, the visual impact would result in a moderate adverse visual impact. Visualisations of the proposed bridge over Mehi River are provided in **Picture 16**.

Crossing loops generally result in a moderate-high level of visual modification where they are located parallel to the Newell Highway and are within the local setting (0-0.35 kilometres from the proposal). A moderate modification level results where the proposal intersects rural roads. Generally, the crossing loops require no, or minimal clearing as they are located in lightly vegetated agricultural land.

PICTURE 15 – VISUALISATIONS OF THE PROPOSED JONES AVENUE OVERBRIDGE

PICTURE 16 – VISUALISATIONS OF THE PROPOSED MEHI RIVER BRIDGE

7.2 Discussion of visual impact

Between Narrabri and North Star the proposal traverses agricultural land with occasional townships and settlements. Whilst a range of impacts are recorded, the overall visual impact of the proposal is generally low given agricultural areas occupy significant expanses of the proposal site.

High visual impacts occur where significant pieces of new infrastructure are proposed, such as the Newell Highway overbridge, the Jones Avenue overbridge or where change is proposed within close proximity to urban areas, such as Moree.

Moderate levels of impact occur where the alignment traverses' areas with scattered residences or settlements. The demolition and reinstatement of the existing river crossings in the same location has been assessed as having a high level of visual sensitivity but a low level of visual modification due to the replacement essentially being 'like for like'.

The overall low visual impact attributed to the proposal has been derived from the generally low level of visual modification, resulting from the majority of the changes occurring to an existing rail corridor, and the limited number of higher sensitivity viewpoints.

Views towards double stacked trains, with a height of 6.5 metres, would be experienced from both agricultural and urban areas. However, these would be transient and experienced at speeds up to 110 kilometres per hour.

During construction, the presence of spoil mounds with their raw earth coloured appearance would result in an increased level of visual modification. However, following mitigation and the establishment of a grassed covering, they are likely to contribute to visual screening of the proposal. As a result, the visual modification level would reduce and, consequently, also the level of visual impact. As the extent of spoil mounds is not as yet known, it has been assumed that they would occur along the majority of the proposal.

7.3 Discussion of landscape impacts

The existing conditions analysis of the landscape traversed by the proposal classified the main landscape types as Settlement Landscape Character Zones or Agricultural Landscape Character Zones. As the scale of settlements varies, resulting in different characters at various settlements, characters were categorised as Township, encompassing Narrabri and Moree whilst Egderoi, Bellata, Gurley, Croppa

Creek and North Star. Outside of the Settlement Landscape Character Zones, the Gwydir Undulating Plains from Narrabri to Moree, and the Northern Marshland Plains from Moree to North Star form the Agricultural Landscape Character Zone. (Refer to ***Table 6***)

TABLE 6 – SUMMARY OF LANDSCAPE IMPACT

CHARACTER ZONE	SENSITIVITY OF USES	KEY WORKS IN ZONE	IMPACT SUMMARY	MODIFICATION TO THE SETTING	IMPACT RATING
Township	High	Culvert and track replacement raised approx. between 0.3 metres and 1.0 metre. Jones Avenue overbridge. Mehi River bridge. Camurra bypass.	Due to a majority of the culvert and track replacement works occurring in an existing rail corridor and the limited extend of change, the proposal would often result in a low modification to the landscape character from these works. wouldThe Jones Avenue overbridge would result in a high landscape impact as a result of new urban infrastructure being introduced into a residential area. The modification level of the works around Mehi River bridge would be moderate due to the result of tree clearance and replacement of an existing structure. Therefore, a high sensitivity level combined with a moderate modification level would result in a high adverse landscape impact.	Moderate	Moderate
Village	High	Culvert and track replacement raised approx. between 0.3 metres and 1.0 metre.	Due to works occurring in an existing rail corridor, the proposal would result in a low landscape impact within this zone.	Low	Low

Gwydir Undulating Plains	Low	Culvert and track replacement raised approx. between 0.3 metres and 1.0 metre. Newell Highway overbridge. Crossing Loop at Bobbiwaa. Crossing Loop at Waterloo Creek. Crossing Loop at Tycannah.	The landscape of this primarily agricultural zone would typically experience a low landscape impact due to a limited number of trees being required to be cleared to accommodate track and culvert replacement along an existing rail corridor. The Newell Highway overbridge would result in a high modification on its immediate setting due to tree clearing being required in a moderately dense woodland setting	Low to Moderate	Low to Moderate
Northern Marshland Plains	Low	Culvert and track replacement raised approx. between 0.3 metres and 1.0 metre. Gwydir River Bridge. Crossing Loop at Coolleearllee. Croppa Creek Bridge. Crossing Loop at Murgo.	The track and culvert replacements to an existing rail line would result in a low landscape impact. Tree clearing for new crossing loops would result in a moderate impact. The replacement bridge crossing over the Gwydir River would result in a localised moderate landscape impact as a result of the clearing of canopy trees on the river bank.	Moderate	Low to Moderate

7.3.1 Settlement landscape character zone

7.3.1.1 Township

The landscapes of the townships are typically flat and comprised of buildings, associated structures and infrastructure and street trees. Consequently, the landscape has a high absorptive capability as ground level views are typically screened and there are limited opportunities for overlooking.

The exception to this occurs at Moree, where the overbridge would result in a high impact to the landscape setting. This is as a result of the overbridge being new features in the landscape as well as associated clearing of vegetation and canopy trees.

7.3.1.2 Village

With a landscape setting generally similar to that of the townships within the proposal site, and with a low modification to the landscape setting resulting from the proposal occurring in the context of existing rail infrastructure, the villages would also experience low landscape impacts. The landscape within this location has a high absorptive capability as the proposal traverses land already utilised for rail infrastructure.

Ultimately, the landscape character of the settlements would not experience a high landscape impact as the proposal would only result in a 250-400 millimetre increase in the vertical alignment of the rail formation. Such a limited amount would be difficult to perceive in the wider landscape. The existing rail corridor is a key element of the landscape in this character zone, with to the proposal resulting in a low landscape impact.

7.3.2 Agricultural landscape character zone

7.3.2.1 Gwydir Undulating Plains

Despite being highly cleared and cultivated, resulting in large expanses of flat, open plains, the proposal would generally have a low landscape impact on the Gwydir Undulating Plains. With limited tree cover, no or minimal clearing would be required to reinstate the existing rail alignment, or to accommodate new crossing loops.

The proposed overbridge at the Newell Highway would result in a landscape impact as a result of required clearing in a moderately dense woodland setting. However, due to the presence of the dense woodland, views to the new structure over the rail corridor would be absorbed by the cover of canopy trees.

7.3.2.2 Northern Marshland Plains

The Northern Marshland Plains between Moree and North Star is a flat floodplain, agricultural landscape with minimal tree cover. For much of the length of the proposal through this zone, the change to the landscape setting is easily absorbed due to the proposal entailing the reinstatement of the existing rail line. Therefore, within this zone the landscape impact is low.

There would be a higher landscape impact recorded at the Gwydir River and Coppa Creek, where clearing would be required in a moderately dense, riparian landscape setting.

8 Mitigation

The following recommended measures to mitigate visual impacts in the vicinity of viewing locations subject to high visual impact are outlined below.

8.1 New crossing loops with no, or minimal clearing required in lightly treed agricultural setting

As the proposal results in minimal changes to the existing character throughout this area, the mitigation action would be to replace existing vegetation, both surface, tree and shrub cover, where possible, within the proposal site at the new crossing loop locations. However, as a minimum, where possible, existing ground surface vegetation disturbed by construction activities should be reinstated.

8.2 Replacement of existing track through open agricultural land

Where the track is to be replaced, there would be no noticeable visual change to the setting. The views to the proposal would remain the same as at present and therefore, mitigation would not be necessary. However, as a minimum, where possible, existing ground surface vegetation disturbed by construction activities should be reinstated.

8.3 Overbridge in moderately dense woodland (Newell Highway)

For a relatively short section, the formation would result in a prominent new elevated structure in the landscape. Mitigation actions include onsite amenity planting on the embankment and bridge approach, in conjunction with offsite screen planting within residential properties, subject to landowner agreement, to offset the possible background view which would reduce the degree of visual impact.

8.4 Overbridge in urban setting (Jones Avenue)

For a relatively short section, the formation would result in a prominent new elevated structure in the urban setting. Mitigation actions include onsite amenity planting on the embankment and bridge approach, in conjunction with potential offsite planting within road reserves (in conjunction / agreement with Council) adjacent to residential properties, to offset the background view.

8.5 New track alignment through open agricultural land (Camurra bypass)

Through some areas, the proposal would have a high visual impact. In areas where properties are impacted, both on and off site planting may be necessary.

In these instances, an offer could also be made to the land owner where foreground screening may assist in additionally screening views to the proposal.

8.6 Demolition of existing bridge and reinstatement of new in same location in well treed riparian setting (Mehi, Gwydir rivers and Croppa Creek)

For a relatively short section, the proposal would result in a prominent new structure in the landscape. Mitigation actions include onsite reinstatement of vegetation removed during the construction process to optimise screening at operation.

The area of disturbance around the replacement bridge should be revegetated with a vegetation composition consistent with the riparian zone.

8.7 Treatment of spoil mounds

Spoil mounds resulting from the construction of cess drains should be shaped to reduce their angular profile and to ensure that they are better integrated within the landscape of the surrounding setting. Sharp transition angles in the surface profile should be avoided and rounded profiles used to provide a more natural form. Grass cover should be established over the entire spoil mound surface area.

9 Conclusion

9.1 Overview

Historically, a freight rail corridor has existed between Narrabri and North Star and, therefore, railway infrastructure has long been an element within the landscape setting and one with which local residents would have a high degree of familiarity with.

The majority of the proposal is located within an existing rail corridor, which would see 188 kilometres of existing track upgraded. However, overbridges are required at Moree and on the Newell Highway near Bellata. A new 1.6 kilometre section of rail line is proposed at Camurra.

There would be views experienced from both agricultural and urban areas towards double stacked trains, with a height of 6.5 metres. However, these would be transient and experienced at speeds up to 110 kilometres per hour.

9.2 Visual Impacts

Due to the relatively flat topography of the setting of the proposal, high visual impacts would be primarily confined to the local and sub-regional settings. Generally, the settlement landscape character areas record the highest levels of visual impact due to their proximity to the proposal within the local setting. Throughout the expansive agricultural landscape, the level of visual impact would generally be low due to the low density of rural residences, and their distance from the proposal.

Where isolated residences exist proximate to the proposal, these viewpoints would occasionally experience a high visual impact where the visual modification level is high to moderate.

Isolated high visual impacts occur where significant pieces of new infrastructure are proposed, such as the Newell Highway overbridge, or where change is proposed within close proximity to urban areas, such as Moree, such as the Jones Avenue overbridge.

Moderate levels of impact occur where the alignment traverses' areas with scattered residences or settlements.

The overall low visual impact attributed to the proposal has been derived from the generally low level of visual modification, resulting from the majority of the changes occurring to an existing rail corridor, and the limited number of higher sensitivity viewpoints.

In addition to the recommended mitigation actions, it is likely that sections of the proposal between Narrabri and North Star would receive a degree of visual screening as a result of the rehabilitation of the surface of spoil mounds with grassing. Over time as the grassed cover is established, the spoil mounds would assist in the proposal being absorbed into the wider landscape. As the extent of spoil mounds is not as yet known, it has been assumed that they would occur along the majority of the proposal.

9.3 Landscape Impacts

Similar to the visual impact of the proposal, there would be a generally low landscape impact for the majority of the proposal site, including villages or townships where no crossing loops are proposed.

With a variety of built form, vegetation and trees within a relatively flat landscape, the settlement character areas have been assessed as having a high level of absorptive capability. It is unlikely that height increases of 250-400 millimetres would be perceivable in townships and villages, ultimately not impacting the landscape setting.

A low to moderate landscape impact on the agricultural areas would occur due to the construction of five new crossing loops which, in some cases would require a small amount of vegetation clearing and earthworks to create a new rail embankment and accompanying cess drains and spoil mounds. However, the proposal, consisting primarily of the upgrading of existing tracks, would result in changes in the landscape setting that would be difficult to recognise, given they are relatively minor horizontal components in the wider landscape.

The proposed Newell Highway overbridge and the replacement bridge over the Mehi River at Moree are likely to result in the highest landscape impacts.

9.4 Mitigation

The recommended mitigation would result in a reduction of visual impact over time for the most sensitive viewing locations. With a generally low visual impact recorded throughout the expanses of agricultural land, which contain an existing rail corridor, the requirement for mitigation would be limited. However, where possible, new ground surface vegetation would reduce visual impacts resulting from the proposal.

The proposed overbridges, containing elevated structures, would require mitigation to screen proposal elements from sensitive viewing locations, including residences and regional roads. Over time the proposed works would be gradually screened from view, or significantly reduced in their degree of visual prominence, as new vegetation matures.

9.5 Residual impacts

Table 7 summarises the visual impacts that are assessed as having a moderate or high impact ratings. These locations generally result in a reduction of visual impact due to the proposed mitigation outlined in **Section 8**.

TABLE 7 – SUMMARY OF RESIDUAL IMPACT

PROPOSAL COMPONENT	VISUAL IMPACT	RESIDUAL IMPACT
Crossing loop at Bobbiwaa	Moderate to high	Low to moderate
Culvert and track replacement at chainage 593-602	Moderate	Low
Culvert and track replacement at chainage 612-618.5	Moderate	Low
Newell Highway overbridge	High	Moderate
Culvert and track replacement at chainage 621-623	Moderate	Low
Culvert and track replacement at chainage 628-630.5	Moderate	Low

PROPOSAL COMPONENT	VISUAL IMPACT	RESIDUAL IMPACT
Culvert and track replacement at chainage 642-644.5	Moderate	Low
Culvert and track replacement at chainage 658-660.5	Moderate	Low
Culvert and track replacement at chainage 662.5-664	Moderate	Low
Jones Avenue overbridge	High	Moderate
Culvert and track replacement at chainage 665.5-666.5	Moderate	Low
Mehi River Bridge	Moderate	Low
Culvert and track replacement at chainage 667-670.5	Moderate	Low
Culvert and track replacement at chainage 674.5-676	Moderate	Low
Gwydir River Bridge	Moderate	Low
Camurra Bypass	High	Moderate
Culvert and track replacement at chainage 678-680	Moderate	Low
Culvert and track replacement at chainage 684.5-686.5	Moderate	Low
Culvert and track replacement at chainage 699-708	Moderate	Low
Culvert and track replacement at chainage 715.5-717.5	Moderate	Low

PROPOSAL COMPONENT	VISUAL IMPACT	RESIDUAL IMPACT
Culvert and track replacement at chainage 728-730	Moderate	Low
Culvert and track replacement at chainage 731.5-733.5	Moderate	Low
Culvert and track replacement at chainage 735.5-737	Moderate	Low
Culvert and track replacement at chainage 748-758	Moderate	Low

10 References

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Appendix A Locations of new rail infrastructure

Paper Size A4

0 45 90 180 270 360

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

Newell Highway overbridge

Existing rail line

VP Viewpoint location

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number	22-17916
Revision	0
Date	02 Aug 2017

Newell Highway overbridge

Appendix A1

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Data source: Urbis: Viewpoint, 2017. LPI: DCDB/DTDB, 2015. Created by: kpsroba

PHOTO A1: VP1 – VIEW LOOKING NORTH ALONG NEWELL HIGHWAY

SOURCE: GHD

PHOTO A2: VP2 – VIEW LOOKING NORTH ALONG NEWELL HIGHWAY

SOURCE: GHD

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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LEGEND

- Bridge replacement in same location
- VP Viewpoint location
- Camurra bypass
- Existing rail line

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 02 Aug 2017

Gwydir River bridge crossing and Camurra bypass

Appendix A2

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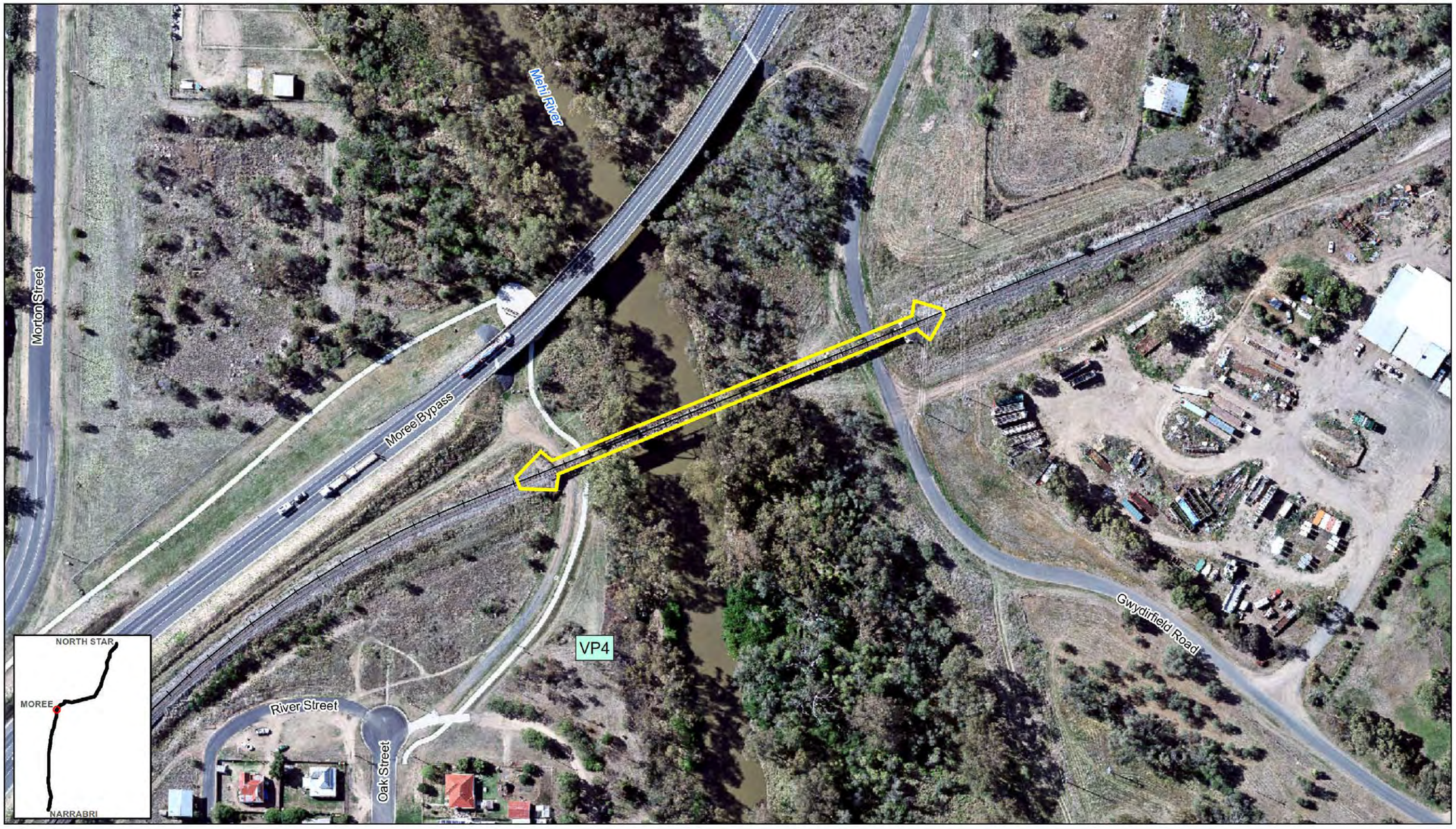
Data source: Urbis: Viewpoint, 2017. LPI: DCDB/DTDB, 2015. Created by: kpsroba

PHOTO A3: VP3 – VIEW LOOKING NORTH FROM SOUTHERN EMBANKMENT OF GWYDIR RIVER

SOURCE: GHD



Paper Size A4

0 5 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Bridge replacement in same location
- VP Viewpoint location
- Existing rail line

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number	22-17916
Revision	0
Date	02 Aug 2017

Mehi River bridge crossing

Appendix A3

G:\22\17916\GIS\Maps\Deliverables\N2NS\LVIA\2217916_LVIA006_NNS_ViewPoints_0.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

Data source: Urbis: Viewpoint, 2017. LPI: DCDB/DTDB, 2015. Created by: kpsroba

PHOTO A4: VP4 – VIEW LOOKING NNE TO PROPOSAL CORRIDOR
SOURCE: GHD

Paper Size A4

0 20 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Bridge replacement in same location
- VP Viewpoint location
- Existing rail line

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number	22-17916
Revision	0
Date	02 Aug 2017

Gwydir River bridge crossing

Appendix A4

G:\22\17916\GIS\Maps\Deliverables\N2NS\LVIA\2217916_LVIA006_NNS_ViewPoints_0.mxd

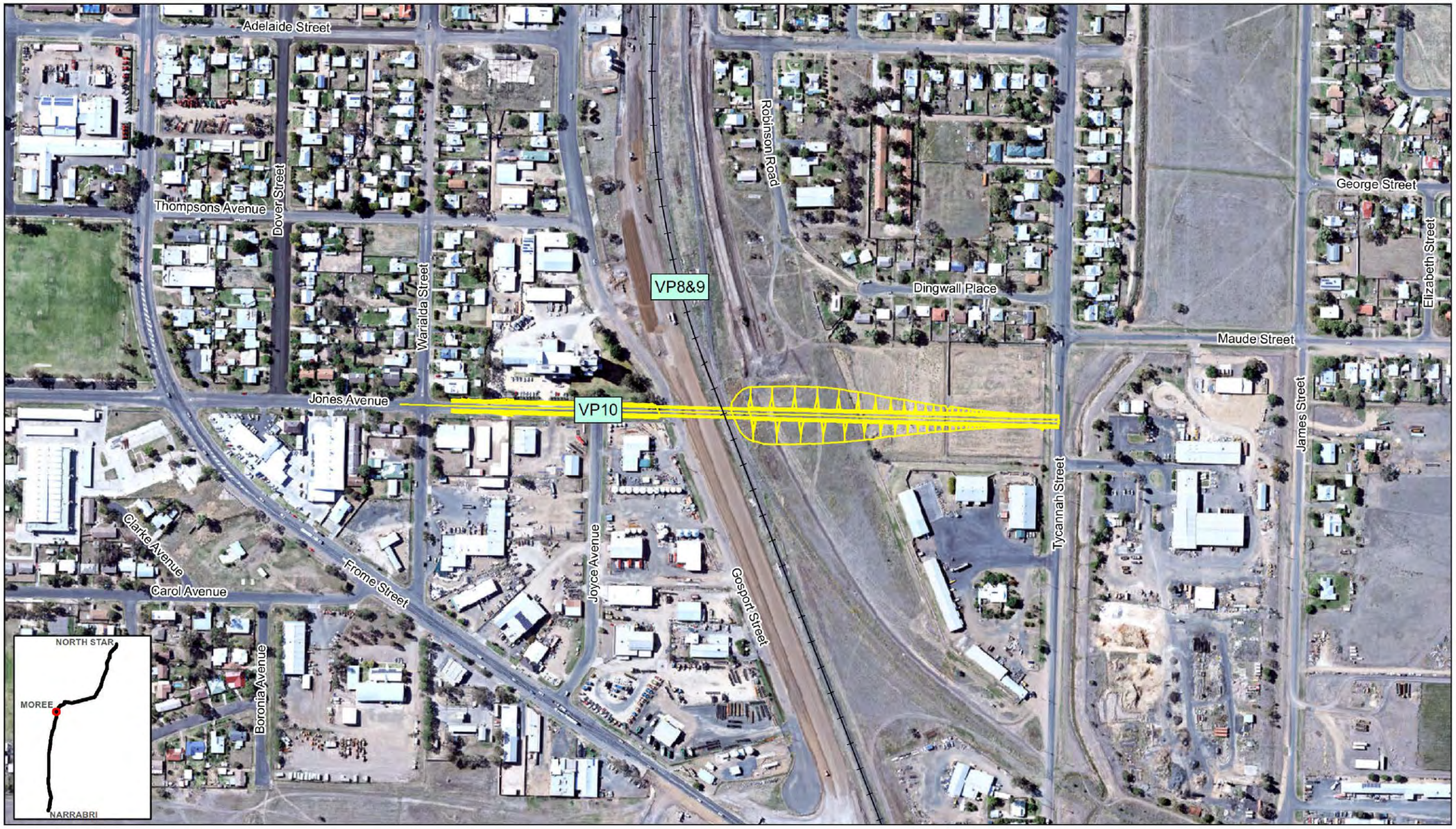
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

Data source: Urbis: Viewpoint, 2017. LPI: DCDB/DTDB, 2015. Created by: kpsroba

PHOTO A5: VP5 – VIEW LOOKING SOUTH-EAST TOWARDS MOSQUITO CREEK ROAD
SOURCE: GHD

PHOTO A6: VP6 VIEW LOOKING EAST FROM NEWELL HIGHWAY TO GWYDIR RIVER BRIDGE
SOURCE: GHD

PHOTO A6: VP6 VIEW LOOKING EAST FROM NEWELL HIGHWAY TO GWYDIR RIVER BRIDGE
SOURCE: GHD



Paper Size A4

0 20 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

Jones Avenue overbridge

Existing rail line

VP Viewpoint location

Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 0
Date 02 Aug 2017

Jones Avenue overbridge location

Appendix A5

G:\22\17916\GIS\Maps\Deliverables\N2NS\LVIA\2217916_LVIA006_NNS_ViewPoints_0.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com.au

Data source: Urbis: Viewpoint, 2017. LPI: DCDB/DTDB, 2015. Created by: kpsroba

PHOTO A7: VP8 – VIEW LOOKING SOUTH SOUTH EAST TO PROPOSAL CORRIDOR

VP9 - VIEW LOOKING SOUTH EAST TO PROPOSAL CORRIDOR

SOURCE: GHD

PHOTO A8: VP10 – VIEW LOOKING EAST ALONG JONES AVENUE TOWARDS RAIL ALIGNMENT

Appendix B Visual prominence rationale

VISIBILITY – RELATIONSHIP WITH VIEWSHEDS

The report defines a number of viewsheds based on distance from the development for the purposes of assessment. The methodology is based on the reduction of impact with an increase in distance between a given viewpoint and the development. These viewsheds or settings are:

Local Setting – up to 0.35 km from the development.

Sub-regional Setting – between 0.35 km and 0.7 km from the development.

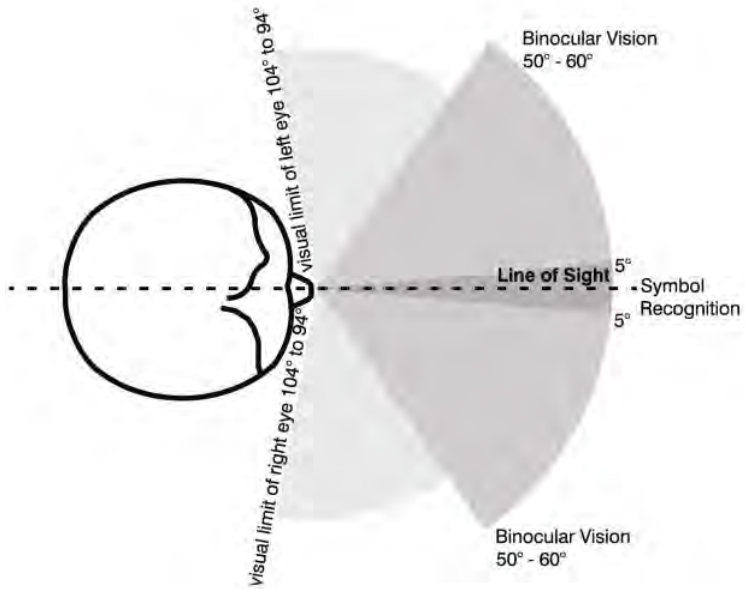
Regional Setting – between 0.7 km and 1.0 km from the development.

These distances have been established based on previous studies undertaken by Urbis. They are based on the reduction of visibility of objects in the distance as the field of view reduces.

HORIZONTAL LINE OF SIGHT

It is generally accepted that the central field of vision for the human eye covers a horizontal angle of approximately 50 degrees to 60 degrees. Given both eyes see simultaneously and that there is a degree of overlap, a central field of view results in a person looking straight ahead (Figure A.1).

HORIZONTAL LINE OF SIGHT FIGURE A.1



In the production of visual simulations, a 50 mm lens on a 35 mm film format is most widely used as it captures a field of view of approximately 46 degrees, similar to that of the view from one eye. Two photos taken with a 50 mm lens produced as a panorama, with a degree of central overlap, capture the central field of view in a similar way to that of the human binocular view (binocular field).

Within the central field of vision, the viewed image is sharp, colours are separately defined and depth perception occurs.

VISUAL IMPACT/VISUAL PROMINENCE

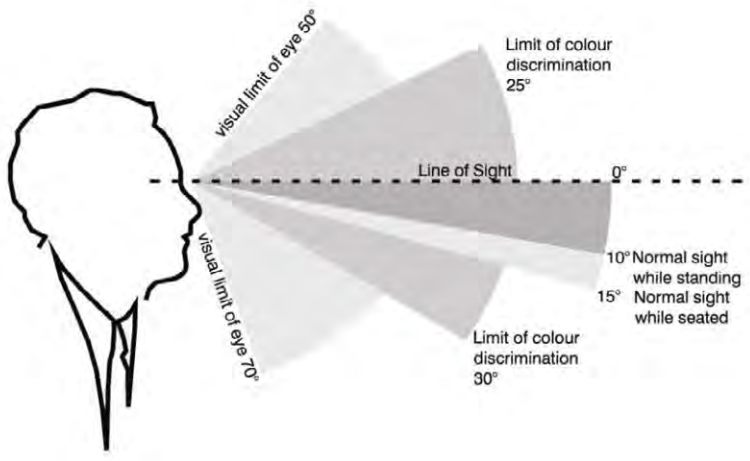
The potential visual impact of a development would, to a large extent, depend on how much of the central field of vision that it occupies.

DEGREES OF FIELD OF VIEW OCCUPIED	POTENTIAL VISUAL PROMINENCE – HORIZONTAL FIELD OF VIEW
Less than 5º	**Insignificant** The development would not be highly visible in the view, unless it contrasts strongly with the background.
5º – 30º	**Potentially Noticeable** The development may be noticeable. The degree that it intrudes on the view would be dependent on how well it integrates with the landscape setting.
Greater than 30º	**Potentially Dominant** The development would be highly noticeable.

VERTICAL LINE OF SIGHT

As for the horizontal line of sight, there is also a vertical central field of view. If we assume that the horizon is 0º then the eye clearly defines colour, field of view and has image sharpness for an angle of approximately 25º upwards and 30º downwards. However, in reality, the typical line of sight for a standing person at ground level is approximately 10º below the horizon line (Figure A.2).

VERTICAL LINE OF SIGHT FIGURE A.2



VISUAL IMPACT / VISUAL PROMINENCE

Objects that occupy a small proportion of the vertical field of view are visible but not dominant, particularly when they occur within landscapes that have been modified by human activity.

DEGREES OF FIELD OF VIEW OCCUPIED	POTENTIAL VISUAL PROMINENCE – HORIZONTAL FIELD OF VIEW
Less than 0.5º	**Insignificant** A small thin line in the landscape.
0.5º – 2.5º	**Potentially Noticeable** The development may be noticeable. The degree that it intrudes on the view would be dependent on how well it integrates with the landscape setting.
Greater than 2.5º	**Potentially Dominant** The development would be highly noticeable, although the degree of visual intrusion would depend on the landscape setting and the width / thickness of the object.

VISUAL PROMINENCE IN RELATION TO DISTANCE AND VIEWSHED SETTINGS

The following distances relating to visual prominence are based on the previous field of view exercises. The distances also relate to the distances for the setting types in the visual assessment methodology.

DEGREES OF FIELD OF VIEW OCCUPIED	POTENTIAL VISUAL PROMINENCE – HORIZONTAL FIELD OF VIEW
5000 metres	**Insignificant** Visually insignificant.
1000 – 5000 metres	**Potentially Noticeable** The development may be noticeable. The degree that it intrudes on the view would increase as distance reduces.
Less than 1000 metres	**Potentially Dominant** The development would be highly noticeable.

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