

APPENDIX



H

Landscape and Visual Impact Assessment

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



The Australian Government is delivering
Inland Rail through the Australian
Rail Track Corporation (ARTC), in
partnership with the private sector.

Inland Rail

Gowrie to Helidon

Appendix H Landscape and Visual Impact Assessment Technical Report

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Inland Rail Package 12: Gowrie to Helidon
Landscape and Visual Impact Assessment

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1 Summary

This Landscape and Visual Impact Assessment (LVIA) has been prepared by Lat27 Pty Ltd on behalf of Future Freight Joint Venture as part of an Environmental Impact Statement (EIS) for the Gowrie to Helidon (G2H) Project (the Project).

The Inland Rail Program is a major national interstate freight route project between Melbourne and Brisbane. Australian Rail Track Corporation (ARTC) proposes to construct and operate the Project which extends approximately 28 kilometres (km) in length through the Toowoomba Range, connecting the existing Queensland Rail (QR) West Moreton System rail corridor with the existing Interstate Line.

1.1 Key elements of the Project relevant to LVIA

The elements of the Project that are relevant to the LVIA include:

- New track: approximately 28 km of new track within the Project, predominately within a greenfield rail corridor, with 5.6 km of brownfield development at the western and eastern extent of the Project. Where possible, the Project utilises land protected for the Gowrie to Grandchester future public passenger transport corridor protected under the *Transport Planning and Coordination Act 1994* (Qld).
- Tunnel: a 6.24 km undrained tunnel traversing the Toowoomba Range
- Crossing loops: three crossing loops, designed to accommodate trains initially up to 1,800 metres (m) long but potentially up to 3,600 m long in the future, located at the western and eastern tunnel portals and Postmans Ridge
- Tie-ins: Project tie-ins to the existing West Moreton System rail corridor, the Main Line in the east and the Western Line in the west
- Viaducts and bridges: 13 new structures (rail bridges over watercourses, rail bridges over terrain and watercourses, rail bridges over terrain, road and watercourses, one rail bridge over road, rail and watercourses, one road bridge over rail and watercourse and one road bridge over rail crossing). The two road bridges over rail are associated with the provision of a new bridge over Gowrie Creek, Gowrie Junction Road bridge and the provision of a grade separated crossing on McNamaras Road. The combined bridge/viaduct length for the Project is approximately 6.7 km.
- Culverts: reinforced concrete pipe culverts and reinforced concrete box culverts. Scour protection measures will generally be installed around culverts to avoid erosion
- Drainage: embankment and catch drains to divert surface runoff
- Ancillary works: ancillary infrastructure including signalling and communications infrastructure, signage, fencing and utilities
- Presence of the freight train: presence of double stacked trains, with a height of 6.5 m and length of 1,800 m with provision to accommodate up to 3,600 m long in the future
- Fencing: the Project will be fenced in accordance with the ARTC fencing strategy with standard three or four strand wire fence. Where superior fencing is required near roads or where trespass is occurring a 1.8 m chain wire fence is proposed. Fauna exclusion fencing will also be provided where required.
- Cuts and embankments: approximately 6.65 km of cut, with maximum cut depths up to 45.7 m and approximately 15.4 km of fill sections, with maximum embankment heights of up to 33.3 m
- Construction laydown areas: including laydown areas tunnel portal staging areas and site offices vegetation clearance, construction equipment, stockpiles, construction lighting etc.

1.2 The landscape of the LVIA study area

The Project is proposed to connect into the adjacent Inland Rail New South Wales (NSW)/QLD Border to Gowrie (B2G) project north of Charlton in the west and travel in a generally easterly direction to Helidon, where it will connect with the proposed Inland Rail Helidon to Calvert (H2C) project in the east. The Project traverses rural landscapes, comprising irrigated and dryland agricultural and pastoral landscapes, passes through rural settlements to the north of Toowoomba, and crosses forested landscapes associated with the Great Dividing Range.

The study area for the LVIA (LVIA study area) was defined extending 10 km from the Project alignment. The landscape of the LVIA study area varies greatly, from low-lying alluvial plains with subtle undulations to densely forested elevated areas associated with the Toowoomba Range which forms part of the Great Dividing Range. The Project includes a 6.24 km long tunnel through the Toowoomba Range along with a series of viaducts to facilitate the required gradient and includes an intermediate ventilation shaft and associated infrastructure in Cranley.

The LVIA study area is traversed by a network of creeks, including Gowrie Creek that forms part of the Condamine-Balonne River catchment and Murphys Creek, Lockyer Creek and Six Mile Creek that are within the Lockyer catchment to the east of the Toowoomba Range. The Project does not directly traverse any national parks or other national, State or local protected landscapes; however, Lockyer National Park, Lockyer State Forest and Lockyer Resources Reserve are located in the northeast of the LVIA study area, and the Project traverses some areas of regionally significant scenic amenity value identified within the South East Queensland Regional Plan (Department of Infrastructure, Local Government and Planning (DILGP) now the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP), 2017) (ShapingSEQ).

1.3 Landscape and visual impacts

The LVIA identified and assessed the impact of the Project on landscape, visual and lighting amenity through a combination of desktop and field work, including geographic information system (GIS) analysis, Visibility Analysis Mapping (VAM) and preparation of illustrative cross-sections and visualisations.

Eight Landscape Character Types (LCTs) have been identified within the LVIA study area, of which seven are potentially affected by the Project with impacts of up to:

- Major significance on the landscape character and amenity of one LCT: LCT G: Forested Uplands
- Moderate significance on landscape character and amenity of four LCTs: LCT C: Dry Croplands and Pastures; LCT D: Vegetated Grazing; LCT E: Rural Settlement; and LCT F: Rural Living.

These impacts relate to direct impacts of infrastructure including cuts, embankments, bridges and viaducts on the rural landscape and the setting of settled landscape areas.

For part of the LVIA study area there are relatively few visual receptors with the landscape comprising isolated homesteads set on large private farms or rural blocks. However, the landscape around Toowoomba is quite densely settled with numerous settlements located within the potential viewshed of the Project including suburbs to the north and east of Toowoomba, Gowrie Mountain, Gowrie Junction (herein referred to as Gowrie), Kingsthorpe, Withcott, Postmans Ridge, Helidon Spa and Helidon. Visual impacts are typically contained by the presence of vegetation, including along creek lines, and localised undulations in landform. Visual impacts are also contained through the use of a tunnel for a significant length of the Project. Elevated and panoramic views over the Project are also available from the edge of Toowoomba and the Forested Uplands associated with the Toowoomba Range, scenic lookouts, walking trails within public parks including Jubilee Park, Redwood Park and

Picnic Point Parklands and residential properties with views towards the project, as well as from parts of the Toowoomba Bypass.

As part of the visual assessment, 20 representative viewpoints were selected and assessed for both construction and operation phases of the Project. During construction, the greatest visual impact identified was up to High significance, relating to three viewpoints - Viewpoint 13: Keira Court, Blue Mountain Heights looking southeast; Viewpoint 14: Katoomba Point Lookout, Prince Henry Heights looking north; and Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville.

For visual impacts during operation, seven visual impacts of up to High significance were identified. These are associated with Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west; and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north. These impacts relate to elevated views from significant locations over the wider Project and/or viewpoints situated in close proximity to the Project. Other visual impacts during both construction and operation are of lower significance, typically relating to views experienced by relatively small numbers of homesteads or with a lower magnitude of change to the existing view.

For lighting impacts, the most significant effect during construction is up to Moderate for Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass, the greatest impact identified during operation is up to Low significance for thirteen viewpoints.

Cumulative impacts, particularly the effects in combination with the adjoining B2G and H2C projects have been considered. Cumulative impacts during both construction and operation are considered to be up to Medium consequence, due to the potential for localised areas (particularly the area around Gowrie Mountain in the west of the Project) to be affected by multiple infrastructure and building projects, dependent upon project phasing. There are no identified cumulative impacts associated with night lighting.

1.4 Mitigation opportunities

The design has incorporated management measures that are considered as initial mitigation, which have been considered in the impact assessment. The LVIA has also identified a range of additional mitigation measures including protection of existing vegetation, rehabilitation of disturbed vegetation, opportunities to undertake additional planting to buffer views and opportunities for urban design of key structures. These have the potential to enhance the legacy of the Project and would reduce the residual impact of the Project on some landscapes and views including the potential to reduce the most significant Project effect on landscape character of LCT G: Forested Uplands from Major significance to High significance.

2 Scope of report

This LVIA has been prepared by Lat27 Pty Ltd on behalf of FFJV as part of the EIS for the Project.

The Inland Rail Program is a major national interstate freight route between Melbourne and Brisbane.

ARTC proposes to construct and operate the G2H Project which extends approximately 28 km across the Toowoomba Range linking B2G to the west and H2C to the east. The Project also connects with the existing QR West Morton System at the western and eastern extents providing a more direct and efficient alternative to the existing QR alignment through the Toowoomba Range to existing rail operators. The location of the Project is shown in **Figure 1: Regional context** and **Figure 2: LVIA study area** is discussed in more detail below. The Project connects the adjacent projects of B2G in the west and H2C in the east.

The Project was declared a 'coordinated project', for which an EIS is required by the Queensland (QLD) Coordinator-General under Section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) (QLD Government, 2017). The Project is also a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Commonwealth Minister administering the EPBC Act.

2.1 Project Terms of Reference

The ToR describe the matters the proponent must address in an EIS for the Project. The following matters relating to landscape and visual amenity are described in **Table 1**, along with the relevant sections within this LVIA that address each of the requirements.

Table 1: Terms of Reference compliance table

ToR Item	Requirement	Relevant section where addressed
Section: Project description. Subsection: Proposed construction and operations ToR 10.11	Describe the following information about the proposed project: (p) landscaping and the rehabilitation of affected areas after construction and during operation	Landscape and urban design treatments are discussed in Section 6: Potential impacts and Section 11: Mitigation and residual impact assessment.
Section: Land: Landscape and Visual amenity: Subsection: Existing environment ToR - 11.81	Describe and illustrate the existing landscape character and environment, including key natural landscape features, major views, view sheds and outlooks that contribute to the amenity of the area.	- The existing landscape character is described in Section 5, (particularly Section 5.1: Regional landscape context) and Section 7: Landscape impact assessment. - Views, viewsheds and outlooks are described in Section 5, (particularly Section 5.3: Visual assessment baseline) and Section 8: Visual impact assessment.
Section: Land: Landscape and Visual amenity. Subsection: Impact assessment ToR - 11.82	Describe and illustrate the visual impact of the construction and operation of the project. Include major views, view sheds, outlooks, and features contributing to the amenity of the area. Such views should be representative of public and private viewpoints, including places of residence, work, and recreation.	The visual impact of the Project is described in Section 8: Visual impact assessment and illustrated on the associated plans and figures – including visualisations – in Appendix 1 and 2.

ToR Item	Requirement	Relevant section where addressed
Section: Land: Landscape and Visual amenity. Subsection: Impact assessment ToR - 11.83	Address the findings, requirements and recommendations of South East Queensland Regional Plan 2005-2026 Implementation Guideline No 8 – Identifying and Protecting Scenic Amenity Values (2007)	Consideration of regional scenic amenity is included in Section 3, (particularly Section 3.2: State and regional) and, as required, in Section 7: Landscape impact assessment.
Section: Land: Landscape and Visual amenity. Subsection: Mitigation Measures ToR - 11.84	Describe any proposed measures to avoid, minimise or mitigate potential impacts on landscape character and visual amenity.	Landscape and urban design treatments are discussed in Section 11: Mitigation and residual impact assessment.

2.2 Objectives of the LVIA

The purpose of the LVIA is to:

- Identify the urban design and landscaping aspects of the Project and its components.
- Assess the impact of the Project on the urban, rural and natural fabric
- Explore the use of Crime Prevention Through Environmental Design (CPTED) principles during the design development process, including natural surveillance, lighting, walkways, signage and landscape
- Identify urban design strategies and opportunities to enhance healthy, cohesive and inclusive communities
- Assess the visual impact of the Project and any ancillary infrastructure on:
 - Views and vistas
 - Streetscapes, key sites and buildings
 - Heritage items including Indigenous places and environmental heritage
 - Local community spaces.
- Provide artist impressions and perspective drawings of the Project to illustrate how the Project has responded to the visual impact through urban design and landscaping.

Key objectives of the LVIA are:

- To undertake a baseline assessment describing existing environmental values of the LVIA study area (refer to **Section 4.1: Definition of the LVIA study area**) with respect to landscape character and visual amenity including scenic viewpoints
- To describe the existing landscape or visual values including reference to any values identified in planning schemes (landscape receptors) and identify those people who experience and value views of the landscape (visual receptors)
- To identify key Project risks on landscape and/or visual values during the day (and consider the potential for any night time impacts)
- To evaluate the significance of the impacts of the Project activities on landscape, views and visual receptors during the construction and operation phases of the Project, during day and night including cumulative impacts
- To describe any Project modifications or management techniques that can mitigate identified landscape and visual impacts and consider the likely significance of residual impacts once these measures have been implemented
- To illustrate the visual impacts using visualisation techniques to assist members of the public in understanding potential impacts.

3 Legislation, policies, standards and guidelines

The purpose of this section is to identify and discuss the relevance of any legislative or policy level objectives and standards that exist to protect or manage the landscape and visual values in the context of the Project.

The purpose of LVIA is to assist in creating a design that is integrated into its landscape context across the entire Inland Rail Program. For this reason, it is necessary to consider policies and guidelines (particularly at the higher national, state and regional level) that may extend beyond the immediate context in which the Project is sited. As an example, consideration of urban design principles set out in both NSW and QLD guidelines will ensure that a common approach is adopted to design and mitigation which fulfils the separate requirements of these jurisdictions while ensuring design consistency across the Inland Rail Program.

Similarly, as landscape and visual impacts may cross boundaries, most obviously views between adjoining local council areas, consideration has also been given to the policies applying to adjacent jurisdictions at the local level.

Relevant guidelines that have informed the LVIA methodology are discussed in **Section 4: Methodology**.

Legislation, policies, standards and guidelines that have been considered in this LVIA are described below and, where applicable, shown on **Figure 3: Regional scenic amenity and planning designations**.

3.1 National

The national regulatory context for LVIA practice and policy is summarised in **Table 2**.

Table 2: Regulatory context – national

Legislation, policy or guideline	Relevance to the Project
National	
<u>AS4282-1997 Australian Standard for the Control of the obtrusive effects of outdoor lighting</u> This standard sets out guidelines for the control of the obtrusive effects of outdoor lighting and provides recommended limits for the relevant lighting parameters to contain these effects within tolerable levels. It refers to the potential effects of lighting systems on receptors including nearby residents and users of adjacent roads. It does not apply to road lighting or lighting systems that are of a cyclic or flashing nature.	• Lighting is proposed as part of the Project (see Section 6: Potential impacts for details) • AS4282-1997 is relevant to the consideration of spill lighting associated with a project • The standard notes that the determination of when the spill light becomes obtrusive to others is difficult since both physiological and psychological effects are involved • It provides a common basis for assessment of developments that provide outdoor lighting • Key aspects for consideration include the level of lighting existing in the area, the times the proposed lighting is likely to operate (with different standards applied before and after an established curfew hour – typically 11.00 pm), and the type of lighting used • Public lighting is excluded because it is provided to facilitate after dark safety and security • As the standard excludes lighting of a flashing nature, technically this excludes lighting associated with safety systems such as traffic lights or level crossings

Legislation, policy or guideline	Relevance to the Project
	- Section 2.4 of the standard states that <i>“people will have a range of reactions to the installation of outdoor lighting; responses may vary from positive acceptance to outright rejection. The degree of response will depend, in part on the nature of surrounding developments, past experiences, novelty of the installation, and frequency and times of operation.”</i> - Table 2.1 of the standard sets out recommended maximum values (lux levels – a standard measurement of light intensity) for the control of obtrusive light - Illuminance reduces in proportion to the inverse of the square of the distance from the floodlight – therefore, the further away a light source is from a receptor the lower the potential illuminance - The objective of design is to ensure that direct view of the bright parts of floodlights are prevented from positions at eye height of neighbouring properties - As all proposed lighting during construction and operation is for safety and security purposes, as described in Section 6: Potential impacts, a full quantitative lighting assessment is not deemed to be required. However, the general principles of AS4282 have been used to inform the qualitative lighting assessment methodology (described in Section 4.10: Lighting impact assessment methodology).
<u>AS4970: Protection of Trees on Development Site</u>	- This standard provides guidance on the principles for protecting trees on land subject to development. Where development is to occur, the standard provides guidance on how to decide which trees are appropriate for retention, and on the means of protecting those trees during construction work - The standard does not apply to the establishment of new trees.
<u>Disability (Access to Premises – Buildings) Standards 2010</u> This is a legislative standard that provides a nationally applicable set of provisions that detail what must be provided for non-discriminatory access to public buildings for people with disability. These standards take effect subject to subsection 31(4) of the <i>Disability Discrimination Act 1992</i> (Cth).	- The Project is mostly located in a rural area with restricted access to the general public, limiting the applicability of the Disability (Access to Premises – Buildings) Standards. However, accessibility needs to be considered: - Where the Project passes through settlements - In recreational areas - Adjacent recreation trails and walkways where people may be present close to the Project - Along the Toowoomba Range tunnel and viaduct structures, to provide emergency egress. - The objectives of these standards are: - To ensure that dignified, equitable, cost-effective and reasonably achievable access to buildings, and facilities and services within buildings, is provided for people with a disability - To give certainty to building certifiers, building developers and building managers that, if access to buildings is provided in accordance with these standards, the provision of that access, to the extent covered by these standards, will be lawful.

3.2 State and regional

The QLD State and regional regulatory context for LVIA practice and policy is summarised in **Table 3**. This comprises documents referenced in the ToR or identified as being relevant to the assessment.

Table 3: Regulatory context – QLD state and regional

Legislation, policy or guideline	Relevance to the Project
QLD	
<u>Road Landscape Manual (RLM) (Department of Transport and Main Roads (DTMR), 2013)</u> This manual aims to facilitate the understanding of, and procedures associated with, the assessment, design and management of roads as they affect the QLD landscape. It sets out principles for the design of roads to assist in their integration in their natural, cultural and urban landscape settings. Appendix 2 of the manual describes the process for visual assessment required in the planning and design of QLD roads.	• The Project requires the realignment and redesign of several local and main roads (see Section 6: Potential impacts for details) • Key principles for the design of roads outlined in the manual are integration, context sensitive design, collaboration, sustainability and liveability • Road landscape integration requires that a consistent and harmonious approach is adopted, reflecting and referencing the surrounding natural and built landscape to achieve integration • Context sensitive design solution recognises and respond to the road landscape setting to provide “<i>a transportation facility that fits its setting...that leads to preserving and enhancing scenic, aesthetic, historic, community and environmental resources, while improving and maintaining safety, mobility, and infrastructure conditions</i>” • The manual describes a range of acceptable approaches for the design of hard and soft landscape and urban design elements, including earthworks, vehicle bridges, buffer planting etc. • The visual assessment methodology does not directly apply as it is intended for the assessment of DTMR projects. However, the principles have informed the assessment methodology for this Project (described in Section 4: Methodology). • The landscape and urban design guidelines described in the RLM have informed the design and the mitigation of impacts of the Project on the roads within the LVIA study area as described in Section 11: Mitigation and residual impact assessment.
<u>Crime Prevention through Environmental Design (CPTED) (QLD Government 2007)</u> The CPTED guidelines for QLD seek to promote the incorporation of CPTED principles into the planning, design and management of development in QLD. They aim to guide and encourage public and private developers to design with CPTED in mind. This guideline is a suitable framework for consideration of the Hea-2 Crime Prevention credit in the Infrastructure Sustainability (IS) Rating Scheme, although is not directly referenced.	• The Project is mostly located in a rural area within privately-owned land with limited public accessibility limiting the applicability of the CPTED guidelines. However, CPTED needs to be considered where the Project passes through settlements and in recreational areas or adjacent to recreation trails and walkways where people may be present close to the Project. • The guidelines describe several principles to inform design including surveillance (both direct and indirect), legibility, territoriality, ownership, management and vulnerability • The guidelines address a range of scales from planning through to detailed design and include strategies for signage, public artwork and materiality (functional and robust without being harsh) • Key relevant principles include design of the built environment to reduce or limit risk from assault by providing well-lit, active and overlooked places and pedestrian and cyclist systems and routes to important places and avoiding the creation of hidden spaces close to pedestrian/cyclist travel routes in the public realm

Legislation, policy or guideline	Relevance to the Project
	• Elements such as landscaping, walls, fences, buildings, passages, bridges, tunnels and street furniture are to be designed to avoid hidden places close to paths or hidden corners, blind spots or bends that create places of concealment • It is recommended to avoid, where possible, pedestrian/cyclist tunnels, bridges or other movement predictors (especially closed ones) which limit surveillance and response options.
QLD (regional level)	
<u>South East Queensland Regional Plan (ShapingSEQ) (DSDILGP 2017)</u> The South East Queensland (SEQ) Regional Plan 2017 (SEGRP), also known as ShapingSEQ, is the regional plan for the SEQ region. It was given effect on 11 August 2017. The region includes the following local government areas (LGAs) through which the Project passes or which fall within the LVIA study area: Toowoomba (part only) and Lockyer Valley. The plan provides a regional framework for growth management, and sets planning direction for sustainable growth, global economic competitiveness and high-quality living including by ensuring land use and infrastructure planning are integrated, valuing and protecting the natural environment including landscapes, and supporting rural communities. The plan is supported by a range of background papers.	• The majority of the LVIA study area falls within the SEQ region, with the exception of a small part of the LVIA study area to the west of Kingsthorpe that is located within the Darling Downs Region • The ToR require consideration of the Project against the requirements of ShapingSEQ, which sets out the vision and strategy for planning in the SEQ region • The 'Prosper' and 'Connect' themes of the plan support investment in upgrades and the provision of new infrastructure, including the Melbourne to Brisbane Inland Rail that "will reinforce SEQ as the apex of Australia's strategic freight network" • The 'Sustain' theme of the plan highlights the importance of "valuing and protecting our greatest assets – our regional landscapes and natural systems that sustain us." • There are five goals which align with the five themes identified in ShapingSEQ, each of which is supported by several elements which provide more specific outcomes, including: • Goal 3: Connect seeks to enhance "<i>the movement of goods and services via key freight connections</i>". ○ Key regional infrastructure outcomes in this subregion are shown on Map 4b and include: delivering the Southern Freight Rail Corridor (SFRC) (part of the Melbourne to Brisbane Inland Rail project), which will improve the freight network's efficiency throughout the subregion and beyond; delivering the Toowoomba Bypass; and supporting the development of the regional freight and logistics hub at the Toowoomba Enterprise Hub (Charlton Wellcamp Enterprise Area) ○ The Western Subregion's role as the western gateway, connecting SEQ to the rural areas and towns of Darling Downs and South Burnett, and providing critical freight connections with northern NSW and the southern states is emphasised. • Goal 4: Sustain is the most important in terms of guiding the regional context for landscape and visual amenity values stating "<i>Our regional landscapes contain a wide range of values, including biodiversity, rural production, natural economic resources, scenic amenity, cultural landscapes and outdoor recreation. These values contribute to SEQ being one of the most biodiverse and liveable regions in Australia.</i>": ○ Element 4: Regional landscapes seeks to protect the values of inter-urban breaks, protect and rehabilitate culturally significant plans, and protect the regional greenspace network and "<i>protect regional scenic amenity</i>"

Legislation, policy or guideline	Relevance to the Project
	<i>areas from development that would compromise their values."</i> ○ Map 5c: Regional landscape values, maps key valued landscapes in SEQ including protected areas, regionally significant greenspace, regionally significant scenic amenity and inter-urban breaks ○ Scenic amenity areas are "<i>Landscape areas identified by the SEQ regional amenity methodology as having scenic amenity value</i>". The stated benefits of such areas include physical and mental health and wellbeing, tourism, sense of place and community cohesion. ○ The Project passes through/close to areas of identified regionally significant scenic amenity as described in Section 5.1: Regional landscape context. These areas are subject to detailed assessment in the landscape and visual assessment. ○ Key regional outcomes in the western sub-region (comprising Ipswich, Lockyer Valley, Scenic Rim, Somerset and Toowoomba) include the identification, protection and management of regional landscapes. • Goal 5: Live is also relevant in terms of landscape and scenic amenity. For example, Live Element 3: Inspiration from local character requires that "<i>The communities of SEQ demonstrate a strong respect for their heritage, distinct context and local character</i>". This includes identifying and conserving local landscape, heritage and cultural assets including indigenous landscape values; working with natural topography to create development that contributes positively to the environmental and visual experience of a place; using appropriate building materials that add to a local area's character and diversity; and, working with the characteristics, traditions and values of the local community to create a distinctive local character and contributory community value: ○ Map 6 Live - Some great places, identifies Toowoomba city centre as a 'great place' ○ The Western Subregion includes the city of Toowoomba and the rural townships of the Lockyer Valley. This subregion is characterised by features including "<i>a predominantly regional and rural lifestyle supported by spectacular open space, hinterland and natural landscape settings</i>".
<u>South East Queensland Regional Plan (SEQR) Implementation Guideline</u> <u>No 8 Identifying and protecting scenic amenity values (DSDILGP 2007)</u> This guideline was developed to assist SEQ local governments to voluntarily implement policies of the SEQR relating to scenic amenity and regional landscape values. It was developed to support the (now superseded) Scenic Amenity policies of the SEQR but is still	• The guidelines were informed by the SEQ 2004 Public Preference Survey. This established that 68 per cent of people consider scenic values to be the most important or second-most important values at places where the scenery is highly preferred, such as the views from lookouts over the ocean, beaches, rocky cliffs, bushland, rivers and mountains. • The guideline establishes a methodology that centres around some key concepts: ○ Scenic amenity which is defined as "a measure of the relative contribution of each place in the landscape to the collective appreciation of open space as viewed from places that are important to the public" (DSDILGP 2007)

Legislation, policy or guideline	Relevance to the Project
referenced as the <i>SEQ regional amenity methodology</i> in Table 11b of the current regional plan ShapingSEQ.	○ Scenic preference which is defined as “a rating of the community’s liking for scenery of open space compared to areas occupied by built structures, measured using photographs” (DSDILGP 2007) ○ Public viewing locations: publicly accessible outdoor locations such as roads, walkways, beaches, picnic areas, lookouts or viewing platforms. Significant and popular viewpoints are elevated public viewing locations where people can safely stop and rest to admire the view. ○ Seen landscape areas: natural or built areas such as hills, the ocean, farmlands, watercourses, towns, cities or suburbs visible from one or many public viewing locations. Areas of high scenic amenity are highly preferred and seen landscape areas. ○ View corridors: three-dimensional spaces that connect public viewing locations with seen landscape areas. Important view corridors connect significant and popular viewpoints with areas of high scenic amenity. • The regional scenic amenity values are calculated using GIS analysis which combines visual exposure (least visible to most visible) and visual preference (least preferred to most preferred) to give a value between 1 and 10 • Regional scenic amenity applies to areas with a value of 9 to 10 with local scenic amenity value applying to areas with values of 6 to 8 • Regionally significant and popular viewpoints need to have a scenic value of 9 to 10 in at least one direction with a visitation importance rating of 9 or 10. Locally significant and popular viewpoints need to have a scenic value of 6 to 8 in at least one direction with a visitation importance rating of 6 to 8. • The SEQ Regional Scenic Amenity mapping is a useful tool for indicating regional scenic amenity values and, therefore, assists in determining relative sensitivity of landscape and visual values across the LVIA study area. It has been used to inform the sensitivity of the landscape character areas identified in this LVIA and to identify areas where views are likely to have high scenic amenity values and are, therefore, likely to be of greater sensitivity to change. • The SEQ Regional Scenic Amenity methodology is applicable only to SEQ. While some LGAs outside of SEQ region through which the Inland Rail passes have applied the methodology and have this mapping available, it is not available for all landscapes affected by Inland Rail in QLD. Therefore, care needs to be taken in its application to the LVIA methodology and it cannot be used in isolation of other approaches. For example, while some parts of the Project are within the SEQ region and these areas have scenic amenity mapping available, other parts of the Project within the Darling Downs Region and other parts of the Inland Rail Program do not have scenic amenity mapping available, and therefore alternative approaches are required to ensure consistency.

Legislation, policy or guideline	Relevance to the Project
	• The guideline includes an assessment methodology for determining acceptable proposed development in areas of high scenic amenity. This involves taking photographs and calculating the percentage of evident built development to determine acceptability. • This simplistic empirical methodology for development assessment is only applicable to high scenic value areas (which, as noted are only mapped for the eastern extent of the LVIA study area within the SEQ region) and is, therefore, not considered to be suitable to use for the LVIA assessment method for Inland Rail. The approach used in this LVIA is consistent with standard international (including QLD) LVIA practice and recognises the need to consider landscape and visual impacts across the LVIA study area, including impacts on areas of more local scenic amenity value to the community taking a defined qualitative approach. However, the key concepts of the guideline and the associated mapping (as discussed further in Section 5.1: Regional landscape context) have informed the baseline assessment and the analysis outputs as described in Section 4: Methodology.
<u>Darling Downs Regional Plan 2013</u> The <i>Darling Downs Regional Plan 2013</i> provides strategic direction and policies to deliver regional outcomes which align with the State's interests in planning and development. It is focussed on delivering regional policy aimed at achieving specific regional outcomes. The region includes parts of Toowoomba LGA through which the Project passes.	• The western extent of the LVIA study area is located within the Darling Downs Region, of which the Darling Downs Regional Plan applies as the relevant statutory regional plan • Key regional policies are to protect Priority Agricultural Land Uses while supporting co-existence opportunities for the resources sector and provide certainty for the future of towns in the region • The plan states the importance of the regional landscape values stating <i>"the region has some of the State's best assets, with high value scenic and natural amenity, vibrant towns and strong communities underpinned by a diverse range of cultural values. The region encompasses a variety of regional landscapes, including urban and rural holdings, agricultural production, resource and mine sites, and protected areas."</i> • The plan addresses the increasing importance of the region for tourism noting increasing growth with visitors coming to experience scenic, natural, cultural and heritage attractions • The plan also emphasises the importance of the region for freight connectivity, noting the eastern Darling Downs is at the junction of several strategic highways and railway lines and is the major transport and service hub of the region. This area facilitates the movement of goods and resources between QLD's southeast and west, enabling access to domestic and international markets through the strategic port facilities along the east coast. The plan also notes that the eastern area of the Darling Downs Region contains the region's largest population centre, Toowoomba—the largest non-capital inland city within Australia. • The plan highlights the balanced approach that needs to be taken to managing the environmental, community and economic values of the Darling Downs Region, which applies to all projects including Inland Rail.

The following documents that apply to NSW have also been considered and, where relevant, applied to the LVIA process for this Project to ensure consistency of approach for the landscape assessment and mitigation approach across the QLD and northern NSW sections of the Inland Rail Program. These are summarised in **Table 4**.

Table 4: Regulatory context – NSW state and regional

Legislation, policy or guideline	Relevance to the Project
NSW	
<u>Beyond the Pavement: Urban design policy, procedures and design principles (RMS, 2014)</u> <i>Beyond the Pavement</i> is a high-level urban design policy that systematically incorporates urban design thinking into infrastructure projects, with a focus on delivering improved design outcomes and higher levels of community satisfaction. This policy is referenced in <i>the IS Technical Manual</i> as part of the Urb-1 Urban Design credit in the IS Rating Scheme	• This report is relevant to the entirety of the Inland Rail Program, as it is important to consider the broader impacts of the Project and associated infrastructure upon existing built form, communities and the natural environments the Project traverses (including infrastructure associated with temporary construction such as laydown yards and construction lighting). • The key purpose of this report is to ensure that during construction and operation: ○ Existing landscape and built environment qualities are understood and protected ○ Built projects contribute to the quality of the built environment in urban and rural contexts, and create a legacy for the future ○ The quality of life of local communities is protected or improved in terms of connections, access to facilities, proximity to noise, views, safety and sense of place. • The report considers “...roads and bridges can be impressive and attractive feats of engineering which add visual interest and identity to the environment, or, if not designed well, can be visually unappealing and fail to be embraced by the community” • Relevant to the LVIA, this report states that: ○ The architectural and landscape quality of transport infrastructure should be visually pleasing ○ Transport infrastructure should fit sensitively into its natural setting, protecting the scale and unique qualities of the places in which it is situated ○ Major built elements can add character and help transform areas for the better ○ The design quality of structures and elements contributes to how a place looks and feels and how robust and durable it is ○ Major structures (such as bridges) associated with the entry to country towns should be planned and designed with special care as they can form ‘gateways’ and signature landmarks in the landscape ○ The location, scale and design of earthworks and structures should be kept in character with the existing landscapes and neither intrude into views from key sites and nearby properties, nor affect sites which may be of significant heritage or conservation value, or that have visual prominence or value ○ The retention of views helps define the scenic quality of a road or a journey

Legislation, policy or guideline	Relevance to the Project
	○ Views and viewpoints to heritage bridges, abutments and buildings should be maintained, as far as possible ○ Signage should be designed and located to minimise the visual impact on heritage buildings and ensembles, as well as structures of heritage significance, such as bridges, Indigenous heritage and culture, historic roads and the broader landscape of which these are part ○ Vegetation contributes to the uniqueness of a place, the 'greening' of a corridor and the overall tree cover of an area ○ Plantings in towns, cities and the countryside or along roads that can be considered to have heritage value, even if their heritage value has not yet been assessed and formally listed on an environmental plan or register should be preserved and respected.
<u>The Environmental Impact Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment (practice note EIA-N04) (RTA 2018)</u> This practice note applies to projects which Roads and Maritime Services (RMS) is seeking determination and approval to proceed. Therefore, it applies principally to road projects. It recognises the importance of landscape character and visual impact assessment to determine impacts on the character and views within a place to ensure a good urban design outcome.	• This document applies to NSW, however is worthy of consideration in the QLD context given the cross-border nature of the Inland Rail Program • The purpose of this practice note is to: ○ Inform the development of the preferred route and concept design to avoid and minimise impacts up front ○ Inform the community about what avoidance, management and mitigation strategies would be implemented. • Nine principles are described in the practice note • The note differentiates between the assessment of impact on an area's built, natural and cultural character or sense of place and the assessment of impacts on views • The impact assessment process is based upon assessment of sensitivity to change and magnitude (scale, character, distance) of the project on an area or view • A range of attributes for the assessment of landscape character are described and the guidance requires a combination of desktop and field analysis to break the LVIA study area down into character zones • The visual assessment methodology includes defining the extent of visibility, identifying key viewpoints and their sensitivity in order to assess visual impacts • Guidelines are given for refining the concept design through siting and mitigation using the RMS suite of urban design guideline documents including both the construction and operation phases.
<u>Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW (RMS, 2012)</u> The purpose of this document is to help design teams produce bridges of aesthetic value.	• This document is relevant to the assessment of the design of bridge structures in NSW. Although this document applies to NSW and the <i>Road Landscape Manual</i> (DTMR, 2013) described above takes precedence within QLD, it is also worthy of consideration in the QLD context given the cross-border nature of the Inland Rail Program. This document states that: ○ Bridge design should consider the visual impact of proposed infrastructure on the local context and be contextually appropriate

Legislation, policy or guideline	Relevance to the Project
	○ Bridges along the route should be designed to create a visually consistent design language, that assists in placemaking and wayfinding.
<u>NSW Sustainable Design Guidelines Version 4.0 (TfNSW, 2017)</u> These guidelines are a key tool in helping to realise sustainable project outcomes and seek to deliver sustainable development practices by embedding sustainability initiatives into the planning, design, construction, operations and maintenance of transport infrastructure projects.	• The guidelines apply in NSW and incorporate the following key aims: ○ Minimising impacts on the environment, whether through transport operations, infrastructure delivery or maintenance ○ Procuring, delivering and promoting sustainable transport options that achieve value for money and reduced life cycle costs ○ Developing, expanding and managing the transport network that is sustainable and climate resilient • The guidelines outline several sustainability initiatives (14 compulsory requirements and 2 sub requirements) that project teams are required to implement at each project delivery stage: ○ While these guidelines apply to NSW, they are worthy of consideration in the QLD context given the cross-border nature of the Inland Rail Program.
<u>Crime prevention and the assessment of development applications (DUAC, 2001).</u> These guidelines are intended to assist councils identify crime risk and minimise opportunities for crime through the appropriate assessment of development projects. This guideline is referenced in the IS Technical Manual as part of the Hea-2 Crime Prevention credit.	• This document applies to NSW, however is worthy of consideration in the QLD context given the cross-border nature of the Inland Rail Program • The Crime Prevention through Environmental Design (QLD Government 2007) takes precedence in QLD • The Project is mostly located in a rural area within privately-owned land with limited public accessibility limiting the applicability of the CPTED guidelines. However, CPTED needs to be considered where the alignment passes through settlements, near recreational areas or adjacent to recreation trails and walkways where people may be present close to the alignment. • The guidelines describe several basic CPTED principles to assess development applications including surveillance (both direct and indirect), access control, territorial reinforcement and space management. These principles apply to both the construction and operation project phases.

3.3 Local

The Project passes through the jurisdictions of Toowoomba Regional Council (TRC) and Lockyer Valley Regional Council (LVRC). The provisions of these council's respective planning schemes and associated strategy documents are relevant to the Project.

The key policies at the local level are summarised in **Table 5**. These planning schemes recognise and protect areas valued for their landscape and/or scenic qualities, arising from nature conservation or rural characteristics.

Table 5: Regulatory Context – QLD Local

Legislation, policy or guideline	Relevance to the Project
<u>Toowoomba Regional Planning Scheme (TRC 2018)</u> The TRC planning scheme is the relevant assessment benchmark for assessing development within the Toowoomba LGA. The planning scheme divides the area into zones with associated codes including specific overlay codes associated with scenic amenity.	• The Project predominantly traverses land zoned as Rural, however also passes through areas with High Impact Industry, Community Facilities, Limited Development, Low Density Residential, Emerging Community and Rural Residential zonings • Section 3.6 Natural Resources and Landscape of the planning scheme, includes outcomes relevant to scenic amenity and landscape values • Section 3.6.1 Strategic outcomes requires that “Scenic landscapes are valued and protected, and natural resources are well managed.” • Section 3.6.2 Scenic Amenity states that “the scenic landscapes and landscapes of rural and heritage value help define the character and identity of Toowoomba. Changes to the essential characteristics of landscape are undertaken in a measured and informed manner.” • 3.6.2.1. Specific Outcomes include: ○ Areas identified as high scenic amenity are protected by integrating built elements or significant disruptions into the landscape through design that minimises visual impacts ○ Large intrusions onto this landscape, such as extraction, mining, wind turbines and large solar collectors are designed, located and operated to mitigate negative amenity impacts • Section 8.3.3 Scenic Amenity Overlay Code includes provisions to ensure development in areas of high scenic amenity does not significantly detract from the scenic quality of the area. • Overall outcomes of the Scenic Amenity Overlay Code include: ○ The scenic amenity values are protected ○ Development in scenic amenity areas is sited and designed to minimise the adverse impacts on the scenic qualities of the area. • Further to this, the Scenic Amenity Overlay Code states that: ○ Development on land covered by the Scenic Amenity Overlay should not adversely affect the scenic amenity qualities of the site when seen from publicly accessible viewing locations. In the vicinity of Toowoomba, these locations include elevated landscapes at Picnic Point, Mount Kynoch and Mount Lofty. Where no publicly accessible viewing locations such as lookouts are in the vicinity of the development site, assessment should be determined from areas indicated as having high visual exposure. ○ Areas having high visual exposure generally comprise thoroughfares with high traffic volumes and include the New England, Gore and Warrego Highways and other main roads throughout the region.

Legislation, policy or guideline	Relevance to the Project
	• Areas of high scenic amenity value/visual exposure are described further in Section 5.1: Regional landscape context • Specific requirements for the maintenance of visual amenity are identified in the Low Density Residential Zone (Section 6.2.1.2); High Impact Industry Zone (Section 6.5.3.2); Community Facilities Zone (Section 6.6.1.2); Emerging Community Zone (Section 6.6.2.2) include the following requirements: ○ Development mitigates adverse impacts on natural topography, features, scenic values and amenity ○ Development considers CPTED issues. • Section 6.6.6.2 Purpose and Overall outcomes for Rural Zone includes provisions for amenity and rural landscape as follows: ○ 1 (c) protect the landscape character and its associated visual and scenic amenity ○ 2 (h) natural features such as creeks, gullies, watercourses, wetlands and bushland are retained, managed, enhanced and provided with appropriate buffers from development ○ 2 (k) the viability of both existing and future rural uses and activities are protected from the intrusion of incompatible uses.
<u>Toowoomba Regional Council – Scenic Amenity Study (Conics 2009)</u> This document provides a comprehensive inventory and assessment of scenic quality within the Toowoomba region, to identify areas of strategic significance with respect to their visual contribution to the regional image. This study has been based on the approach detailed in the SEQ Regional Plan 2005-2026 Implementation Guideline No. 8 – ‘Identifying and protecting scenic amenity values’ (QLD Government 2007) and has applied a quantitative method to the process of assessment of scenic values.	• This document includes recommendations and strategies for the management of scenic amenity, designed to inform the preparation of the Toowoomba Regional Planning Scheme, described above • Section 10.2 Protecting areas with high scenic amenity includes proposed management objectives for each constraint category defined by the study • Areas of high scenic amenity value/visual exposure are described further in Section 5.1: Regional landscape context of this LVIA. • Strategies identified within Section 10.3 Managing Significant and popular viewpoints of the study, include: ○ Retaining or enhancing public access to significant and popular viewpoints by publicising its existence through maps and brochures, upgrading access to the viewing location, providing signing to draw casual visitors to the site and providing additional facilities • Introducing planning controls to define acceptable development within the view corridor by limiting the visibility of any proposed buildings or infrastructure.
<u>Toowoomba Regional Council – Open Space Strategy (TRC 2016)</u> The Open Space Strategy maps out a new vision that recognises that ‘one size does not fit all’ and that a range of open spaces will be needed across our expansive region. It will deliver a connected and distinctive open space network that will	• This strategy provides a framework for protecting, enhancing and managing open spaces • It recognises the importance of open space and includes provisions for amenity and rural landscape as follows: ○ Goal 2: Retain and integrate existing vegetation and landscape features to provide visual amenity ○ Objective: Provide attractive environments to live and play ensuring a network of open space that integrates

Legislation, policy or guideline	Relevance to the Project
enhance the unique character of each locality. In addition, it will acknowledge the social, cultural, environmental, and heritage values of these areas and create a sense of place and pride for the community.	with existing vegetation and preserves landscape features.
<u>Toowoomba Regional Council – Heritage and Urban Character Study (Brannock and Associates 2010)</u> The TRC Heritage and Urban Character Study examines the non-indigenous cultural heritage and character values and resources of the regional council area.	• Recommendations and options arising from the study have been used to inform the Toowoomba Regional Planning Scheme. • The purpose of the 'Code setting out assessment benchmarks' (in Schedule 2 of the <i>Queensland Heritage Act Regulation 2015</i>) is to provide for the conservation of local heritage places by (amongst other things): (c) protecting, as far as practicable, the materials and setting of local heritage places.
<u>Toowoomba Regional Community Plan (TRC 2014)</u> The TRC Community Plan articulates the long-term vision, goals and priorities of the local communities of the region, with some direct relevance to the protection of landscape character and regional landscape values. The plan outlines a number of themes to guide community development in the region.	• Theme 1: Settlement Pattern states that “development within our region is undertaken in a coordinated and wise manner to avoid compromising landscape values...” and seeks the following relevant outcomes: ○ Development is designed and sited to respond to climate, is resource-wise, reinforces local character and achieves innovation and design excellence ○ Development within the rural landscape does not compromise primary production, and considers cultural, heritage, environmental biodiversity and water network values • Theme 5: Natural Resources and Landscape seeks the following relevant outcomes: ○ “scenic landscapes, regional greenspaces and landscapes of rural and heritage value are identified, protected and managed.” • Theme 6: Community states that “the rural qualities of our regional towns, townships and landscapes are an intrinsic part of our region’s character and identity.” • Theme 8: Economy supports the development of key infrastructure projects, including Toowoomba Bypass, Brisbane West Wellcamp Airport and the potential Melbourne Brisbane Inland Rail Project.
<u>West Toowoomba Land Use Investigations (TRC 2016)</u> West Toowoomba Land Use Investigations is part of a series of local planning investigations by council to guide sustainable growth and development in the Toowoomba Region. The LVIA study area is situated between Toowoomba and the Toowoomba Enterprise Hub (Charlton Wellcamp) and is bounded by the Toowoomba Bypass (now part of the Warrego Highway) to the west, Gore Highway to the south, rail line in the north and Boundary Street in the east. It	• Projected population growth, investment in major transport infrastructure (Gore and Warrego Highways, Toowoomba Bypass (now part of the Warrego Highway), Brisbane West Wellcamp Airport and Inland Rail are all key drivers of this study). • The creeks, hills and western escarpment are identified as distinctive landscape character elements of the region • The report outlines 10 key strategic directions to guide development in the region, relevant extracts are noted below: ○ 3. Communities Framed by Green: Creating a Connected Greenspaces Network - Establish a major greenspace network focused on the natural vegetated features of the creek corridors, the Toowoomba Escarpment and hills. These features physically and visually define the communities and contribute to the West Toowoomba sense of place.

Legislation, policy or guideline	Relevance to the Project
includes the localities of Cotswold Hills, Torrington, Glenvale West and Westbrook.	○ The greenspace network will have multiple functions including providing a high amenity setting for future residential development ○ 4. Strategic Transport Corridor: Protecting Key Movement Networks – The identified corridor is of strategic importance, accommodating the major interstate transport routes of the Warrego Highway (including recently opened Toowoomba Bypass) and railway, and potential future transport related activities ○ 9. West Toowoomba Identity: Connecting City and Country - Views to the Toowoomba Escarpment, as well as the backdrop of open rural plains and scattered hills, create an identity recognised distinctly as West Toowoomba and the gateway between Toowoomba City and the Darling Downs ○ New development contributes to the distinctive sense of place by marking important gateways, such as key transport corridors and at major community facilities, through appropriate building, signage and landscaping and maintaining scenic views and vistas, such as along roads and open space • The report also references significant view corridors and areas of environmental value that should be preserved and enhanced to retain the sense of place in the impact assessment area identified in the Scenic Amenity and Landscape Character Assessment (Jensen Planning and Design, 2016) • The structure plan responds to recommendations in the Scenic Amenity and Landscape Character Assessment and is considered to be compatible with retaining high quality scenic amenity and landscape character outcomes, for example by: ○ Preserving important views to peaks, ridgelines and escarpment such as Gowrie Mountain ○ Establishing connections with existing parkland e.g. Mt Peel and the Cranley Escarpment ○ Providing open space that capitalises on view corridors ○ Providing green networks along water courses. • Relevant provisions are described further in Section 5.1: Regional landscape context • The structure plan contributes to the West Toowoomba identity by: ○ Establishing distinctive compact urban neighbourhoods with a defined urban edge ○ Maintaining scenic views and vistas, such as along roads and greenspace ○ Marking important gateways such as key transport corridors and at major community facilities through appropriate building, signage and landscaping ○ Establishing boulevards with distinctive tree planting along key roads and approaches.

Legislation, policy or guideline	Relevance to the Project
	- Specific scenic views and vistas have been identified by the report that fall within the impact assessment area (outlined below). The plan seeks to preserve and enhance these vistas which include: - Elevated view points along the western Toowoomba Escarpment – looking west across the central plains area (for example view G located west of Cotswold Hills) - Central plains in vicinity of Oestreich Road – looking east towards the treed escarpment (away from the Project) - Locations around Gowrie Junction Road, in the vicinity of the Toowoomba Bypass (view B and C) - Mt Peel to Gowrie Mountain (and along Drayton Wellcamp Road) – long distance views provide a strong sense of place as there is a full mix of different landscapes and looking east a very significant view of the escarpment and treed peaks - Scattered hills within the lower plains and along the Toowoomba Escarpment such as Harvey Court Park provide relief in the landscape.
<u>West Toowoomba Land Use Investigation Study Compendium – Background Information (TRC 2016)</u>	- The report summarises the findings of the <i>Scenic Amenity and Landscape Character Assessment</i> (Jensen Planning + Design, 2016), and recognises the importance of significant natural environment features of ridgelines, vegetated peaks and water courses, as well as unique views and vistas - The rural landscape character is also identified as being significant within the area.
<u>Highfields, Meringandan & Meringandan West Local Plan Report (Deicke Richards 2013)</u>	- The report has a section titled “Scenic Amenity & Greenspaces”, that states: <i>...the area contains significant scenic amenity with rural uses and views in the west and greenspace views in the east. It also contains some regional greenspace in TRC ownership, with several large blocks along the eastern escarpment containing important biodiversity values. Development in greenfield areas must ensure that views and vistas are maintained to protect the scenic values of the locality. The preservation of existing and planned biodiversity corridors will contribute to maintaining the scenic amenity within the area</i> - Section 4 Vision and Principles includes the following Vision 2: Cradled by Green: <i>The identity and character of Highfields, Meringandan and Meringandan West is reinforced by maintaining rural and vegetated buffers between these existing communities. Maintaining a separate identity was identified as important to both communities. Creek corridors, rural landscape, natural areas with significant vegetation and other green links are used to define these localities by providing physical separation. The escarpment is an important natural area of the Highfields and Greater Toowoomba locality. Proposed bridle and walking trails capitalise on the natural beauty of the area and enable both regional and local connection.</i>

Legislation, policy or guideline	Relevance to the Project
	• Vision 3: Green fingers: ◦ <i>A network of parks and open spaces are created through Highfields, Meringandan and Meringandan West. This includes a range of spaces from local and regional parks to multipurpose vegetation, drainage corridors, and protected natural areas. These parks and open spaces promote an active lifestyle and contribute to scenic amenity.</i> • Vision 5: Country Boulevards: ◦ <i>Street trees and public realm landscape works reinforce the character of the place and provide a gateway to the locality. Important gateways and entries are reinforced through enhanced signage and landscape treatments. Key streets in the local plan area act as boulevards with enhanced street tree planting reinforcing the rural aesthetic of the locality.</i>
<u>Draft Lockyer Valley Planning Scheme</u> Lockyer Valley Regional Council is in the process of producing a draft Lockyer Valley Planning Scheme. Until its adoption, the planning schemes currently in force and effective across the Lockyer Valley LGA are those of the former Gatton and Laidley Shires which were in place when these shires were amalgamated to form the Lockyer Valley Regional Council on 15 March 2008.	• This draft planning scheme is relevant to the parts of the Project alignment that runs through Lockyer Valley LGA • As a result of feedback during the public consultation period and the passage of the <i>Planning Act 2016</i> by the Queensland Parliament, Lockyer Valley Regional Council has determined to review the content of the draft planning scheme and prepare an amended planning scheme document and amended mapping. • The draft Lockyer Valley Planning scheme is still under review by the State government. • The exception is in the Grantham area, where the Grantham Reconstruction Area Development Scheme prepared by the QLD Reconstruction Authority has been in force and effect since 4 August 2011.
<u>Gatton Shire Planning Scheme (Gatton Shire Council 2007)</u> The Gatton Shire Planning Scheme regulates development within the former Gatton Shire (with the exception of the area that is subject of the Grantham Reconstruction Area Development Scheme). The planning scheme divides the area into zones with associated codes.	• Most of the LVIA study area is zoned "Rural – Agricultural" and "Rural-General", however, it also intersects land zoned as "Urban Residential", "Open Space and Recreation", "Industrial", "Commercial", "Community Facility", "Park Residential", "Rural Residential (Existing Rural Residential)", "Rural Residential (Homestead Residential)" • Section 3.1 discusses desired environmental outcomes making specific reference to the following desired outcome under the heading of 'Character and Landscape Quality': ◦ (e) The rural character, significant natural features, cultural heritage and landscape values of the Shire are protected and enhanced. • Section 6.1.1 Earthworks Code states that the purpose of the code is to ensure that earthworks, including that not associated with a material change of use or building work: do not adversely affect the visual character or amenity of the site and the surrounding area • Section 6.13 Specific Outcomes: seeks to ensure that: ◦ P1 Earthworks do not: ◦ (b) impact adversely on the visual amenity or privacy of surrounding premises including public places ◦ (e) adversely impact visual significance of the site.

Legislation, policy or guideline	Relevance to the Project
	○ P2 Earthworks minimise potential dust, odour or noise emissions and their impact on the amenity of adjoining premises and public places. ○ P4 Retaining walls and batters are designed, constructed and landscaped to: ○ (b) minimise the visual impact on any public place or adjoining land • Section 6.15 Landscaping Code states that the purpose of the code is to ensure that new development includes landscaping to a standard which will contribute to and strengthen the amenity and attractiveness of the Shire. Landscaping: ○ (5) enhances the appearance of the development and contributes to the positive streetscape character ○ (6) effectively buffers incompatible or sensitive uses where necessary ○ (8) minimises or mitigates adverse impact of development on the amenity of surrounding areas. • Section 6.17 Specific Outcomes states: ○ P1 Landscaping associated with new development is designed, established and maintained in a manner which: ○ Achieves a high-quality frontage appearance that positively ○ Contributes to the streetscape character ○ Screens the views of unsightly buildings, structures, open storage and refuse areas and the like from public view ○ Integrates existing site attributes into the development including natural landform, existing vegetation, site views, availability of water and drainage ○ Maintains lines of sight along State-controlled roads. ○ P2. A landscape buffer is provided between the new development and existing or likely future incompatible/or sensitive uses on adjoining land such that the privacy and amenity of the adjoining use will be maintained, and a sensitive interface provided. • 6.19 Lighting Code seeks to ensure lighting associated with new development contributes to and strengthens the Shire image. Lighting: ○ (2) creates pleasant and safe working and living environments; ○ (5) enhances the appearance of the development and contributes to the positive streetscape character; ○ (6) effectively buffers incompatible or sensitive uses where necessary; ○ (9) minimises or mitigates adverse impact of development on the amenity of surrounding areas.

Legislation, policy or guideline	Relevance to the Project
	• P2. Outdoor lighting provides a sense of security, is consistent with the character of the local area and does not cause unreasonable disturbance or nuisance because of emission of light.
<u>Scenic Amenity of the Lockyer (Forest Images, 2002)</u> This document provides a comprehensive inventory and assessment of scenic quality within the Lockyer region and proposes a series of management objectives that will protect, maintain, and enhance scenic amenity. This study has been based on the approach developed by the Regional Landscape Strategy Advisory Committee (RLSAC), which was developed in response to the South East Queensland Regional Framework for Growth Management (RFGM) (Queensland Regional Coordination Committee, 2000).	• This document includes recommendations and strategies for the management of scenic amenity, that informed the development of the planning schemes of Gatton, Laidley and Esk shires • Identified areas of high scenic preference within the LVIA study area include: ○ Parts of the Great Dividing Range from Glen Rock to the vicinity of Toowoomba ○ Parts of Helidon Hills near gorges and peaks.
Grantham Reconstruction Area Development Scheme (Queensland Reconstruction Authority 2011)	• While the Project does not directly impact land covered by the Grantham Reconstruction Area Development Scheme, zoned for "Community Purposes", it falls within the LVIA study area • Land impacted by the Inland Rail Program is shown in the scheme as future dedication to DTMR • This land is intended to house a significant showground site for the Lockyer Valley. The precinct will cater for a broad range of events, including large agricultural and industry shows that require a significant area of land. • The land use plan includes the proposed future rail corridor. Therefore, the future intent to construct a railway through the Showgrounds precinct is consistent with the expectations for the area following the protection of the Gowrie to Grandchester rail corridor.

4 Methodology

The LVIA methodology has been developed with reference to guidelines and techniques used in Australia and internationally, including:

- *Guidance Note for Landscape and Visual Assessment (GNLVA)* (Australian Institute of Landscape Architects (AILA) QLD, 2018)
- Guideline for landscape character and visual impact assessment - Environmental impact assessment practice note EIA-N04 (RMS, 2018)
- *Guidelines for Landscape and Visual Impact Assessment – Third edition* (GLVIA 2013) (Landscape Institute and Institute of Environmental Management and Assessment, 2013)
- *Guidelines for Landscape and Visual Impact Assessment – Second edition* (GLVIA 2002) (Landscape Institute and Institute of Environmental Management and Assessment, 2002)
- *South East Queensland Regional Plan Implementation Guideline No 8 Identifying and protecting scenic amenity values* (DSDILGP 2007)
- *Technical Guidance Note TGN 06/19: Visual Representation of Development Proposals* (Landscape Institute, 2019)
- *Landscape Institute Advice Note 01/09: Use of photography and photomontage in landscape and visual assessment* (Landscape Institute, 2011)
- *Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity* (Scottish Natural Heritage and The Countryside Agency, 2006)
- *Australian Standard 4282 – Control of Obtrusive Effects of Outdoor Lighting* (Standards Australia, 1997)
- *Guidance Notes for Reduction of Obstructive Lighting* (The Institution of Lighting Engineers UK, 2005).

As described in the GNLVA (AILA, 2018):

“Landscape and Visual Assessment (LVA) is an essential tool of reconciling development with landscape and scenic values and promoting better outcomes for our communities.”

4.1 Definition of the LVIA study area

For the purposes of the assessment, an LVIA study area has been defined as the area illustrated in **Figure 2: LVIA study area**. The LVIA study area aims to establish the area within which the Project has potential to influence landscape and/or visual values and receptors.

The LVIA study area is a 10 km offset from the centreline of the Project alignment; a distance derived from VAM and fieldwork. The Project commences north of Charlton, where it connects to the B2G project, and then travels east parallel to the QR West Moreton System rail corridor (Western Line) for approximately 4.8 km before diverging south through the Toowoomba Range with an approximately 6.24 km long tunnel beneath Cranley, Mount Kynoch and Ballard, including an intermediate ventilation shaft and building infrastructure at Cranley. On the eastern side of the tunnel, the Project continues down the Toowoomba Range, past Postmans Ridge, where it crosses Lockyer Creek, after which it parallels the QR West Moreton System rail corridor (Main Line), to connect with the H2C project, to the north-west of Helidon.

The definition of the LVIA study area limits is based on:

- The horizontal and vertical alignment for the Project

- Assumptions regarding the likely extent of visibility of projects of this nature, based on experience of previous similar projects in Australia such as the LVIA for the SFRC (AECOM 2008). It is considered unlikely that any visual receptors located beyond the boundary of the 10 km LVIA study area will be able to obtain views of the Project. However, it is noted that the Project connects to the adjacent B2G and H2C Inland Rail projects, considered further in Section 10: Cumulative impacts.
- VAM, as described below, which establishes the theoretical viewshed of the Project based on landform
- Refinement based on views obtained during the field survey stage.

4.2 Desktop assessment

A desktop analysis of existing landscape character and visual amenity for the Project and wider LVIA study area, as defined in **Figure 2: LVIA study area**, was undertaken to inform this LVIA. The desktop analysis comprised assessment of the underlying topography, land cover and landscape values. Information sources that have been identified and reviewed through the desktop analysis include:

- Relevant planning schemes, policies and guidelines from local councils and the QLD and NSW state governments (see **Section 3: Legislation, policies, standards and guidelines**)
- Publicly available information on recreation spaces and public visitor areas
- Traffic count data, based on traffic census data for the QLD State-controlled road network (2019) and is generally consistent with the traffic and transport assessment undertaken as part of the EIS (refer EIS Appendix U: Traffic impact assessment)
- Digital aerial photography (Google Earth, 2020 and ESRI)
- Cadastral data (showing roads, property boundaries and built areas)
- QLD bioregion data Interim Biogeographic Regionalisation for Australia (IBRA) Environmental Resources Information Network (ERIN)
- ARTC-provided LIDAR survey, resampled to 20 m
- Geoscience Australia Digital Elevation Model (DEM-S-1S) data - landform and topography
- EPBC Act Protected Matters Search Tool - Matters of National Environmental Significance
- Department of Regional Development, Manufacturing and Water, formerly the Department of Natural Resources, Mines and Energy (DNRME) – Watercourse Identification Mapping
- Department of Environment and Science (DES) - Matters of State Environmental Significance
- Other GIS information available online, including Queensland Globe and Queensland Spatial Catalogue (QSpatial)

4.3 Visibility Analysis Mapping study

The VAM study, sometimes also known as a 'Zone of Theoretical Visibility' (ZTV), comprises a digitally mapped representation of the area within which a proposed development may have an influence or effect upon views and visual amenity. It is used as a desktop tool to inform the visual assessment, including selecting representative viewpoints for more detailed assessment through field survey.

ESRI ArcGIS 10.5.1 software has been used to model the VAM. The viewshed analysis tool in ArcGIS was used to identify the cells in the Digital Elevation Model (DEM) that are potentially visible from the observation features, which are selected mapped points along the rail alignment at approximately 500 m intervals and their known elevations. The DEM was derived from a combined DEM lidar survey (resampled to a raster size of 20 m) within 5 km and Shuttle Radar Topography Mission (SRTM) (DEM1s) data beyond this distance (at 30 m resampled back to 20 m).

Cells in the DEM that are in the theoretical visible line of sight of each part of the rail line are given the value of 1 (potentially visible). Cells that are not in the line of sight of each observation feature, due to being obscured by intervening landform, are given the value of 0 (not visible). The digitally-mapped representation indicates how many of the observation points are theoretically visible based on topography over the extent of the LVIA study area. No colour is applied to areas that are not visible from any observation points with blue, turquoise, yellow, orange and red colour added with increasing number of observation points potentially visible (up to a maximum of 50).

The calculation of the VAM does not take into account any built development, which can locally reduce the availability of receptors views. However, based on field observations, it is considered that because built development within the LVIA study area is generally minimal, it would be unlikely to meaningfully affect the extent of the identified visible zone. VAMs also do not account for vegetation which can significantly affect visibility locally and over large forested areas (such as state forests) but provides a coarse level of analysis to guide the fieldwork as described below.

An additional VAM was produced during the assessment period indicating the height of the double stacked train (i.e. to a height of 7.5 m above the rail alignment).

Further analysis was undertaken to compare the VAM of permanent infrastructure with the VAM of the double stacked train. This assisted in determining the extent to which the operational rolling stock may affect visibility of the Project. Preparation of a VAM comparing the difference between operational infrastructure and the rolling stock assisted further.

Collectively the VAM outputs were used with other desktop information (such as cadastral information indicating the likely presence of visual receptors) to assist in identifying view sheds and potential major views and outlooks for further analysis in the field, to meet the requirements of the ToR to assess the visual impact of the construction and operation of the Project on major views, view sheds, outlooks, and features contributing to the amenity of the area as described in **Section 2.1: Project Terms of Reference**. The results of the VAM are described in **Section 5.3: Visual assessment baseline**.

4.4 Field assessment

Three field visits to assess the LVIA study area were carried out from 24 to 26 October 2018 and on the 3 September 2019 and the 24 March 2020. These were undertaken by a landscape planner with extensive experience in LVIA accompanied by a landscape architect skilled in landscape photography.

The purpose of the field assessment was to ground truth the findings of the desktop assessment and to assess landscape character and visual amenity, including identifying sensitive viewpoints requiring further assessment. Photographs were taken to:

- Portray landscape character
- Inform the viewpoint assessment from representative viewpoints
- Provide base images to produce visualisations.

The field visit focused on aspects of the landscape with potential to be of the greatest sensitivity to the Project and to understand the Project infrastructure that is most likely to affect landscape character and visual amenity values.

4.5 Stakeholder and community consultation inputs

Community perception of Inland Rail is an important consideration in assessing the landscape and visual impact of the Project. Therefore, a stakeholder and community engagement process has been developed for the Project. Relevant feedback from preliminary consultation activities undertaken by others (including as part of the Social Impact Assessment - refer EIS Appendix Q: Social impact assessment) has informed the LVIA, where appropriate. Issues raised during consultation that have informed the landscape and visual assessment process include:

- General comments about impacts related to the construction and/or operation of the Project on rural and town amenity.
- Concerns about impacts upon the amenity of individual properties, most notably those adjacent the Gowrie Junction Road bridge, due to the grade separated structure.

This includes, for example, selection of particular viewpoints for the visual assessment reflecting community concerns and informing the sensitivity of identified landscape and visual values.

Visualisations have subsequently been developed to inform the LVIA and communicate the impacts of the Project to stakeholders. Feedback from stakeholders and the community on these visualisations has, where appropriate, informed the assessment. The visualisation process is described further in **Section 4.9: Visual impact assessment methodology**.

4.6 Identification of potential Project impacts

This component of the LVIA includes describing infrastructure that is likely to be associated with the Project, such as infrastructure associated with the Toowoomba Range tunnel portals and intermediate ventilation building, the presence of embankments, bridges and viaducts, cuttings, fencing and noise barriers.

The potential for impacts of different types across a range of Project phases, scales and timeframes are considered, including:

- Temporary (short-term) and permanent (long-term)
- Reversible and irreversible
- Beneficial, neutral and adverse
- Daytime and night-time (lighting)
- Construction and operation
- Cumulative.

These potential impacts are further discussed in **Section 6: Potential impacts**.

4.7 LVIA methodology overview

The LVIA methodology is a significance assessment which has been applied to environmental values that will be impacted by the Project where impacts cannot be quantified. Unlike some other technical disciplines there are no established, measurable thresholds of significance for defining either landscape or visual impacts, although there are some standards associated with lighting. The purpose of the LVIA process is to determine the level of significance of impacts on landscape and visual amenity, during day and night, during both the construction and operation phases of the Project.

The significance of a potential impact is assessed in terms of the sensitivity (or vulnerability) of the environmental value, and the magnitude of the potential impact. The LVIA significance methodology is, therefore, determined by considering the sensitivity of the landscape or visual receptor (that is, the landscape or person experiencing a view) and the magnitude of change to the receptor anticipated as a result of the Project.

It is noted that the LVIA methodology has defined its own thresholds for sensitivity and magnitude that are different to the criteria in EIS Chapter 4: Assessment methodology and follow criteria and principles more widely-used for the assessment of landscape and visual impacts. This is because many landscape values, including views, are rarely listed on State, national or international registers. Assessment at the local government level of landscape and visual values is also not always available and is frequently inconsistent. Therefore, establishing common criteria specific to landscape and visual values is more likely to result in a fair assessment of values and sensitivity. Similarly, magnitude criteria need to be defined that recognise the range of factors relevant to LVIA, for example the number of people experiencing a change in view and the intensity of the change.

The significance assessment matrix has also been streamlined to remove 'major' for sensitivity and magnitude established in EIS Chapter 4: Assessment methodology since these thresholds are difficult to translate to landscape and visual values. For example, 'major sensitivity' elements are not anticipated to be present since there are no 'entirely intact' landscapes within the LVIA study area as all landscapes have been influenced by human activities. Similarly, 'major magnitude' is unlikely because any Project impacts on landscape or visual values would be reversible, with sufficient time and budget.

Although related, landscape, visual and lighting impacts are considered separately for clarity. This process is illustrated in **Plate 1** and described in further detail in **Section 4.8: Landscape impact assessment methodology**, **Section 4.9: Visual impact assessment methodology** and **Section 4.10: Lighting impact assessment methodology**.

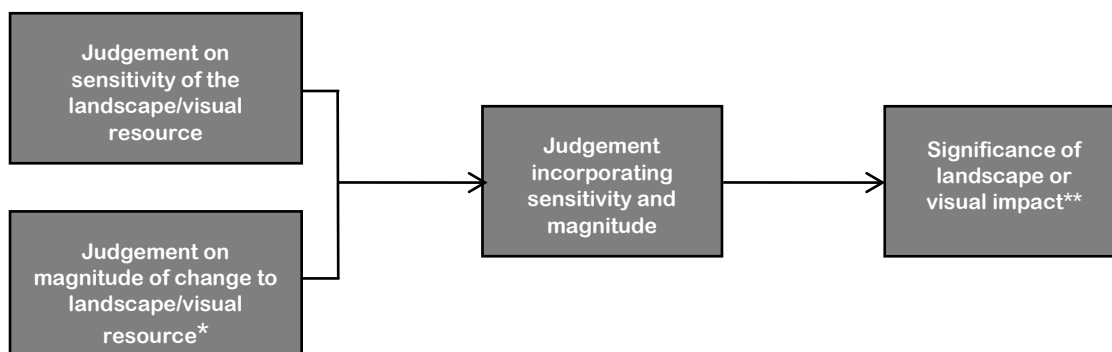


Plate 1: Landscape and Visual Impact Assessment Process

* There is no standard methodology for the quantification of the magnitude of effects; however, it is generally based on the scale or degree of change to the landscape or visual resource, the nature of the effect and its duration.

** Overall landscape or visual impact is determined by combining the sensitivity of the landscape or visual resource with the magnitude of change. Professional judgement is used to determine the overall significance of impact based on these two elements.

While the values placed on views and landscapes may be culturally influenced, the GNLVA (AILA, 2018) states the following general principles have been consistently found in scenic preference studies and community consultation:

- Water and natural elements are preferred over urban scenes
- Mountains and hills are preferred over flat land

- Views are preferred which include both mid-ground elements (with some detail discernible) and a background
- Views with skyline features and views which include focal points are preferred
- Views dominated by, or with a high proportion of attractive features (such as mountains) are considered to be more attractive, and hence more important to retain, than those with only a minor or distant proportion of such elements
- Panoramic views with a number of such distinctive elements are more attractive and worthy of protection than narrow view corridors or a line of sight to a single element
- Diversity is generally preferred over uniformity, and heritage over modernity, but these need to be balanced with preferences for consistency and coherence of built form, which are also valued
- Viewpoints (including residences and public places) may have primary views in one direction (e.g. to an attractive or distinctive feature) and secondary views in other directions. The distinction may be related to desirability of views (e.g. river views), viewing distance, or to the orientation of viewpoints (e.g. lookouts).
- Discordant elements which contrast markedly with their otherwise-attractive settings are often regarded as having a detrimental impact on amenity. This depends on the viewing distance and proportion of view affected, and overall design.
- Views from accessible public spaces (e.g. streets, lookouts, parks etc.) are valued more than views available only from private residences.

4.8 Landscape impact assessment methodology

The landscape assessment is based upon an analysis of landscape character, including those landscape features that contribute to the amenity of the area; particularly any landscape values identified in legislation or planning documents during the desktop phase or through community and stakeholder consultation.

Landscape Character Assessment is a tool for identifying what makes one place different from another. It identifies what makes a place distinctive, without necessarily assigning a value to it. This approach has been used to establish the existing character of the landscape to provide a framework for measuring the impact of the Project on landscape character. Landscape Character Types (LCTs) have been defined and, where necessary, these have been further subdivided into geographically distinct Landscape Character Areas (LCAs). It is noted that:

- LCTs are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern.
- LCAs are single unique areas and are the discrete geographical areas of a particular LCT.

The general character of the landscape and the identified LCTs are described in **Section 5.1:**

Regional landscape context.

4.8.1 *Landscape sensitivity*

The sensitivity of a landscape is judged on the extent to which it can accept change of a particular type and scale without adverse effects on existing landscape character and values. Therefore, assessment of sensitivity is based on the scale and location of the Project and how this relates to the landscape characteristics of the LVIA study area. For example, undulating forested landscapes may be sensitive to removal of vegetation and creation of cuttings. Sensitivity to change also considers landscape values protected by legislation or policies (such as national parks or locally-valued landscapes protected in a local planning scheme).

- Levels of sensitivity vary according to the type of development and the nature of the landscape. Key aspects that have been considered when identifying the level of sensitivity associated with each LCT defined in **Table 6** include:
 - The landscape's inherent values (e.g. perceptual qualities, cultural importance, and any specific values that may apply such as landscape planning designations, as described in **Section 3: Legislation, policies, standards and guidelines**).
 - The landscape's ability to absorb changes associated with the Project (e.g. the extent to which the Project may fit or be absorbed into the landform, land use, pattern, scale or texture of the existing landscape).

Table 6: Defining landscape sensitivity

Sensitivity of landscape	Attributes of landscape sensitivity categories
High	A landscape protected by national designation (such as a national park) and/or widely acknowledged for its quality and value; a landscape with distinctive character and low capacity to accommodate the type of change envisaged.
Moderate	A moderately valued landscape, perhaps a regionally important landscape and/or protected by regional/state designation, or where its character, land use, pattern and scale may have some capacity to accommodate a degree of the type of change envisaged.
Low	A landscape valued to a limited extent, perhaps a locally important landscape or where its character, land use, pattern and scale is likely to have the capacity to accommodate the type of change envisaged.
Negligible	A landscape which is not valued for its scenic quality or where its character, existing land use, pattern and scale are tolerant of the type of change envisaged, and the landscape has capacity to accommodate change.

4.8.2 *Magnitude of change to landscape amenity*

The magnitude of change to landscape character depends on the nature, scale and duration of the change that is expected to occur. The magnitude of change also depends on the loss, change or addition of any feature to the existing landscape and is based upon that part of the LCT which is likely to be impacted to the greatest extent by the Project before the application of any mitigation.

Magnitude of change is described as Negligible (barely perceptible change), Low (noticeable change), Moderate (considerable change) or High (dominant change), as illustrated in **Table 7**. The descriptions of magnitude and sensitivity are illustrative as there is no defined boundary between levels of impacts.

Table 7: Defining magnitude of change to landscape character

Magnitude of change to landscape character	Typical examples
High	<u>Dominant change</u> : A clearly evident and frequent/continuous change in landscape characteristics affecting an extensive area, which is likely to fundamentally change the character of the landscape.
Moderate	<u>Considerable change</u> : A considerable change in landscape characteristics, frequent or continuous and over a wide area or a clearly evident change, but over a restricted area.
Low	<u>Noticeable change</u> : A noticeable change in landscape characteristics over a wide area or a considerable change over a restricted area but will not fundamentally change the character of the landscape.
Negligible	<u>Barely perceptible change</u> : An imperceptible, barely or rarely perceptible change in landscape characteristics.

4.8.3 Significance of landscape impact

An evaluation of overall potential effects on landscape character is based on the sensitivity of the existing landscape to change and the magnitude of change that is likely to occur. No prescribed methods for assessment of significance of landscape impacts exist; therefore, professional judgement and experience are applied to identify the level of significance. Each landscape receptor is assessed on its own merits, as factors unique to each circumstance need to be considered. However, there are general principles which can be used as a guide to this process that provide transparency about how judgements have been made as described in in **Section 4.7: LVIA methodology overview**. The overall significance of change to landscape amenity is determined by using the matrix shown in **Table 8**.

Table 8: Determining significance of effect on landscape values

Significance of effect		Magnitude of change to landscape amenity			
		High (Dominant change)	Moderate (Considerable change)	Low (Noticeable change)	Negligible (Barely perceptible change)
Sensitivity of landscape	High	Major	High	Moderate	Low
	Moderate	High	Moderate	Low	Low
	Low	Moderate	Low	Negligible	Negligible
	Negligible	Low	Low	Negligible	Negligible

In instances where there is no magnitude of change and no potential impacts on landscape character are anticipated, a judgement of no impact is recorded.

Table 9 describes the classification of significance of impact.

Table 9: Significance classifications

Significance	Description
Major	Arises when an impact will potentially cause irreversible or widespread harm to an environmental value that is irreplaceable because of its uniqueness or rarity. Avoidance through appropriate design responses is the only effective mitigation.
High	Occurs when the proposed activities are likely to exacerbate threatening processes affecting the intrinsic characteristics and structural elements of the environmental value. While replacement of unavoidable losses is possible, avoidance through appropriate design responses is preferred to preserve its intactness or conservation status.
Moderate	Results in degradation of the environmental value due to the scale of the impact or its susceptibility to further change even though it may be reasonably resilient to change. The abundance of the environmental value ensures it is adequately represented in the region, and that replacement, if required, is achievable.
Low	Occurs where an environmental value is of local importance and temporary or transient changes will not adversely affect its viability provided standard environmental management controls are implemented.
Negligible	Occurs where the proposed activities will have a negligible effect on environmental values. This typically occurs where the activities are located in already disturbed areas and/or where sensitivity to the change is low.

4.9 Visual impact assessment methodology

4.9.1 Identification and description of visual receptor audiences and viewpoints

The visual assessment is based upon an analysis of views and viewsheds; particularly any major views or outlooks identified in legislation or planning documents during the desktop phase or through stakeholder and community consultation.

Visual receptor audiences are assessed and described in terms of the views which can be obtained from selected representative viewpoints within the LVIA study area. The specific viewpoints used for the assessment have been selected based upon outputs from the VAM study and field survey (as described in **Section 4.3: Visibility Analysis Mapping study** and **Section 4.5: Stakeholder and community consultation inputs** respectively). Consistent with typical landscape and visual assessment practice, viewpoints on private properties have not been visited or assessed. Where appropriate, publicly-accessible locations nearby have been selected to represent private views.

Potential representative visual receptor audiences and receptors have been identified based on a range of parameters including:

- Proximity of the receptor: the visual receptors most likely to be affected by the Project are typically anticipated to be located closest to the Project, generally within a 5 km of the Project unless located at an elevated vantage point with potential to look down on the Project (therefore the LVIA study area extends to 10 km from the Project)
- Type of visual receptor/visual receptor audience, for example:
 - A permanent resident of a dwelling or homestead
 - Drivers or passengers of vehicles passing through the LVIA study area
 - Members of the public accessing marked recreational areas (for example in national parks, State forests, cycle ways, footpaths and public parks and sportsgrounds)
 - An industrial or commercial worker (excluding those employed as part of the Project).

These visual receptor audiences and representative viewpoints are discussed further in **Section 5.3: Visual assessment baseline** and **Section 8: Visual impact assessment**.

4.9.2 Visual sensitivity

The sensitivity of each viewpoint, and the visual receptor audiences which it represents, is considered to be dependent upon the:

- Importance of the view, its existing scenic qualities and the presence of other existing man-made elements in the view
- Type of the visual receptor audience and their likely interest in the view (e.g. residents, visitors to important/valued landscapes or visitors to non-designated areas, motorists)
- Volume of visual receptors and the duration of time that receptors spend experiencing the view.

The GLVIA2 (2002) states '*changes affecting large numbers of people are generally more significant than those affecting a relatively small group of users.*' Similarly, GLVIA3 (2013) states the visual receptors most susceptible to change include '*... residents at home...people, whether residents or visitors who are engaged in outdoor recreation, including use of public rights of way whose attention or interest is likely to be focused on the landscape and on particular views; ...communities where views contribute to the landscape setting enjoyed by residents in the area*'. This guidance is reflected in the method used to assess the sensitivity of the viewpoints to the Project. For example, views from a regionally important location where viewers' interest is specifically focussed on the landscape (such as views from a scenic viewpoint in a national park) have been judged as having a high sensitivity to change, as have locations with large numbers of residential viewers present who are likely to have prolonged viewing opportunities. In contrast, passing transient views from cars or views obtained by a smaller number of residential viewers are typically judged to have lower sensitivity.

Levels of sensitivity, shown in **Table 10**, vary according to the type of development and the visual receptor audience.

Table 10: Defining visual sensitivity

Sensitivity of viewpoint	Attributes of visual sensitivity categories
High	Large numbers of viewers or those with proprietary interest and prolonged viewing opportunities such as residents and users of attractive and/or well-used recreational facilities. Views from a regionally important location whose interest is specifically focussed on the landscape, for example a national park.
Moderate	Medium numbers of residents (e.g. rural communities and townships) and moderate numbers of visitors with an interest in their environment e.g. visitors to state forests, including bush walkers, horse riders, trail bikers. Larger numbers of travellers with an interest in their surroundings, for example, local designated scenic routes.
Low	Small numbers of visitors with a passing interest in their surroundings or transient views e.g. those travelling along principal roads. Viewers whose interest is not specifically focussed on the landscape, for example, workers, commuters, truck drivers.
Negligible	Very occasional numbers of viewers with a passing interest in their surroundings, for example, those travelling along minor roads and views from the air.

4.9.3 Magnitude of change to visual amenity from representative viewpoints

The magnitude of change to views and visual amenity depends on the nature, scale and duration of the change that is expected to occur. The magnitude of change also depends on the loss, change or addition of any feature in the field of view of the receptor; or any change to the backdrop to, or outlook from, a viewpoint. The significance of effects on a view depend on the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle of view, duration of view and distance from the Project.

Magnitude of change is described as Negligible (barely perceptible change), Low (noticeable change), Moderate (considerable change) or High (dominant change), as illustrated in Table 11. Full descriptions on the magnitude of change from each representative viewpoint are discussed further in **Section 8.1: Viewpoint assessment**.

Table 11: Defining magnitude of change to visual amenity

Magnitude of change to visual amenity	Typical examples
High	<u>Dominant change</u> : Major changes in view at close distances, affecting a substantial part of the view, continuously visible for a long duration, or obstructing a substantial part or important elements of view. Generally, short distances (typically < 250 m) to the nearest Project infrastructure element
Moderate	<u>Considerable change</u> : Clearly perceptible changes in views at intermediate distances, resulting in either a distinct new element in a significant part of the view, or a more wide-ranging, less concentrated change across a wider area. Generally, short to medium views (typically 250 m – 1 km) to the nearest Project infrastructure
Low	<u>Noticeable change</u> : Minor changes in views at long distances or visible for a short duration, and/or are expected to blend in with the existing view to a moderate extent. Generally, medium to long distance views (typically 1 km – 2.5 km) to the nearest Project infrastructure
Negligible	<u>Barely perceptible change</u> : Change which is barely visible at a very long distance or visible for a very short duration, and/or is expected to blend with the existing view. Distant views (generally, > 2.5 km) to the nearest Project infrastructure.

4.9.4 Significance of visual impact

Impacts on the visual resource have been described by representative views in the LVIA study area. Impacts can be short-term (i.e. those occurring during installation/construction of a development) or long-term (i.e. those lasting for the lifetime of the Project). In addition, they can be widespread (i.e. taking up a large proportional change in the view) or localised.

The evaluation of overall potential impacts on visual amenity is based on the sensitivity of existing views to change and the magnitude of change that is likely to occur. No prescribed methods for assessment of significance of impacts on visual amenity exist; therefore, professional judgement and experience are applied in order to identify the level of significance. Each viewpoint is assessed on its own merits, as factors unique to each circumstance need to be considered. However, the general principles outlined in **Section 4.7: LVIA methodology overview** and this section provide transparency about how judgements have been made. The overall significance of change to landscape amenity is determined by using the matrix shown in **Table 12**.

Table 12: Determining significance of effect on visual values

Significance of effect		Magnitude of change to visual amenity			
		High (Dominant change)	Moderate (Considerable change)	Low (Noticeable change)	Negligible (Barely perceptible change)
Sensitivity of views	High	Major	High	Moderate	Low
	Moderate	High	Moderate	Low	Low
	Low	Moderate	Low	Negligible	Negligible
	Negligible	Low	Low	Negligible	Negligible

In instances where there is no magnitude of change and no potential impacts on visual amenity are anticipated, a judgement of no impact is recorded.

Classification of significance of impact is considered as described in **Table 9** above.

4.9.5 *Preparation of visualisations*

Visualisations are artist's illustrations that aim to represent an observer's view of a proposed development. For the purposes of this assessment, visualisations have been prepared to represent the potential visual impact of the presence of the Project from a selection of the representative viewpoints identified. Visualisations have been used to:

- Assist with community and stakeholder consultation through providing an artist's impression of features of the Project that affect key views identified in the assessment
- Illustrate the visual impact assessment to assist in the interpretation of the findings
- Validate the assessment of magnitude of change
- Inform the development of mitigation measures by identifying opportunities for Project modifications, including landscape and urban design proposals (such as screen planting or alternative materials), to help integrate the Project into its visual and landscape setting.

Visualisations have not been prepared for all viewpoints, rather visualisations have been selected on the basis of those illustrating key infrastructure elements likely to be of interest to the community and/or the most sensitive viewpoints, such as from regionally-significant scenic lookouts.

The methodology for the visualisation production has been based on State and international guidance including the GNLVA (AILA, 2018), GLVIA3 (Landscape Institute and Institute of Environmental Management and Assessment, 2013) and *Landscape Institute Advice Note 01/09: Use of photography and photomontage in landscape and visual assessment* (Landscape Institute and Institute of Environmental Management and Assessment, 2011). Consideration has also been given to the Landscape Institute Technical Guidance Note: *Photography and Photomontage in Landscape and Visual Impact Assessment, Public Consultation Draft* 2018-06-01 (Landscape Institute and Institute of Environmental Management and Assessment 2018).

The visualisations have been generated using the following sequential method:

- Step 1: Select and prepare candidate field imagery for photomontage base (field panorama preferred viewpoint):
 - Select preferred field photo location as part of representative LVIA condition
 - Choose a sequence set of field photos from this location representing 75° horizontal field of view (H-FOV) (generally 2-3 overlapping images)
 - Create combined panorama from raw imagery and crop to 75°
 - Note GPS location of chosen panorama camera position.
- Step 2: Assemble 3D design model on terrain model for each viewpoint
 - Import georeferenced 2 km x 2 km meshed terrain model Triangular Irregular Network (TIN) to SketchUp as base for Project design visualisation
 - Drape georeferenced high resolution ortho aerial photography Enhanced Compression Wavelet (ECW via AutoCAD) onto TIN Mesh
 - Create surface meshes from 3D Civil design geometry strings and insert into terrain model (12D Exports to DWG) – then inserted into the Sketchup Program (computer program) with geo-reference
 - Add Structural Design Geometry of bridges and other design structures. (Export from Revit as an Industry Foundation Classes (IFC) file and insert)

- Cross check master assembly of geometries against contemporaneous general arrangement plans, sections and other documents
- Cross check to ensure civil geometry closely matches terrain model (especially batters/earthworks).
- Step 3: Camera match field panorama in 3D design model
 - Create camera frame in 3D model with 75° H-FOV
 - Locate approximate camera position in model based on GPS coordinates and field notes, set bearing and set camera height to photographer's eye height. Generally positional accuracy at this stage is +/- 5 m.
 - Create positional massing of existing site features (buildings, power poles, isolated trees, fencing and others) that are identifiable on both aerial and site photography
 - Fine-tune camera position by superimposing field panorama and 3D model viewport. Positional iterations at this stage aim to locate 3D camera within 1 m of actual field position.
- Step 4: Site detail and entourage
 - Create or import site furniture or design detail, materials, planting, texture necessary or having significant visual impact or effect on visual character of the scene
 - Create and insert suitable distribution of entourage and vehicles. Generally, this means illustrating a track use condition showing close proximity of typical representative double-stacked freight traffic.
- Step 5: 3D rendering and photomontage creation
 - Render 3D model at suitably high resolution for desired production outputs. For this LVIA reporting this is 7500 x 2500 pixels
 - Composite rendered image with field panorama image using Adobe Photoshop
 - Postprocessing and repair to existing site features. Remove and demolish site features (such as poles, trees and buildings) and make good any ground features to be altered permanently during construction.
 - Mask parts of rendered image that can be better represented by parts of field image (generally terrain)
 - Introduce new elements to the view including any proposed mitigation measures such as vegetation.

Every reasonable effort has been made to ensure the images are representative and have not been manipulated to downplay the extent of impact. It is noted that visualisations produced are representative of the Project design at the time of preparing the LVIA and may be subject to change during the future design phases.

To ensure the photomontages consistently present a view which is representative of the human eye, the field assessment photographs were taken at around average human viewing height (typically considered to be 1.5 m). The photos were taken using a Canon EOS 6D Mark II body with a Sigma 50 mm f/1.4 DG JSM lens. The Canon EOS 6D is a full sensor lens. Using a 50 mm lens it has an equivalent field of view (FOV) as a standard Single Lens Reflex using 35 mm film and 50 mm focal length, which is the standard (albeit technologically outdated) recommendation for obtaining photographs that are representative of the human field of vision (40°).

Photo stitching software and Adobe Photoshop were used to piece together the adjoining images to produce a field of vision of approximately 75° that is considered representative of the human field of view. Although the parameters of human vision when stationary is often quoted as falling between the 45-60° (Scottish National Heritage, 2006), humans generally move their eyes, heads and bodies as necessary to experience a view. Therefore, a wider field of view has been used for the photomontages with 75° insets of key portions of the field of view, which is in line with good practice.

Photomontages and visualisations should be viewed at the correct 'viewing distance'. Very simply, if the hard copy of the photomontage is held too close to the eye, the elements in the scene will appear too big; if it is held too far away, the elements will appear too small; and there is only one distance at which the photograph will match the real scene (the correct viewing distance).

The visualisations have been illustrated on A4 landscape pages, although could be printed at A3. The recommended viewing distance for each photomontage is determined by the image size and field of view and is represented in **Plate 2**.

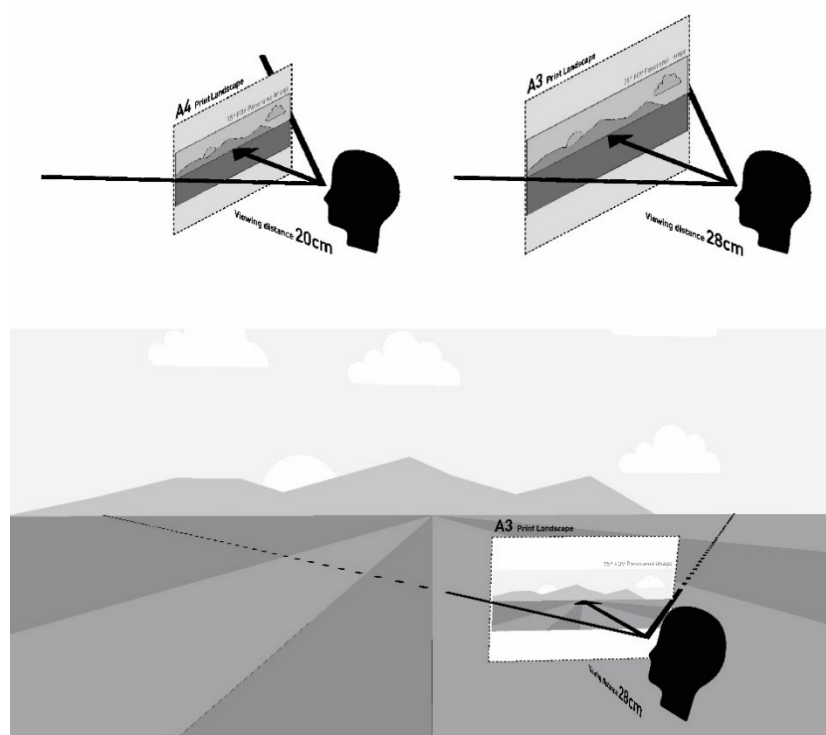


Plate 2: Recommended viewing distance for photomontages and visualisations

4.10 Lighting impact assessment methodology

The lighting assessment is based upon an analysis of representative views identified through the visual assessment. Lighting impacts are considered during both the construction and operation phases of the Project.

It is anticipated that construction work, including tunnelling, would be undertaken during the following primary Project construction hours:

- Monday to Friday – 6.30 am to 6.00 pm
- Saturday – 6.30 am to 1.00 pm
- No work on Sundays or public holidays

- Spoil haulage and tunnelling activities will proceed on a 7 day/24 hour basis
- Track possessions, when the construction contractor has control over an operating railway, will proceed on a 7 day/24 hour period
- Track possession of QR assets will generally be allocated over weekend periods, with extended track possession occurring over holiday periods.

Works outside of primary Project construction hours may occur throughout the duration of the construction program and may involve:

- Delivery of concrete, steel, and other construction materials delivered to site by heavy vehicles
- Movements of heavy plant and materials
- Roadworks to arterial roads.

Extended working hours would be considered permissible where there are no nearby sensitive receptors or impacts to receivers can be appropriately managed. Any changes to working hours would be supported by assessing impacts to sensitive receptors.

ARTC will consult with QR to determine the optimum timing and duration for temporary possession of QR network during construction of the Project. These details will be finalised prior to the commencement of construction.

Construction works are proposed after dark; lighting for construction activities will comprise night time security lighting of compounds and laydown areas as well as some additional sites where night time construction works will be required. Permanent lighting associated with the Project will be minimal, and includes lighting associated with the train headlight, tunnel portals (e.g. Toowoomba Range tunnel control centre, ventilation buildings, associated infrastructure) and safety lighting. Therefore, light spill during the construction and operation phases have been assessed through a high-level qualitative assessment.

As there is no prescribed assessment method for assessing the impacts of lighting on visual amenity, guidance and terminology has been taken from Australian Standard 4282 – *Control of Obtrusive Effects of Outdoor Lighting* (1997) and *Guidance Notes for Reduction of Obstructive Lighting* (2005) prepared by The Institution of Lighting Engineers UK. This information has then been combined with the standard method of assessment for impacts on visual amenity. Visual receptor audiences are assumed to be the same as those identified in the visual impact assessment process. The assessment is qualitative, and these locations have not been visited at night to measure existing light levels.

4.10.1 Judgement of visual sensitivity to lighting

The sensitivity of each representative viewpoint to changes in after-dark lighting conditions due to the Project has been based upon elements illustrated in **Table 13** including:

- The proximity of the viewpoint to the greatest lighting source that is associated with the Project
- The public and private accessibility of the representative viewpoint location and the likely number of viewers who will visit the viewpoint.

Full descriptions on the judgements of visual sensitivity to lighting from each representative viewpoint are discussed in Section 9: Lighting impact.

Table 13: Defining viewpoint sensitivity to lighting

Sensitivity of viewpoint	Attributes of viewpoint sensitivity to lighting categories
High	Easily accessible at night with large numbers of viewers or those with proprietary interest and prolonged viewing opportunities located at very close distances (typically less than 200 m) to the light source.
Moderate	Relatively accessible at night with medium numbers of viewers and close to the project or easily accessible with propriety interest but located some distance (typically up to 500 m) from the light source.
Low	Typically, location not accessed at night, with small numbers of visitors with a passing interest in their surroundings e.g. those travelling along principal roads or greater numbers of viewers but located at considerable distance from the light source (typically less than 1 km).
Negligible	Rarely accessed at night. Rural locations with very occasional numbers of viewers with a passing interest in their surroundings e.g. those travelling along minor roads and views from the air or located at greater than 1 km from the light source.

4.10.2 Magnitude of change to lighting from representative viewpoints

The magnitude of change to views and visual amenity due to lighting depends on the nature, scale and duration of the change to lighting that is expected to occur. The magnitude of change also considers any change to the backdrop of, or outlook from, the representative viewpoint. The assessment assumes a worst-case scenario without mitigation. The significance of effect on a view depends on the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view and angle of view.

To enable the judgement of the magnitude of changes in lighting, **Table 14** considers the existing condition against the potential condition. These conditions include:

- Intrinsically dark – inherently remote rural landscapes with minimal artificial lighting other than that which is localised lighting of a dwelling. Typically, no street lighting and no industrial lighting.
- Predominantly dark – commonly rural residential landscapes where dwellings are still largely isolated from one another, creating a relatively dark atmosphere with intermittent sources of lighting (such as street lighting). Industrial lighting may occur in predominantly dark landscapes; however lengthy distances between these sites and residential dwellings result in minimal lighting spill onto private property.
- Predominantly lit – commonly small towns with standard elements of lighting such as street lighting and lighting from residential dwellings, commercial businesses and some industrial lighting
- Brightly lit – town/city centres or large-scale industrial landscapes with high levels of lighting.

The outcome of this judgement will result in either a High, Moderate, Low or Negligible change to lighting conditions from the representative viewpoint. Full descriptions on the magnitude of change from each representative viewpoint are discussed in **Section 9: Lighting impact**.

Table 14: Defining magnitude of change to lighting amenity

Magnitude of change	Typical examples
High	<u>Dominant change</u> : Occurs when an intrinsically dark landscape becomes brightly lit.
Moderate	<u>Considerable change</u> : Occurs when an intrinsically dark landscape becomes predominantly lit or a predominantly dark landscape becomes brightly lit.

Magnitude of change	Typical examples
Low	<u>Noticeable change</u> : Occurs when an intrinsically dark landscape becomes predominantly dark, a predominantly dark landscape becomes predominantly lit or a predominantly lit landscape becomes brightly lit.
Negligible	<u>Barely perceptible change</u> : Occurs when a landscape experiences negligible changes from the existing lighting conditions to the proposed lighting conditions.

4.10.3 Significance of lighting impact

This evaluation considers sensitivity of each representative night time viewpoint and the magnitude of change that is likely to occur. The general principles outlined in this section provide transparency about how judgements have been made. The overall significance of change to lighting amenity and individual viewpoints is determined by using the matrix shown in **Table 15**.

Table 15: Determining significance of effect on lighting values

Significance of effect		Magnitude of change to lighting amenity			
		High (Dominant change)	Moderate (Considerable change)	Low (Noticeable change)	Negligible (Barely perceptible change)
Sensitivity of viewpoint to lighting	High	Major	High	Moderate	Low
	Moderate	High	Moderate	Low	Low
	Low	Moderate	Low	Negligible	Negligible
	Negligible	Low	Low	Negligible	Negligible

In instances where there is no magnitude of change and no potential impacts on lighting amenity are anticipated, a judgement of no impact is recorded.

Classification of significance of impact is considered as described in **Table 9** above.

4.11 Mitigation and Residual Impact Assessment

Mitigation describes measures that can be implemented to avoid or reduce potential impacts to as low as reasonably practicable, based on the hierarchy of avoid, minimise, manage and offset. The aim of mitigation identified in the LVIA is to protect identified landscape and visual values. Measures may be implemented through Project design, construction methods, operating and/or maintenance procedures.

Some measures to avoid, mitigate and manage potential impacts form part of ARTC's standard environmental management procedures and, therefore, constitute the base case prior to the implementation of the identified mitigation measures.

Additional mitigation and management measures proposed as a result of the findings of this LVIA may be incorporated into the Project to further reduce identified impacts. These comprise a range of generic measures that are applicable to all components across the Project as well as the identification of measures that are specific to an infrastructure component or particular location. The mitigation measures are described in **Section 11: Mitigation and residual impact assessment**.

Residual impacts relate to any changes in the overall significance of effect for potential impacts post the implementation of mitigation. This potentially includes measures that avoid an impact occurring or reduce the magnitude of change. The residual impact assessment is determined using the same process as for the landscape, visual and lighting assessment methodology described above. The residual impact assessment is presented in **Section 11.4: Residual impact assessment**.

5 Description of existing landscape and visual amenity values

5.1 Regional landscape context

The LVIA study area is located near Toowoomba and includes areas within Toowoomba and Lockyer Valley LGAs. In the western part of the LVIA study area, the Project passes through rural and grazing lands and is in tunnel under the Toowoomba plateau, passing under the localities of Cranley, Mount Kynoch, and Ballard and emerging on the eastern side of the Toowoomba Range near Mount Kynoch, before continuing through areas of native vegetation and grazing properties. Within the LVIA study area, large areas of land have been cleared for pasture, agricultural production and for rural and urban residential settlements. Tracts of remnant vegetation are also present, limited to the steep, hilly landscapes of Lockyer National Park and the Great Dividing Range. The undulating uplands of these ranges are a dominant feature in the landscape that separates the fertile arable floodplains of the Lockyer Valley from the Toowoomba plateau. The Project and its wider landscape context are illustrated in **Figure 1: Regional context**.

5.1.1 Settlement and infrastructure

The Project traverses a broad range of landscapes, from developed urban areas, industrial and waste management precincts, isolated rural settlements, open woodland, pastoral and agricultural landscapes to the undulating and vegetated foothills of the Great Dividing Range. Extensive areas within the LVIA study area have been cleared for agricultural purposes and for the development of residential communities. These areas include typical built infrastructure such as powerlines, landfills, water treatment plants and pipelines.

The largest settlement in the LVIA study area is the regional city of Toowoomba, situated on an escarpment on the western side of the Great Dividing Range, approximately 700 m above sea level and 130 km west of Brisbane with a population of 160,779 (ABS, 2016). The suburbs of Harlaxton, Cotswold Hills and Wilsonton Heights are all considered part of Toowoomba along with the adjacent suburbs of Cranley (1,446) and Mount Kynoch (237). These suburbs are either impacted by Project infrastructure (including the intermediate ventilation building) or have potential views towards the Project.

Highfields, situated to the north of Toowoomba is both a town and a suburb, serving as a satellite suburb of the city of Toowoomba. Highfields has a population of 8,131 and the adjoining suburb of Blue Mountain Heights, has an estimated urban population of 929 (ABS, 2016). Kingsthorpe and Gowrie are rural residential localities that are situated in close proximity to the Project, situated 17 km and 10 km northwest of Toowoomba respectively, with populations of 1,867 and 2,120 respectively (ABS, 2016). Meringandan and Meringandan West are situated in the far northern extent of the LVIA study area with respective populations of 487 and 2,211 (ABS, 2016), and it is considered there will be no impact on these areas.

Smaller rural settlements and localities within the LVIA study area include Gowrie Mountain, Murphys Creek, Withcott and Helidon, which have populations of 224, 221, 1,844 and 1,059 respectively (ABS, 2016). There are also several areas of acreage estates and emerging residential communities within the vicinity of Kingsthorpe, Gowrie, Cotswold Hills, Blue Mountain Heights, Withcott, Postmans Ridge and Helidon Spa.

There is also new development occurring within the region and LVIA study area, including the Mount Lofty master planned residential community (on the former Mount Lofty Rifle Range) that will have potential views of the Project.

There are five major roads within the LVIA study area, including the Warrego Highway (A2), New England Highway (A3), Gore Highway (A39), Toowoomba Connection Road (A21) and Toowoomba-Athol Road (A139).

In 2018, the Annual Average Daily Traffic (AADT) counts for these roads (Queensland Government, 2018) were as follows:

- Warrego Highway (including what is now Toowoomba Connection Road) AADT counts were between 24,982 near Withcott, to 13,872 near Gowrie Mountain
- New England Highway AADT counts were between 20,372 in Toowoomba to 6,485 near Highfields
- Gore Highway AADT counts were between 14,584 in Toowoomba to 8,305 near Westbrook (noting that this section of road is now Toowoomba-Athol Road).

The Toowoomba Bypass is comprised of the Warrego Highway, from Helidon Spa to Charlton and the Gore Highway from Charlton to Athol (DTMR, 2020) and was opened in September 2019 and will become a main road through the region with anticipated AADT up to 2,900 (2019).

Other key roads and their respective 2019 AADT counts (unless otherwise noted) include Toowoomba-Cecil Plains Road (3,791 in the Charlton area), Troys Road (Charlton Connection Road) (4,541), Carrington Road (5,541), Gowrie Junction Road (4,200), Boundary Street (1,900), Goombungee Road (900, based on Old Goombungee Road, 2013 council data), Murphys Creek Road (2,242), Jones Road (1,200, 2018 data), Gittins Road (590, 2018 data), McNamaras Road (no data available, assumed value of 800), Postmans Ridge Road (450), Airforce Road (540, 2015 data) and Gatton-Helidon Road (5,060).

Some of these routes form part of scenic drives, as discussed further in **Section 5.3: Visual assessment baseline**.

The West Moreton System is an existing operational freight and passenger rail corridor located within the LVIA study area, connecting rail services from Brisbane to the west and southwest of the State and providing an important connection to the Darling Downs. The Main Line links Brisbane to Toowoomba, with the Western Line linking Toowoomba to Miles.

The West Moreton System rail corridor supports the twice weekly 'Westlander' passenger service between Brisbane and Charleville (Australian Rail Maps, 2018). The passenger service departs Brisbane on Tuesdays and Thursdays at 7.15 pm and departs Charleville on Wednesdays and Fridays at 6.15 pm, with trains passing through the LVIA study area late on Tuesday and Thursday evenings, and early on Thursday and Saturday mornings, respectively.

The section of the Main Line from the end of Murphys Creek railway station to the Ruthven Street overbridge, Harlaxton (Main Range Railway), is listed on the QLD Heritage Register. The Murphys Creek Railway Complex, Lockyer Creek Railway Bridge (Lockyer), Lockyer Creek Railway Bridge (Guinn Park) and Swansons rail bridge are also heritage listed (QLD Heritage Register, 2018).

Several branch lines were constructed to connect the Western Line (Toowoomba to Miles) to local towns, including connections between Toowoomba and Crows Nest and Kingsthorpe to Haden. Remnants of these historic railway lines can still be seen today.

The South Western System branches from the West Moreton System at Toowoomba and proceeds south through Warwick and Stanthorpe to the NSW border at Wallangarra.

5.1.2 *Geology, landform and hydrology*

As illustrated on **Figure 4: Landform and hydrological context**, the most notable landscape features within the LVIA study area are the mountainous regions of the Great Dividing Range and the dramatic vertical face of the Great Escarpment. Both geological features are evident along the east coast of Australia, however Toowoomba is one of the few exceptions where both features are coincident (Queensland Roads, 2008).

The Great Dividing Range divides the watershed between coastal flowing rivers and inland flowing rivers, while the Great Escarpment separates tablelands. The Great Escarpment, while lesser known is a much more identifiable landscape feature due to its steep gorge-like valleys and abrupt elevation changes, which within the LVIA study area are up to approximately 400 m high (Queensland Roads, 2008). The escarpment separates two areas of differing elevation and underlying geology, the Darling Downs to the west and the Lockyer Valley (part of the Brisbane Valley Basin) to the east. Accordingly, landform across the LVIA study area varies greatly.

The Toowoomba region and Darling Downs are situated on top of basalts of the Main Range volcanics and are characterised by isolated basaltic peaks (Gowrie Mountain, Storey Mountain, Mt Davidson (Sugarloaf), McGregor Mountain and Glenvale Mountain), dryland cropping and large open grazing properties. The Toowoomba region falls within the Balonne-Condamine drainage basin and Condamine River drainage sub-basin, one of the largest catchments of the Murray-Darling Basin (MDBA, 2018). The key watercourse of this catchment within the LVIA study area is Gowrie Creek and its tributaries, East Creek, West Creek and Black Gully. Other creeks within the Condamine River drainage sub-basin include Westbrook Creek, Dry Creek, Spring Creek and Meringandan Creek.

The Lockyer Valley is largely volcanic in origin with large areas of sedimentary deposits and falls within the Lockyer Creek drainage sub-basin, a sub-basin of the Brisbane River Basin. Much of the catchment is underlain by sandstone formations, and the area is characterised by cultivated alluvial plains surrounded by flat to gently undulating lowlands that give way to densely vegetated hilly to sub-mountainous basaltic uplands ranges on igneous, metamorphic, and sedimentary rocks (DEHP, 2016). Within Lockyer National Park there are small areas of impermeable rocks and isolated patches of basalt, providing sandstone ridges and sandy soils. Elevated areas of Lockyer National Park are steep and rugged with gorges, exposed cliff lines and waterfalls in the foothills of the Great Dividing Range (NPSR, 2013). Other local peaks include Mt Tabletop, Mt Davidson, Katoomba Point, Mount Kynoch, Ben Lomond Mountain, Wards Hill, Stringybark Mountain and Evans Hill.

The Lockyer Creek and its many tributaries collect runoff from the eastern slopes of the Great Dividing Range. Lockyer Creek is a macro channel, capable of containing all levels of flood except the most extreme events (DEHP, 2016). Several watercourses intersect the Project to the east of the Great Dividing Range, including (from west to east) Oaky Creek, Six Mile Creek and Lockyer Creek.

5.1.3 *Soils, vegetation and land use*

Existing land use within and adjacent to the LVIA study area is shown on **Figure 5: Land use context** and is largely characterised by rural activities on a variety of allotment sizes, in particular grazing, dryland cropping, irrigated horticulture and production forestry. Toowoomba is a regional city and the largest urban settlement of the Darling Downs (TRC, 2017). A diverse range of other land uses are found in the area including rural properties, urban development, industrial areas and more localised specialist land uses such as vineyards, explosives storage and production, commercial sandstone mining, poultry farms, golf courses, wastewater treatment and waste management facilities.

Extractive industries, logistics and transport are major growth areas for Toowoomba's economy (TRC, 2017). This is evident by the recent expansion of the runway at Toowoomba Wellcamp Airport, Charlton Logistics Park and Witmack Industrial Park (both part of the Toowoomba Enterprise Hub), proposals for construction of the InterLinkSQ – Global Logistics Centre, and for the expansion of the New Acland Coal Mine.

The Darling Downs and low-lying areas of the Lockyer Valley are renowned for their fertile soils and productive agricultural landscapes. The most productive soils within these valleys are the black alluvial clays, typically found on flat, slightly sloping and undulating land along watercourses in low-lying flood prone areas, which support irrigated agricultural production (SEQ Catchments, 2009).

These productive landscapes are surrounded by dryland cropping and cattle grazing, predominately beef cattle, on poorer elevated land and the gently undulating foothills of the surrounding mountain ranges. These ranges are characterised by densely-vegetated undulating to mountainous areas (including reserves and national parks), on siliceous sands, sandstones and basalts.

Within both the Lockyer Valley and Darling Downs low lying fertile floodplains have been extensively cleared for agricultural production. Extensive clearing has also taken place to facilitate urban development and industrial land uses.

Throughout the LVIA study area, remnant patches of open forest woodlands are found on low lying alluvial plains, river banks, creek flats and drainage lines - typically confined to constrained gullies with limited access and creek channels. These fringing woodlands are typically dominated by Blue gum (*Eucalyptus tereticornis*) or Red gum (*E. camaldulensis*). Other tree species such as River she-oak (*Casuarina cunninghamiana*), Coolibah (*E. coolabah*), Paperbark (*Melaleuca* spp.) and Rough-barked apple (*Angophora floribunda*), are commonly present. Grey box (*E. moluccana*) and Red ironbark (*E. crebra*) sometimes present in more elevated areas of the floodplain (DES, 2019).

Prior to being cleared for agriculture, the fertile plains of the Darling Downs supported vast areas of native grassland communities, dominated by Queensland Bluegrass (*Dichanthium sericeum*) and Mitchell grasses (*Astrebla* spp.). These grasslands also extended into the marginal soils associated with the gently undulating areas, where tree species such as Mountain coolibah (*Eucalyptus orgadophila*), Silver-leaved ironbark (*E. melanophloia*), Variable red-barked bloodwood (*Corymbia erythrophloia*) and Willow wattle (*Acacia salicina*) are sometimes present. The surrounding low hills formed from basalt are dominated by open eucalypt forests, typically comprised of Blue gum (*Eucalyptus tereticornis*) and Yellow box (*E. melliodora*), and basalt stones and boulders are often present at the surface (DES, 2019).

Within the Lockyer Valley, undulating landscapes and foothills are dominated by open eucalypt forests on sedimentary rocks, typically comprised of Brown bloodwood (*Corymbia trachyphloia* subsp. *trachyphloia*), Lemon-scented gum (*Corymbia citriodora* subsp. *variegata*), Narrow-leaved ironbark (*E. crebra*), Red ironbark (*E. fibrosa* subsp. *fibrosa*). Within elevated parts of the Great Dividing Range, there are remnant pockets of Narrow-leaved ironbark woodland, which contains Narrow-leaved ironbark (*E. crebra*), Forest red gum (*Eucalyptus tereticornis*), Moreton bay ash (*Corymbia tessellaris*), Smooth-barked apple (*Angophora* spp.) and Silver-leaved ironbark (*E. melanophloia*) (DES, 2019).

Elevated areas on basalt plains and hills (e.g. Great Dividing Range) are dominated by scrubby open woodland on igneous rocks, comprised of Red ironbark (*E. crebra*), Blue gum (*Eucalyptus tereticornis*), Yellow box (*E. melliodora*), Scribbly gum (*E. racemosa*), Smooth branched ironbark (*E. dura*) and Lemon-scented Gum (*Corymbia citriodora* subsp. *variegata*). The higher regions also support areas of heath and open woodland as well as small remnant patches of semi-evergreen vine thicket, limited to steep gullies and slopes on both sedimentary and basalt rocks which can be easily identified in the landscape as bands of dark green low vegetation in contrast to the surrounding bushland (Healthy Land and Water, 2018). This endangered vegetation community is mostly seen to the south of the Project within the Great Dividing Range. Key species include Narrow-leaved bottle tree (*Brachychiton rupestris*), Crows ash (*Flindersia australis*), Rosewood (*Acacia fasciculifera*) and Small-leaved fig (*Ficus obliqua*). Scattered trees of Brigalow (*Acacia harpophylla*) are also present (DES, 2019).

Within the elevated landscapes of the Great Dividing Range are Lockyer National Park and Lockyer State Forest, situated to the north of the proposed alignment. The Lockyer National Park (11,079 ha) is situated approximately 5.3 km to the north of the Project and is comprised of the Lockyer National Park (2,677 ha) and Lockyer National Park (Recovery) (7,790 ha), and is adjacent to the Lockyer Resource Reserve (612 ha) and Lockyer State Forest (818 ha), which are situated approximately 2.3 km and 3 km from the Project respectively. Lockyer National Park and Lockyer National Park (Recovery) were gazetted as national parks in 2008 in recognition of the important biodiversity and conservation values of the area (NPSR, 2013). It features remote sandstone gorges surrounded by remnant eucalypt forest and provides a range of recreational opportunities. Areas within Lockyer National Park to the west of Seventeen Mile Road are limited to low impact activities such as bushwalking and orienteering. The protected area east of Seventeen Mile Road provides 15 km of roads open to the public for vehicle-based touring operating fully road registered four-wheel-drive motor vehicles and motor bikes. There are no facilities or formed walking trails (NPSR, 2013).

The LVIA study area also includes Alice Creek Nature Refuge (310 ha), which provides fauna links between the various sections of Lockyer National Park. These protected national parks and nature refuge areas are all located within elevated, vegetated areas, which are considered to have high scenic amenity value. There are several large parks within Toowoomba, within the Great Dividing Range that are also considered to have high scenic amenity value and offer great and easily accessible vantage points.

Picnic Point Parklands (65 ha) is one of Toowoomba's top tourism destinations. These heritage listed parklands provide panoramic views overlooking the Great Dividing Range and the Lockyer Valley and are a popular destination for picnics and barbeques. There are also playgrounds, a conference centre, restaurant, café, amenities and several walking trails. Elevated scenic views are obtainable from several of the walking trails, including *Picnic Point Circuit*, *Pardalote Walk* and the *Firetrail Walk*, as well as from *Picnic Point Lookout*, *Bill Goulds Lookout* and *Bob Dodds Lookout* at the end of Tobruk Memorial Drive (TRC, 2018a).

Jubilee Park (313 hectares (ha) of bushland) is one of Toowoomba's largest parks and is a popular destination for bushwalking and mountain biking. The area contains formalised downhill mountain bike and cross-country tracks and is also part of the *Bicentennial National Trail* network and offers horse riding opportunities on some trails. The *Bicentennial National Trail*, a long-distance multi-use trekking route intersects the Project in the vicinity of Gittins Road, and is utilised by horse riders, cyclists and hikers. Elevated scenic views of the Great Dividing Range are obtainable from several of the walking trails, including the *Themeda Trail* and the *Yellow Box Trail* (TRC, 2018b).

Mt Tabletop Bushland Reserve protects an area of high significance to the traditional owners. There is an un-maintained bushwalking track to the summit which offers views towards Prince Henry Heights, the Lockyer Valley and back towards the Great Escarpment and Toowoomba (TRC, 2018c).

Redwood Park (243 ha of bushland) is well known for its diverse flora and fauna and has a range of trails, a picnic area and amenities. Excellent views of the Great Dividing Range are attainable, including scenic views from *Burrell Outlook* (TRC, 2018d).

Other parks along the escarpment include McKnight Park, Barry Griffiths Bushland Reserve, J. E. Duggan Park and Glen Lomond Park. McKnight Park and Barry Griffiths Bushland Reserve are both undeveloped with no formal access trails. J. E. Duggan Park offers some short bushwalks and elevated views towards Mt Tabletop which are attainable from *Lockyer Lookout* on the *Squirrel Glider Circuit*. Glen Lomond Park is less visited than the other escarpment and offers trails for walkers, bike riders and horse riders. There are no facilities in this park and views of the surrounding landscapes including Lockyer Valley, Mt Tabletop and surrounding elevated landscapes are attainable from the *Spur Walk* and the *Hell Hole Trail and Falls Walk* (TRC, 2018e and TRC, 2018f).

5.1.4 Interim Biogeographic Regionalisation for Australia classifications

The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian Government department formerly known as Department of Sustainability, Environment, Water, Population and Communities (Department of the Environment and Energy, 2018). IBRA represents a landscape-based approach to classifying the land surface of Australia. The IBRA data consists of two datasets: IBRA bioregions, which are a larger scale regional classification of homogenous ecosystems; and subregions, which are more localised.

Whilst bioregions have been defined mainly for the purposes of ecosystem planning and monitoring, the nominal attributes that make up IBRA are climate, lithology/geology, landform, vegetation, flora and fauna and land use, which are themes typically used to define landscape character at a high level. On 5th July 2012, IBRA version 7.0 was released, which delineates 89 biogeographic regions and 419 subregions, each reflecting a unifying set of major environmental influences which shape the occurrence of flora and fauna and their interaction with the physical environment across Australia. The bioregion information enables a high-level desktop understanding of the different landscape settings of the LVIA study area. The descriptions for the subregions that accompany IBRA version 7.0 are not currently published. However, upon request, the Australian Government Environmental Resources Information Network supplied descriptions of each of the subregions in the LVIA study area for the IBRA version 5.1 dataset (ERIN, 2012, personal communication), which follows similar boundaries.

As shown on **Figure 6: Interim Biogeographic Regionalisation Australia**, the LVIA study area includes areas located within the SEQ and Brigalow Belt South (BBS) bioregions. There is a clear divide between the two bioregions, along the Toowoomba Escarpment. Approximately half of the area falls within the SEQ 02 Moreton Basin and BBS 17 Eastern Darling Downs subregions, while a very small portion to the northern extent is located within SEQ 06 South Burnett subregion. These subregions are described in **Table 16**.

Table 16 IBRA Subregion descriptions

IBRA subregion name, code and total area (ha)	Description
Moreton Basin SEQ 02 784,980 ha	Underlying geology is predominantly Jurassic and Triassic/Jurassic sandstones. It is an area of low, hilly relief and broad alluvial valleys. Some parts of the Moreton Basin subregion are dry with rainfall less than 750 millimetres (mm) per annum. Major vegetation types include eucalypt woodlands and open forests, brigalow (<i>Acacia harpophylla</i>) open forest and semi-evergreen vine thicket.
South Burnett SEQ 06 563,873 ha	This subregion contains basalt flows and old land surfaces interspersed with sedimentary rocks, acid volcanics and metamorphics. The subregion is relatively elevated and contains the Bunya Mountains. The highest parts of the subregion are closely linked to the Scenic Rim province in terms of fauna and flora. In places the boundary between the South Burnett subregion and the Eastern Darling Downs subregion of the Brigalow Belt subregion is difficult to define.
Eastern Darling Downs BBS 17 1,639,276 ha	The Eastern Darling Downs subregion comprises spurs and foothills of Main Range along the eastern boundary of the subregion, low hills in the south and the Condamine River plain in the central and western parts. Substrates include Tertiary basalt in the extreme east, Jurassic sediments in the southeast, Triassic - Jurassic sediments in the northeast and alluvial soils of varying age along the Condamine River plain. The basalt vegetation communities are predominantly woodlands of Narrow-leaved ironbark (<i>Eucalyptus crebra</i>), Yellow box (<i>E. melliodora</i>), Forest red gum (<i>E. tereticornis</i>), White box (<i>E. albens</i>) or Mountain coolibah (<i>E. orgadophila</i>). The sandstone hills support Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) woodland with Gum-topped box (<i>E. moluccana/microcarpa</i>) and Poplar box (<i>E. populnea</i>) woodland on lower slopes and valleys. There are also some areas of Semi-evergreen vine Thicket (<i>Araucarian microphyll</i>) rainforest, particularly in the southeast and Brigalow (<i>Acacia harpophylla</i>) open forest and vine thicket in the northeast. Heavy cracking clays and black earths of the Condamine River plain supported prior to clearing Bluegrass (<i>Dichanthium sericeum</i>) grassland and grassy woodlands of Poplar box (<i>E. populnea</i>) with Forest red gum/River red gum (<i>E. tereticornis/camaldulensis</i>), Rough-barked apple (<i>Angophora floribunda</i>) adjacent to drainage lines. In the eastern part of the Condamine River plain, the black earths appear to have supported a grassy woodland of <i>E. tereticornis</i> and <i>A. floribunda</i> rather than the <i>Dichanthium</i> grasslands and <i>E. populnea</i> woodlands of the central and western parts.

5.1.5 SEQRP regional landscape values

ShapingSEQ includes mapping of areas of 'regionally significant scenic amenity' on 'Map 5c Sustain – regional landscape values'. This is based upon the SEQ regional amenity methodology identified in the SEQRP *Implementation Guideline No 8 - Identifying and protecting scenic amenity values* (DSDILGP, 2007).

As described in **Table 3**, the regional scenic amenity values are calculated using GIS analysis which combines visual exposure (least visible to most visible) and visual preference (least preferred to most preferred) to give a value between 1 and 10. Areas with a value of 9-10 are considered to be regionally significant.

Figure 3: Regional scenic amenity and planning designations shows the extent of regional scenic amenity values within the LVIA study area. This figure indicates the following areas of regionally significant scenic amenity, which accord with the elevated areas of mountain ranges described above:

- Escarpment and Foot Hills of the Great Dividing Range at Toowoomba, including landscapes associated with:
 - Ben Lomond in the vicinity of Ballard, Murphys Creek and Withcott
 - Katoomba Point, in the vicinity of Prince Henry Heights, Redwood and Withcott
 - Mt Davidson (Sugarloaf), in the vicinity of Blanchview, Derrymore and Silver Ridge
 - Stringybark Mountain, in the vicinity of Derrymore, Flagstone Creek and Iredale
 - Lockyer National Park and adjacent vegetated areas, within the vicinity of Helidon, White Mountain and Grantham.

5.1.6 Toowoomba regional landscape values

The *Toowoomba Regional Council – Scenic Amenity Study 2009* includes mapping of areas of high scenic amenity value, as identified within the LVIA study area. This study was also based upon the SEQ regional amenity methodology identified in the *SEQR Implementation Guideline No 8 - Identifying and protecting scenic amenity values* (QLD Government, 2007).

This study identifies the following areas within the LVIA study area as having high levels of regionally significant scenic amenity value, that should be protected:

- The isolated mesas, hills and mountains across the central plains and the north eastern ranges, this includes Gowrie Mountain and elevated landscapes near Kingsthorpe and Highfields, including areas associated with the Toowoomba escarpment.

5.1.7 Lockyer regional landscape values

The *Scenic Amenity of the Lockyer* (Forest Images, 2002) includes mapping of areas of high scenic amenity value, as identified within the LVIA study area. This study was also based upon the approach developed by the Regional Landscape Strategy Advisory Committee (RLSAC), which was developed in response to the SEQRFGM (Queensland Regional Coordination Committee, 2000).

This study identifies the following areas within the LVIA study area as having high levels of regionally significant scenic amenity value, that should be protected:

- Parts of the Great Dividing Range from Glen Rock to the vicinity of Toowoomba
- Parts of Helidon Hills near gorges and peaks.

5.1.8 Australian heritage database (non-statutory archive)

The Australian Heritage Commission had, from 1975, maintained a list of significant heritage locations on the Register of the National Estate. With the introduction of the *Australian Heritage Council Act 2003*, the Register of the National Estate was closed to new entries from February 2007. From February 2012, the EPBC Act no longer refers the Register of the National Estate and decisions made under this act no longer need to consider the register and it is no longer considered a statutory list. However, it remains a publicly accessible archive.

Key criteria for inclusion on the Register of the National Estate pertinent to landscape and visual issues, are:

- Criterion A: Its importance in the course, or pattern, of Australia's natural or cultural history: A.3 Importance in exhibiting unusual richness or diversity of flora, fauna, landscapes or cultural features
- Criterion E: Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group: E.1 Importance for a community for aesthetic characteristics held in high esteem or otherwise valued by the community.

The following place was identified within the LVIA study area on the Register of the National Estate (Australian Government Department of Agriculture, Water and the Environment, 2020):

- Escarpment and Foot Hills of the Great Dividing Range at Toowoomba: Place ID14286; Indicative i.e., not fully registered. The citation states *"These wooded slopes are Toowoomba's major natural feature. They clearly demarcate the eastern boundary of the city and give the visitor arriving from the east (Brisbane direction) a very favourable first impression of the garden city of Toowoomba. Rangeside parks provide open space, panoramic views and walking tracks and are a much appreciated source of recreation for locals and tourists..."*

The Project directly traverses this area with the potential to impact the views and scenic amenity values of the Great Dividing Range at Toowoomba. These impacts are considered further in **Section 7.1: Landscape character impact assessment**, specifically within the assessment of LCT G: Forested Uplands, and in **Section 8.1: Viewpoint assessment** within the assessments of Viewpoint 12, 13, 14, 15 and 16.

5.2 Landscape character baseline

The identified LCTs and LCAs areas falling within the LVIA study area are shown on **Figure 7: Landscape character assessment** and are summarised in **Table 17**. Full descriptions of each LCT are provided in **Section 7.1: Landscape character impact assessment**.

Table 17: Landscape Character Types and Areas

Landscape Character Type (LCT)	Associated Landscape Character Areas (LCAs)
LCT A: Vegetated Watercourses – Creeks and Channels	Gowrie Creek Vegetated Watercourse (LCA A1) Westbrook Creek Vegetated Watercourse (LCA A2) Upper Westbrook Creek Vegetated Watercourse (LCA A3) Dry Creek Vegetated Watercourse (LCA A4) Spring Creek Vegetated Watercourse (LCA A5) Meringandan Creek Vegetated Watercourse (LCA A6) Klein Creek Vegetated Watercourse (LCA A7) Reedy Creek Vegetated Watercourse (LCA A8) Lockyer Creek Vegetated Watercourse (LCA A9) Six Mile Creek Vegetated Watercourse (LCA A10) Soda Spring Creek Vegetated Watercourse (LCA A11) Flagstone Creek Vegetated Watercourse (LCA A12) Sandy Creek Vegetated Watercourse (LCA A13)
LCT B: Irrigated Croplands	Oakey North Irrigated Croplands (LCA B1) Oakey South Irrigated Croplands (LCA B2) Westbrook Creek Irrigated Croplands (LCA B3) Brimblecombe Road Irrigated Croplands (LCA B4) Wellcamp Airport Irrigated Croplands (LCA B5)

Landscape Character Type (LCT)	Associated Landscape Character Areas (LCAs)
	Yalungur Irrigated Croplands (LCA B6) Glencoe Irrigated Croplands (LCA B7) Kingsthorpe Irrigated Croplands (LCA B8) Charlton Irrigated Croplands (LCA B9) Westbrook Irrigated Croplands (LCA B10) Wellcamp Irrigated Croplands (LCA B11) Lilydale West Irrigated Croplands (LCA B12) Lilydale East Irrigated Croplands (LCA B13) Meringandan Irrigated Croplands (LCA B14) Klein Road Irrigated Croplands (LCA B15) Highfields Road Irrigated Croplands (LCA B16) Highfields Irrigated Croplands (LCA B17) Gowrie Irrigated Croplands (LCA B18) Morris Road Irrigated Croplands (LCA B19) Birnam Irrigated Croplands (LCA B20) Upper Lockyer Irrigated Croplands (LCA B21) Murphys Creek Road Irrigated Croplands (LCA B22) Lockyer Irrigated Croplands (LCA B23) Airforce Road Irrigated Croplands (LCA B24) Helidon Irrigated Croplands (LCA B25) Flagstone Creek West Irrigated Croplands (LCA B26) Flagstone Creek Irrigated Croplands (LCA B27) Flagstone Creek East Irrigated Croplands (LCA B28) Grantham North Irrigated Croplands (LCA B29) Sandy Creek Road Irrigated Croplands (LCA B30) Grantham South Irrigated Croplands (LCA B31) McLucas Road Irrigated Croplands (LCA B32)
LCT C: Dry Croplands and Pastures	Kings Siding Dry Croplands and Pastures (LCA C1) Oakey Dry Croplands and Pastures (LCA C2) Gowrie Mountain Dry Croplands and Pastures (LCA C3) Biddeston Dry Croplands and Pastures (LCA C4) Gowrie Little Plain Dry Croplands and Pastures (LCA C5) Glencoe Dry Croplands and Pastures (LCA C6) Mt Kingsthorpe Dry Croplands and Pastures (LCA C7) Gowrie Dry Croplands and Pastures (LCA C8) Charlton Dry Croplands and Pastures (LCA C9) Wellcamp Dry Croplands and Pastures (LCA C10) Klein Road Dry Croplands and Pastures (LCA C11) Black Flagstone Road Dry Croplands and Pastures (LCA C12) Helidon Croplands and Pastures (LCA C13) Verdilla Dry Croplands and Pastures (LCA C14)
LCT D: Vegetated Grazing	Meringandan West Vegetated Grazing (LCA D1) Meringandan Vegetated Grazing (LCA D2) Glencoe West Vegetated Grazing (LCA D3) Glencoe East Vegetated Grazing (LCA D4) Gowrie Vegetated Grazing (LCA D5) Highfields Road Vegetated Grazing (LCA D6) Highfields Vegetated Grazing (LCA D7) Kleinton Road Vegetated Grazing (LCA D8) Cabarlah Park Road Vegetated Grazing (LCA D9) Birnam Vegetated Grazing (LCA D10) Wellcamp Vegetated Grazing (LCA D11) Westbrook Vegetated Grazing (LCA D12) Glenvale Vegetated Grazing (LCA D13)

Landscape Character Type (LCT)	Associated Landscape Character Areas (LCAs)
	Cabarah Vegetated Grazing (LCA D14) Fifteen Mile Vegetated Grazing (LCA D15) Murphys Creek South Vegetated Grazing (LCA D16) Murphys Creek North Vegetated Grazing (LCA D17) Murphys Creek Vegetated Grazing (LCA D18) Upper Lockyer Vegetated Grazing (LCA D19) Postmans Ridge Vegetated Grazing (LCA D20) Withcott Vegetated Grazing (LCA D21) Derrymore Vegetated Grazing (LCA D22) Gatton Vegetated Grazing (LCA D23) Lilydale Vegetated Grazing (LCA D24) Volp Road Vegetated Grazing (LCA D25)
LCT E: Rural Settlement	Kingsthorpe (LCA E1) Meringandan West (LCA E2) Meringandan (LCA E3) Meringandan South (LCA E4) Gowrie (LCA E5) Highfields (LCA E6) Toowoomba (LCA E7) Murphys Creek (LCA E8) Withcott (LCA E9) Helidon (LCA E10)
LCT F: Rural Living	Westview Rural Living (LCA F1) Meringandan West Rural Living (LCA F2) Glencoe Rural Living (LCA F3) Redlands Drive Rural Living (LCA F4) Hilltop Drive Rural Living (LCA F5) Gowrie Rural Living (LCA F6) Highfield Ridge Rural Living (LCA F7) Gowrie Mountain Rural Living (LCA F8) Torrington Rural Living (LCA F9) Cranley Rural Living (LCA F10) Glenvale Rural Living (LCA F11) Weale Street Rural Living (LCA F12) Blue Mountain Heights Rural Living (LCA F13) Cabarah Rural Living (LCA F14) Silver Ridge Rural Living (LCA F15) Withcott South Rural Living (LCA F16) Murphys Creek North Rural Living (LCA F17) Murphys Creek South Rural Living (LCA F18) Upper Lockyer Rural Living (LCA F19) Withcott Rural Living (LCA F20) Postmans Ridge Rural Living (LCA F21) Helidon Spa Rural Living (LCA F22) Helidon Rural Living (LCA F23) Grantham Rural Living (LCA F24)
LCT G: Forested Uplands	Mt Davidson (Sugarloaf) Forested Uplands (LCA G1) McGregor Mountain Forested Uplands (LCA G2) Storey Mountain Forested Uplands (LCA G3) Mt Kingsthorpe Forested Uplands (LCA G4) Gowrie Mountain Forested Uplands (LCA G5) Wellcamp Forested Uplands (LCA G6) Glenvale Mountain Forested Uplands (LCA G7) Meringandan West Forested Uplands (LCA G8)

<i>Landscape Character Type (LCT)</i>	<i>Associated Landscape Character Areas (LCAs)</i>
	Kleinton Forested Uplands (LCA G9) Cabarlah Forested Uplands (LCA G10) Great Dividing Range Forested Uplands (LCA G11) Stringybark Mountain Forested Uplands (LCA G12) Lockyer National Park Forested Uplands (LCA G13)
LCT H: Transitional Landscapes	Wellcamp Airport (LCA H1) Boral Quarry (LCA H2) Toowoomba Waste Management Facility (LCA H3) Charlton Industrial Precinct (LCA H4) Charlton Raceway (LCA H5) Wetalla Sewage Treatment Plant (LCA H6) Harlaxton Quarry (LCA H7) Glenvale Quarry (LCA H8)

For clarity, full descriptions of these areas are included together with the impact assessment in **Section 7: Landscape impact assessment**.

5.3 Visual assessment baseline

5.3.1 Visual audiences and receptors

A number of visual receptor audiences were assessed to have the potential to be affected by the Project including:

- Local residents and workers in towns and rural settlements (including Kingsthorpe, Gowrie, Gowrie Mountain, Highfields, Blue Mountain Heights, Toowoomba, Withcott, Postmans Ridge, Helidon Spa and Helidon)
- Local residents and workers on rural and acreage properties
- Travellers on main and local roads
- Tourists on roads including users of 'scenic drives' and staying in tourist accommodation within the LVIA study area
- Travellers/tourists on the 'Westlander' train
- Recreational users of the landscape, particularly using walking trails within the national parks, State forests, public parks and other nature reserves.

5.3.2 Viewpoint selection

Representative views from a range of visual receptor audiences as identified above are assessed in detail in **Section 8.1: Viewpoint assessment**.

Views from a range of residential properties in settlements and rural areas around the LVIA study area including Gowrie Mountain, Glencoe, Torrington, Gowrie, Highfields, Blue Mountain Heights, Prince Henry Heights, Ballard and Helidon Spa. Views from Murphys Creek and Upper Lockyer were also considered although no specific views are included due to the topography and/or distance from the Project.

While it is noted that there is the potential for views to the Project from the future Mount Lofty master planned residential community, these have not been assessed or discussed in detail as the Mount Lofty site is not accessible (private, vegetated land). Representative views from a range of local and main roads are also described and assessed including views representative of the impact from the Warrego Highway and Toowoomba Bypass. Views from the Baillie Henderson Hospital towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure are also considered.

As shown on **Figure 8: Tourist drives and sensitive receptors**, there are four significant signposted tourist routes within the LVIA study area. The *'Warrego Way'*, *'Adventure Way'* and *'Australia's Country Way'* are nationally marketed 'Great Queensland Drives' (Outback Queensland Tourist Association, 2015). *'Warrego Way'* and *'Adventure Way'* both follow the Warrego Highway, while *'Australia's Country Way'* follows the New England Highway. At the regional level the *'Cobb and Co Tourist Drive'* is a well-known and signposted route that stops at several staging posts with informative tourist signage and infrastructure. Other local self-drives that appear in tourist literature but that are not signposted comprise the *'Glen Rock Tourist Drive'*, *'Open Plains Country Drive'*, *'Spring Bluff Tourist Drive'*, *'Farmers Country Drive'*, *'Great Bunya Drive'*, *'High Country Drive'* and *'Steele Rudd Country Drive'*. Views from these drives have been considered and are incorporated into the relevant viewpoint assessments. In addition, views from a range of other local and State-controlled roads have been considered, particularly where these are located close to the Project.

Recreational views have also been considered and viewpoints assessed as appropriate. This includes assessments on the impact of the Project on views from Picnic Point Lookout and Katoomba Point Lookout which are both marketed tourist viewpoints, and are considered representative of views attainable from lookouts, parks and residential properties along the Toowoomba Escarpment. Other lookouts, such as Mount Kynoch were visited during fieldwork investigations, however excluded from the assessment based on limited available views towards the Project, and have, where appropriate, been discussed in other viewpoint assessments.

The Project intersects the Bicentennial National Trail along Gittins Road, and impact existing views along the trail at this location, noting that this section of the trail utilised the road corridor which is already affected by existing infrastructure including the Warrego Highway and Gittins Road overpass.

It is noted that there are no formal recreation facilities within Lockyer National Park and the adjacent protected areas, and no views to the Project could be obtained.

In total, twenty viewpoints have been selected to represent potential visual impacts across the LVIA study area. These are identified in **Figure 9: Visual receptors and location of representative viewpoints** and are summarised in **Table 18**.

Table 18: Viewpoint selection

Viewpoint name	Anticipated approximate distance to Project	Key visual receptors
Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Rail alignment of B2G is approximately 2.2 km north of this viewpoint. G2H Project is 2.8 km to the northeast at closest point.	Represents typical and accessible elevated views of residents of Gowrie Mountain.
Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Rail alignment is approximately 1.8 km to the south of this viewpoint.	Represents typical and accessible elevated views of those visiting Hilltop Drive Park and of nearby residents of Hilltop Drive and Koala Drive.
Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Rail alignment is approximately 3.4 km to the north of this viewpoint.	Represents typical and accessible views of residents of Torrington, Charlton and Cotswold Hills, and of visitors, workers and tourists travelling along the Warrego Highway.
Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Rail alignment is approximately 30 m to the south of this viewpoint, while the Gowrie Junction Road bridge is approximately 220 m to the west of this viewpoint.	Represents typical and accessible views of residents of Paulsens Road and communicates impacts on nearby residential properties situated on Morris Road, McMahon Road, Junction Street and Krienke Road.

Viewpoint name	Anticipated approximate distance to Project	Key visual receptors
Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Rail alignment is approximately 150 m to the north of this viewpoint.	Represents typical and accessible elevated views of residents of Junction Street and nearby isolated rural residential properties.
Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Rail alignment is approximately 780 m to the south of this viewpoint.	Represents typical and accessible elevated views of visitors and residents travelling along Treeline Drive and nearby residents of Gowrie.
Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Rail alignment is approximately 200 m to the northeast of this viewpoint.	Represents typical and accessible views of isolated rural residents of Gowrie and of visitors, workers and tourists travelling along Ganzer Morris Road.
Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Viewpoint is directly over the top of the tunnelled rail alignment. Western tunnel portal is approximately 320 m to the northwest of this viewpoint.	Represents typical and accessible views of nearby isolated rural residents and of visitors, workers and tourists travelling along Boundary Street and the Toowoomba Bypass.
Viewpoint 9: Phoenix Street, Highfields looking southwest	Rail alignment and western tunnel portal are approximately 2.8 km to the southwest of this viewpoint.	Represents typical and accessible elevated views of visitors and residents of Highfields, particularly those situated on Phoenix Street, Federation Drive and Wedgetail Drive. Also representative of views from the nearby Highfield Ridge estate.
Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Rail alignment (tunnelled) is approximately 1.4 km to the southwest of this viewpoint. Toowoomba Range tunnel intermediate ventilation shaft location and associated buildings is approximately 1.4 km to the south-southeast of this viewpoint, in the vicinity of the existing industrial buildings on Hermitage Road.	Represents typical and accessible views of nearby isolated rural residents and of visitors, workers and tourists travelling along Old Goombungee Road.
Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Rail alignment (tunnelled) is approximately 890 m to the northeast of this viewpoint, while the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure is approximately 1 km to the northwest of this viewpoint.	Represents typical and accessible views of visitors, staff and patients of the Baillie Henderson Hospital.
Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Rail alignment (tunnelled) is approximately 350 m to the north of this viewpoint, while the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure is approximately 385 m to the northeast of this viewpoint.	Represents typical and accessible views of nearby workers in industrial buildings, people accessing the Toowoomba Waste Management Centre along Hermitage Road and is also considered representative of possible views from Toowoomba Bypass.

Viewpoint name	Anticipated approximate distance to Project	Key visual receptors
Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	Rail alignment is approximately 2.6 km to the southeast of this viewpoint, while the eastern tunnel portal is approximately 2.7 km to the south of this viewpoint.	Represents typical and accessible elevated views of visitors and residents of Blue Mountain Heights, particularly those situated on Keira Court. Also representative of views from the New England Highway rest area and from private residential properties situated on Murphys Creek Road, Rangeview Road, Skyline Drive, Sirron Street, Buena Vista Crescent, Hilltop Crescent and Rosewall Court.
Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	Rail alignment is approximately 3.4 km to the north of this viewpoint.	Represents typical and accessible views of visitors and tourists visiting Katoomba Point Lookout, a scenic viewpoint with picnic facilities. Also representative of views possible from Jubilee Park, Mt Tabletop and from private elevated residential properties in Prince Henry Heights, Mount Lofty, and Harlaxton.
Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	Rail alignment is approximately 6.5 km to the north of this viewpoint.	Represents typical and accessible views of visitors and tourists visiting Picnic Point Parklands a regionally-important scenic viewpoint with picnic and other recreation facilities. Also representative of views possible from Mt Tabletop and from private elevated residential properties in East Toowoomba and Rangeville.
Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Rail alignment is approximately 280 m north of this viewpoint.	Represents typical and accessible views of isolated rural residents and of those travelling along Jones Road.
Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Rail alignment is approximately 620 m northwest of this viewpoint.	Represents typical and accessible views of residents of those travelling along the Toowoomba Bypass (Warrego Highway). Also representative of similar views likely to be obtained by recreational users of the Bicentennial National Trail, which follows Gittins Road in this location and is also directly impacted by the Toowoomba Bypass and TSRC and Six Mile Creek viaduct, where it crosses Gittins Road approximately 780 m north of this viewpoint.
Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Rail alignment is approximately 330 m north of this viewpoint.	Represents typical and accessible views of residents of those travelling along Murphys Creek Road. Also representative of views possible from Toowoomba Bypass.
Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Rail alignment is approximately 225 m northeast of this viewpoint.	Represents typical and accessible views of visitors and residents of Ashlands Drive.
Viewpoint 20: Airforce Road, Helidon, looking west	Rail alignment is approximately 6 m south of this viewpoint, while the Lockyer Creek viaduct is approximately 685 m to the west of this viewpoint.	Represents typical and accessible views of those travelling along Airforce Road, including workers and visitors and residents of nearby isolated rural residential properties.

The selection of viewpoints and assessments of visual impacts were informed by a series of Visibility Analysis Mapping studies. The VAM indicates the potential visibility of the Project across the LVIA study area:

- **Figure 10: Visibility analysis map – permanent infrastructure** indicates the extent to which permanent infrastructure is potentially visible
- **Figure 11: Visibility analysis map – rolling stock** indicates the extent to which permanent infrastructure plus the train (double-stacked) may be potentially visible
- **Figure 12: Visibility analysis map – difference** indicates the extent of difference between permanent and temporary infrastructure.

6 Potential impacts

6.1 Project description

A summary of the key components of the Project to be assessed in this LVIA are described in **Table 19**.

Table 19: Key components of the Project

Key Component	
Start and finish point	Gowrie to Helidon
Local government areas	Lockyer Valley Toowoomba
Length of Project	28 km (new single-track dual gauge track) Comprises greenfield (22.4 km) and brownfield track (5.6 km) with associated road works to accommodate the Project Includes 6.24 km undrained tunnel through the Toowoomba Range An additional 6.6 km of rail is required for the three crossing loops. The crossing loops are designed to accommodate trains initially up to 1,800 m long but potentially up to 3,600 m long in the future.
Track dimensions	A rail corridor with an average width of 65 m, containing a single track dual gauge railway line with three crossing loops (at the western end of the Toowoomba Range tunnel, at the eastern end of the Toowoomba Range tunnel and in Postmans Ridge, approximately 9.4 km east of the eastern tunnel portal). Viaducts and bridges: 13 new structures (rail bridges over watercourses, rail bridges over terrain and watercourses, rail bridges over terrain, road and watercourses, one rail bridge over road, rail and watercourses, one road bridge over rail and watercourse and one road bridge over rail crossing). The combined bridge/viaduct length for the Project is 6.7 km.
Train lengths	Double stacked trains, with a height of 6.5 m and length of up to 1,800 m with future provision to accommodate double stacked trains up to 3,600 m long.
Expected construction completion	2027

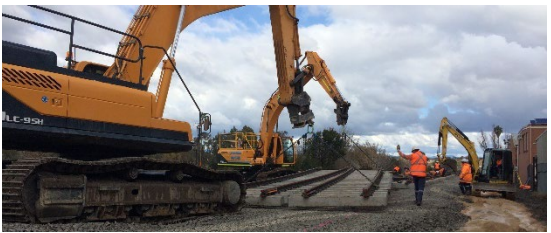
6.2 Key sources of potential impact

Potential impacts have been considered during construction and operation. **Table 20** describes the potential impacts during the construction phase and provides example indicative imagery (e.g. from other similar projects) to represent potential Project infrastructure and construction activities.

Mitigation measures are discussed in **Section 11: Mitigation**. Potential cumulative impacts are also considered and are discussed in Section 10 with relevant projects shown on **Figure 13: Cumulative LVIA**.

Table 20: Potential Project impacts during the construction phase

Construction activities and infrastructure	Indicative imagery
Construction Phase	
Vegetation clearing and associated earthworks Much of the landscape is already cleared for agricultural purposes, with the exception of steep vegetated land associated with the Toowoomba Escarpment. Where required, large-scale machinery will be used to assist in vegetation clearance or trimming activities. This will generate traffic on surrounding roads. Temporary stockpiles of cleared vegetation may also be present. Topsoil, subsoil, rock and other unsuitable materials will be removed where necessary to create stable and level areas for infrastructure to be constructed. This will result in the temporary presence of exposed areas of land.	 Source: ARTC
Creation of stockpiles (existing material from site) Stockpiles of materials cleared from site will be present in the laydown areas in the construction disturbance footprint, where they will be stored prior to use, re-use or disposal. This includes material from cut and fill sites, and large volumes of spoil from the Toowoomba Range tunnel. There are no borrow pits proposed for the Project.	 Source: Lat27
Creation of stockpiles (material delivered to site) Stockpiles of materials delivered to site will be present in the laydown areas and beside the existing rail corridor, where they will be stored prior to use. This includes clean ballast, soil stockpiles and rail materials including precast elements such as tracks and sleepers.	 Source: ARTC
Road and railway construction The construction of new haul roads and rail infrastructure within the LVIA study area will convey construction traffic to and within the construction areas resulting in short-term impacts on landscape and visual values.	 Source: FFJV
Bridge and viaduct construction Bridges and viaducts will be constructed over creeks, rivers, floodplains and existing road and rail corridors. The construction of new infrastructure will convey construction traffic to and within the construction areas resulting in short-term impacts on landscape and visual values.	 Source: ARTC

Construction activities and infrastructure	Indicative imagery
Associated construction equipment Large-scale construction equipment and machinery such as cranes, excavators, trucks, water trucks, scrapers, graders, heavy bulldozers, generators and dump trucks will be required for construction activities.	 Source: ARTC
Construction workers Presence of construction workers wearing high visibility Personal Protective Equipment (PPE). The construction workforce is expected to peak at approximately 590 team members at week 60 of the construction schedule, and maintain a high staff load over approximately 465 team members between weeks 40 to 122. No construction accommodation camps are proposed for the Project, due to the close proximity of nearby urban centres that will offer both workforce and accommodation options.	 Source: ARTC
Construction traffic movement There will be increased traffic movement on existing State-controlled roads and local government roads. This will include a variety of vehicle types.	 Source: Lat27
Temporary construction lighting Site preparation activities undertaken to provide access to the rail corridor are commonly conducted during daylight hours. However, some activities may be undertaken outside of standard daytime hours (e.g. tunnel construction activities will occur 24 hours a day, 7 days a week). Extended working hours may be considered possible in other instances, for example where there are no nearby sensitive receptors or impacts to receivers can be appropriately managed. Any changes to working hours would be supported by assessing impacts to sensitive receptors. Security night lighting would be required at the site offices and fuel storage areas. Potentially, night lighting may also be required at bridge laydown areas. If a flash butt welding facility is utilised during construction, it is anticipated that there would be site security lighting. The primary light source will be from large-scale temporary flood security lighting.	 Source: AECOM

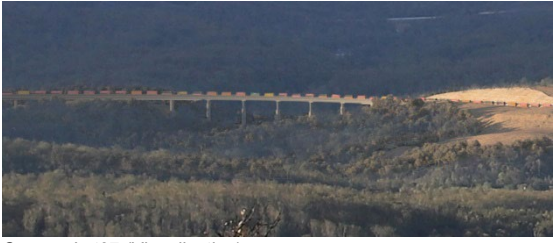
Construction activities and infrastructure	Indicative imagery
Embankments and mounding Embankments and mounding will be created to accommodate the proposed rail corridor. This will be evident in areas where there is a change in levels with the existing ground, for example major cuts. In addition, culverts and bridges will be constructed over creeks and existing road corridors.	 Source: Lat27
Shipping containers and storage sheds Shipping containers will be delivered to construction sites via crane trucks and then stored in laydown areas. The containers commonly contain construction equipment.	 Source: FFJV
Laydown areas, site offices and associated car parking areas The Project will require a number of temporary buildings to facilitate construction activities. This will include site offices and workshops, as well as car parking areas, in at least four locations as follows: • Tunnel construction site offices, segment storage, spoil stockpile, fuel storage, bridge laydown areas for UT1 Gowrie Creek rail bridge • Tunnel and bridge construction site, offices, segment storage, fuel storage • Bridge laydown for Postmans Ridge viaduct, fuel storage, site offices • General construction laydown, site offices, road realignment site. These sites will bring additional traffic, staff and machinery to the LVIA study area. The new, temporary built forms may be seen as uncharacteristic elements in a predominantly rural landscape.	 Source: FFJV
Drainage infrastructure including concrete piping Temporary and permanent drainage infrastructure will be present, including areas in close proximity to existing road corridors.	 Source: FFJV

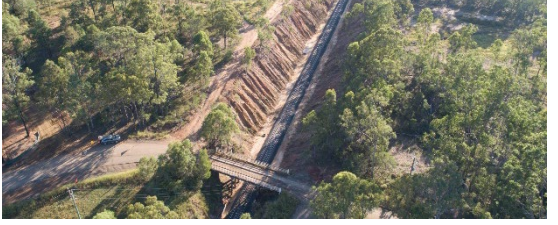
Construction activities and infrastructure	Indicative imagery
Signage A large number of safety signs will be required around construction sites, especially where existing road corridors are in close proximity to the Project.	 Source: FFJV

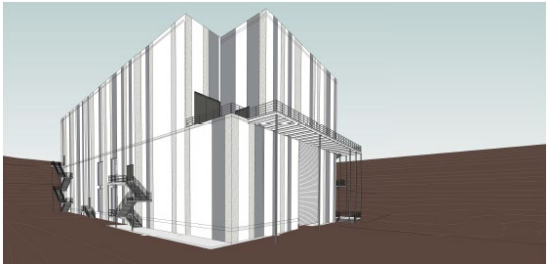
Table 21 describes potential impacts during the operation phase of the Project.

Table 21: Potential Project impacts during the operation phase

Operation activities and infrastructure	Indicative imagery
Operation Phase	
Lighting infrastructure Permanent lighting is limited to lighting associated with buildings and ancillary infrastructure located at tunnel portal locations and the intermediate ventilation building location. There will be traffic signalling associated with proposed passing loops. Emergency lighting will also be provided to rail tunnels in accordance with AS 2293.1, including adjacent to the egress walkway and exit signs. There will also be standard street lighting to roads as necessary.	 Source: ARTC
Freight trains Trains may be at times visible in the landscape from existing roads and residential properties. The current assumption is that there will be on average, 33 movements per day by 2027 (likely to increase to an average 47 trains per day in 2040). The Project is designed to accommodate double stack freight trains 6.5 m high initially up to 1,800 m long with capacity for train lengths to increase to 3,600 m. It is expected to take between one and approximately 2.5 minutes for a train to pass. The trains will have headlights. It is noted that part of the Project alignment is currently operational so some receptors already experience impacts from moving trains.	 Source: ARTC  Source: ARTC

Operation activities and infrastructure	Indicative imagery
<i>Note: this assessment is based on the allowance for 1,800 m long trains, including double stacking. It is likely that the provision of 3,600 m trains will be subject to future approval processes.</i>	
Road and rail bridges Bridges are an obvious built landmark for motorists and are likely to occur over rivers, creeks, rail tracks and roads. The Project proposes three bridges: - One rail bridge over watercourse crossing Project Chainage (Ch) 3.40 km: UT1 Gowrie Creek rail bridge (56 m) - One road over road, rail and watercourse crossing Ch 1.93 km: Gowrie Junction Road bridge (311 m) - One road over rail crossing Ch 15.54 km: McNamaras road bridge (74 m). The proposed Gowrie Creek rail bridge is a pre-stressed concrete (PSC) slab span deck structure, while the two road bridges are typically proposed as single track, super-T girder type structures.	Road bridge over rail  Source: Lat27 (Visualisation) Rail bridge over road  Source: Lat27 (Visualisation)
Viaducts Viaducts are an obvious built landmark and are likely to occur over rivers, floodplains, creeks, rail tracks and roads. The Project proposes ten viaduct structures, that traverse watercourses, terrain and roads. These are typically proposed as single track, super-T girder type structures, with the exception of the Oaky Creek viaduct and Murphys Creek Road viaduct that have an additional crossing loop. Viaducts are located at: - Ch 11.63 km: Oaky Creek viaduct (706 m) - Ch 12.83 km: Withcott viaduct 1 (261 m) - Ch 13.64 km: Withcott viaduct 2 (322 m) - Ch 14.12 km: Withcott viaduct 3 (174 m) - Ch 15.15 km: Withcott viaduct 4 (145 m) - Ch 15.89 km: Toowoomba Bypass and TSRC and Six Mile Creek viaduct (966 m) - Ch 18.44 km: Postmans Ridge viaduct (645 m) - Ch 20.98 km: Murphys Creek Road viaduct (690 m) - Ch 21.84 km: Withcott Seedlings viaduct (1,794 m) - Ch 24.45 km: Lockyer Creek viaduct (506 m)	Rail viaduct over terrain  Source: Lat27 (Visualisation) Rail viaduct over terrain  Source: Lat27 (Visualisation)
Level crossings There are no active level crossings proposed for the Project, however occupational crossings will be required.	Imagery not applicable

Operation activities and infrastructure	Indicative imagery
Railway tracks Where buffers (for example, vegetation and topographic features) do not exist, the railway tracks are likely to become a visible element of infrastructure in the landscape, commonly sighted from adjacent roads and residents' properties.	 Source: ARTC
Culverts Culverts (including multiple barrel culverts) are required where the route crosses small creeks, drainage lines and watercourse crossings. These comprise: 22 Reinforced Concrete Pipes and 13 Reinforced Concrete Box Culverts have been identified for the Project.	 Source: ARTC
Embankments, abutments and retaining walls Embankments and mounding will be created to accommodate the proposed rail infrastructure, this includes: 12 fill sections totalling approximately 15.4 km, ranging from around 160 m to 1,550 m in length; maximum embankment heights of up to 33.3 m.	 Source: Lat27
Cuttings with associated retaining walls Cuts will be created through areas of elevated landform, for example in the Toowoomba Range, to accommodate the proposed rail infrastructure, this includes: 13 cuttings with a total length of approximately 6.7 km with a maximum cut depth of 45.7 m - A range of treatments may be used across the Project for the stabilisation of cut slopes including shotcrete (where batter 1V:1H); geosynthetics with high tensile steel wire nets and meshes (where batter between 1V:1H and 1V:1.5H) and landscape where batter 1V:2H or shallower.	 Source: ARTC
Tunnels with associated tunnel portals and service buildings A 6.24 km tunnel will be created through the Toowoomba Range from Ch 4.10 km to Ch 10.34 km to accommodate the proposed rail infrastructure. At the western and eastern tunnel entries a portal will be created, which will include service buildings, substations and ventilation control buildings. It is noted that as portal infrastructure is typically situated in cut, direct views to service buildings are typically obscured. An additional ventilation control building is proposed at the intermediate ventilation shaft infrastructure location, in Cranley Ch 6.83 km.	Typical tunnel portal  Source: ARTC Western tunnel portal showing tunnel portal ventilation building and associated infrastructure

Operation activities and infrastructure	Indicative imagery
It is also noted that dispersed, ventilated exhaust will be discharged at the tunnel portals.	 Source: Lat27 (Visualisation) Tunnel control centre perspective  Source: FFJV (Visualisation) Tunnel portal ventilation building perspective  Source: FFJV (Visualisation)
Creation of permanent stockpiles A permanent stockpile at the western tunnel portal is proposed to manage spoil from the excavation of the Toowoomba Range tunnel. The stockpile would be a mound between 6 to 7 m high of compacted tunnel spoil, and it is expected the mound would be shaped to suit the landscape and vegetated. The stockpile will also aim to mitigate noise and visual impacts during construction and operation.	 Source: Lat27 (Visualisation)
Fencing Fencing will be provided along the rail corridor, where required in accordance with ARTC's fencing strategy (e.g. fencing at viaducts may not be required). The Project will be fenced with a three or four strand barbed wire fence. Where superior fencing is required near roads or where trespass is occurring a 1.8 m chain wire fence is proposed (e.g. where crossing loops are in close proximity to roads or where critical infrastructure is to be protected). Fauna exclusion fencing is also required in some places.	 Source: FFJV

Operation activities and infrastructure	Indicative imagery
	 Source: FFJV

6.3 Illustrative cross sections of typical conditions

The following illustrations (**Figure 14** to **Figure 25**) have been prepared to indicate typical cross sections of the rail and associated components found across the Project.

It is noted that these images are indicative “artist’s impressions” only, and representative of typical conditions found across the Project. The sections are not specific to any one location.

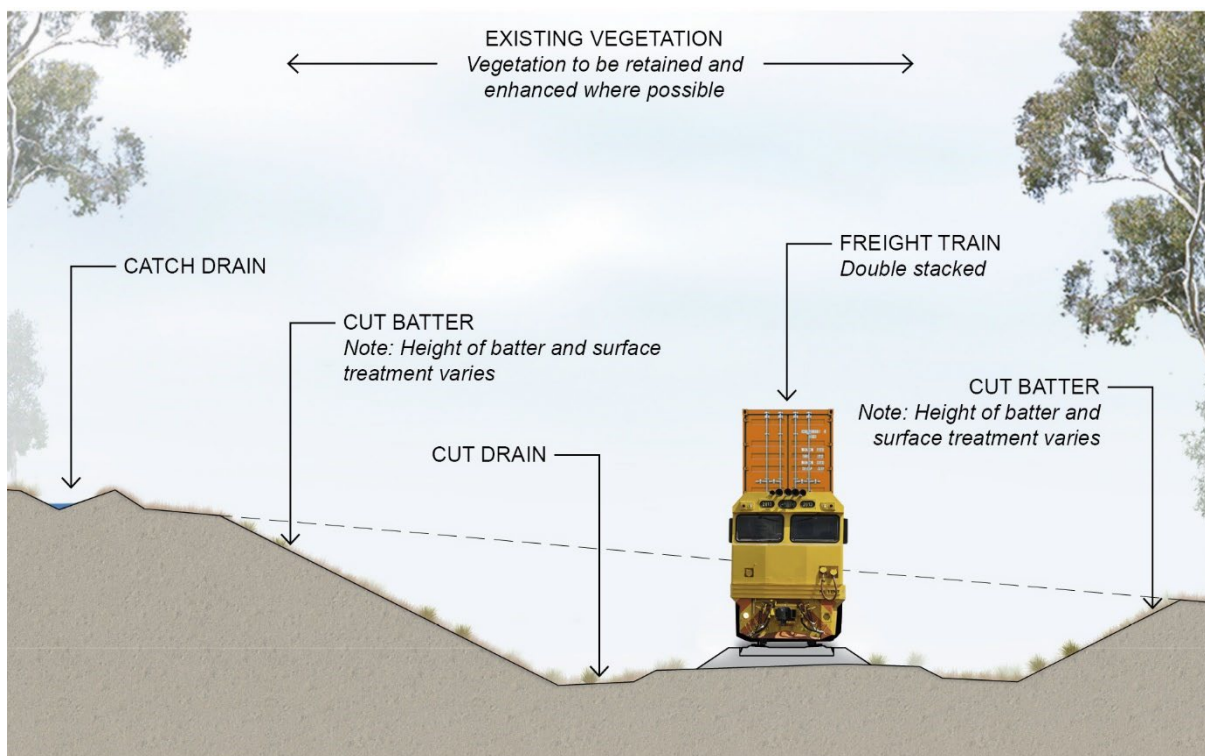


Figure 14: Typical cut

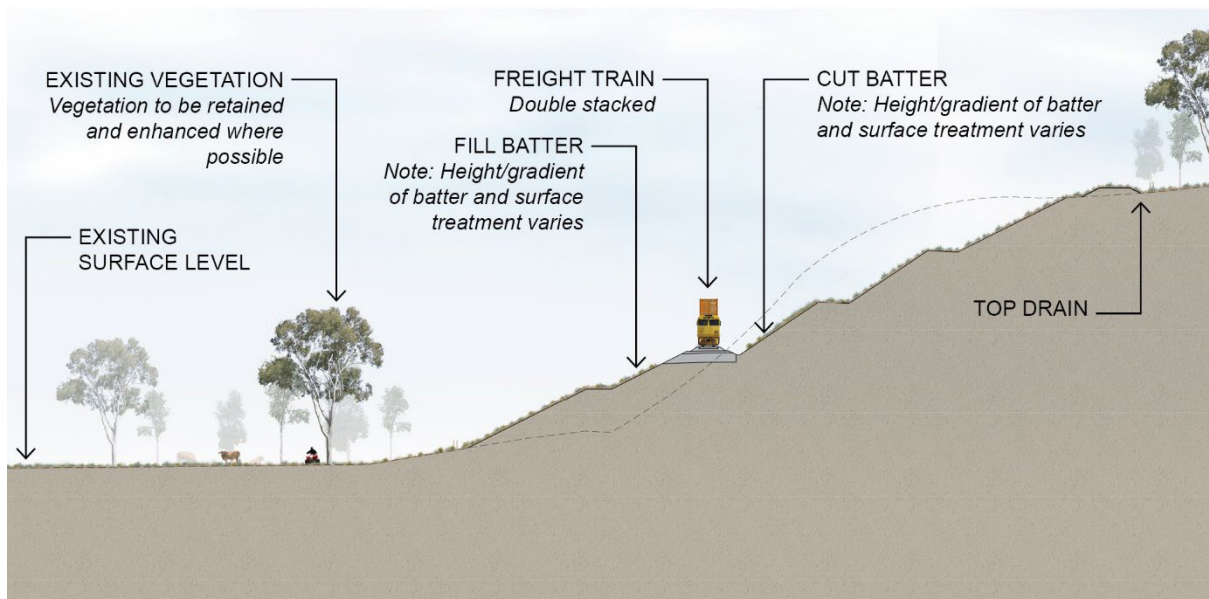


Figure 15: Typical cut/fill batter

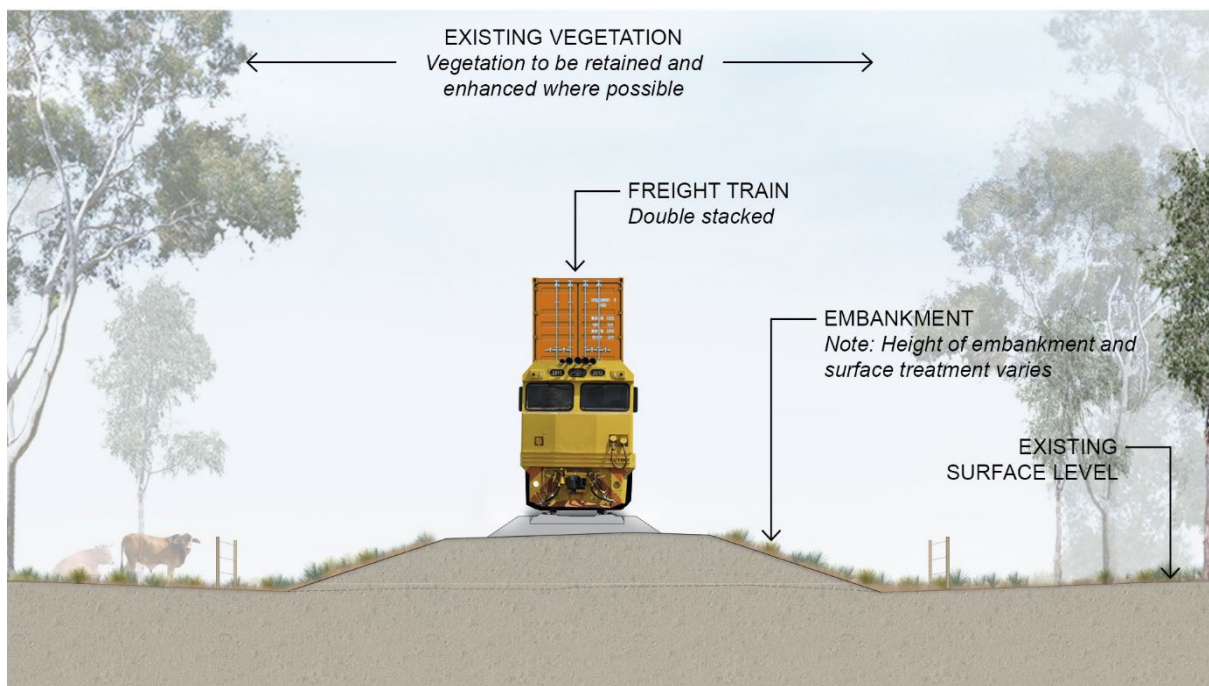


Figure 16: Typical low embankment

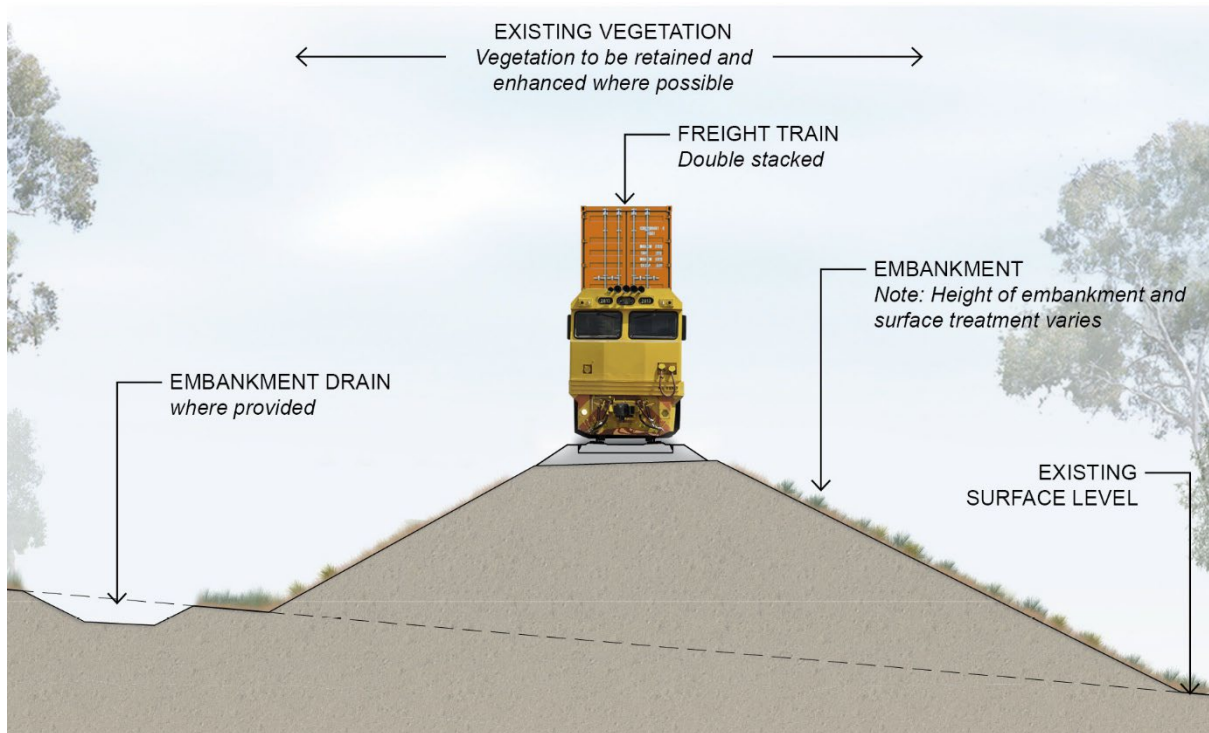


Figure 17: Typical high embankment with drain

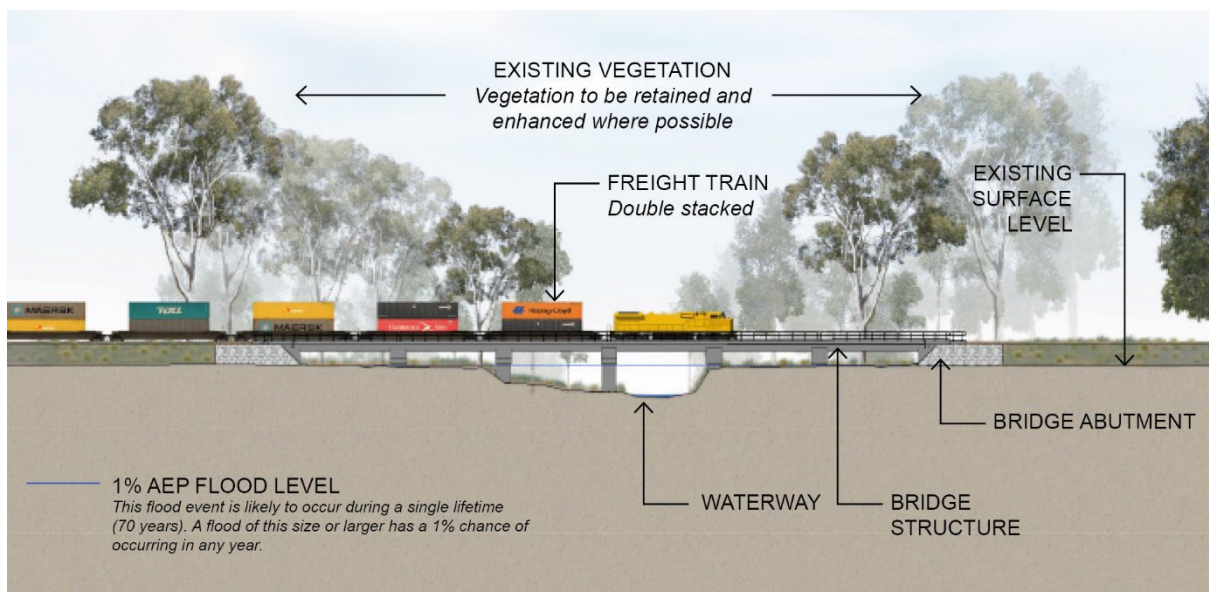


Figure 18: Typical rail bridge creek crossing

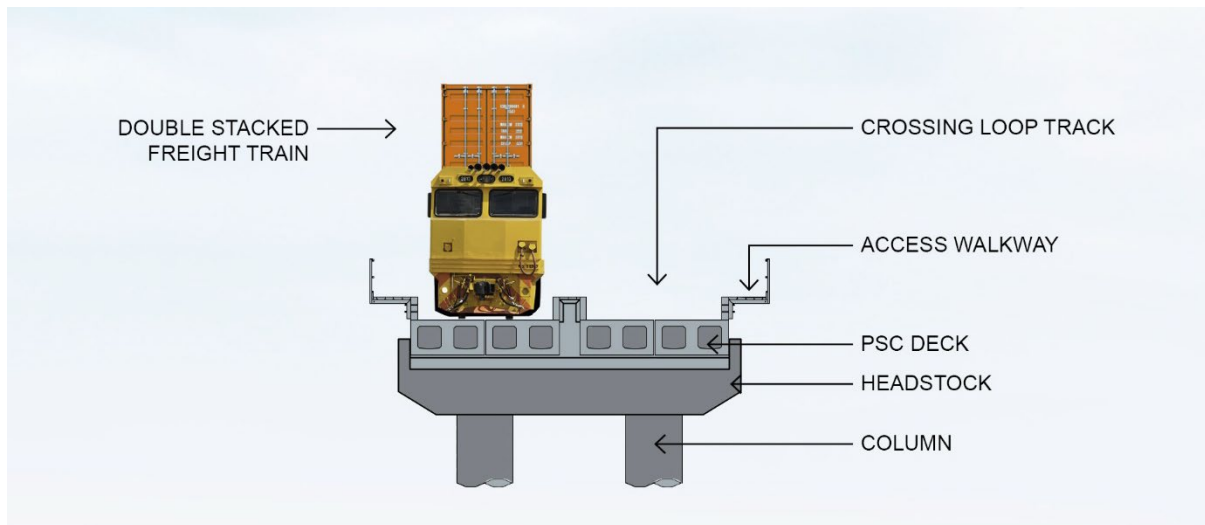


Figure 19: Typical rail bridge with passing loop cross section

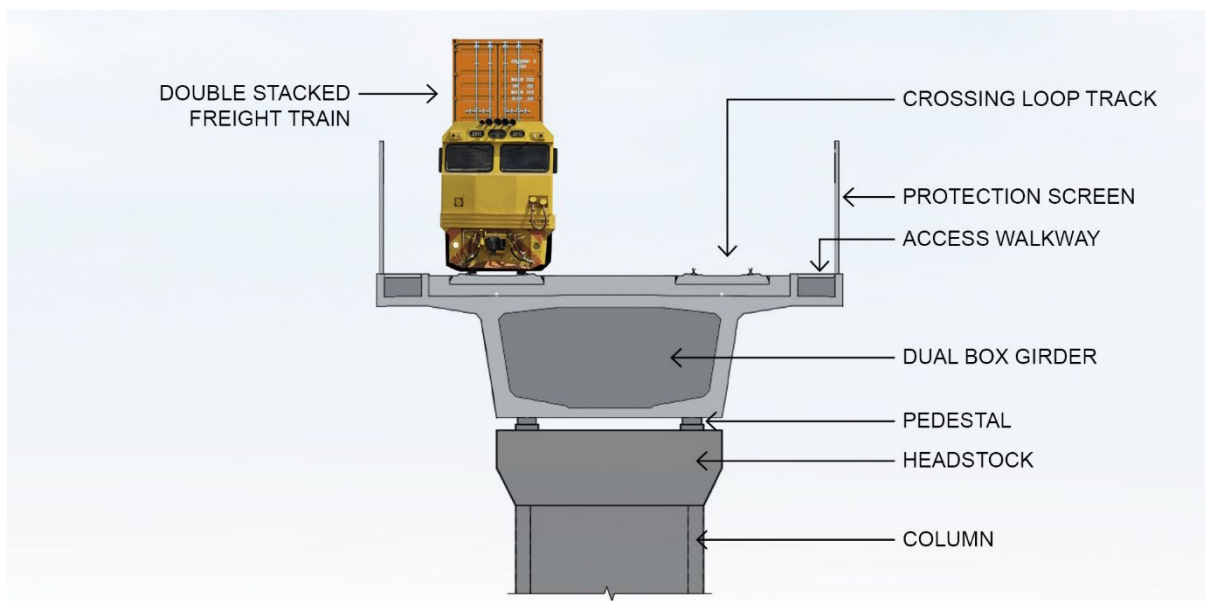


Figure 20: Typical viaduct with passing loop

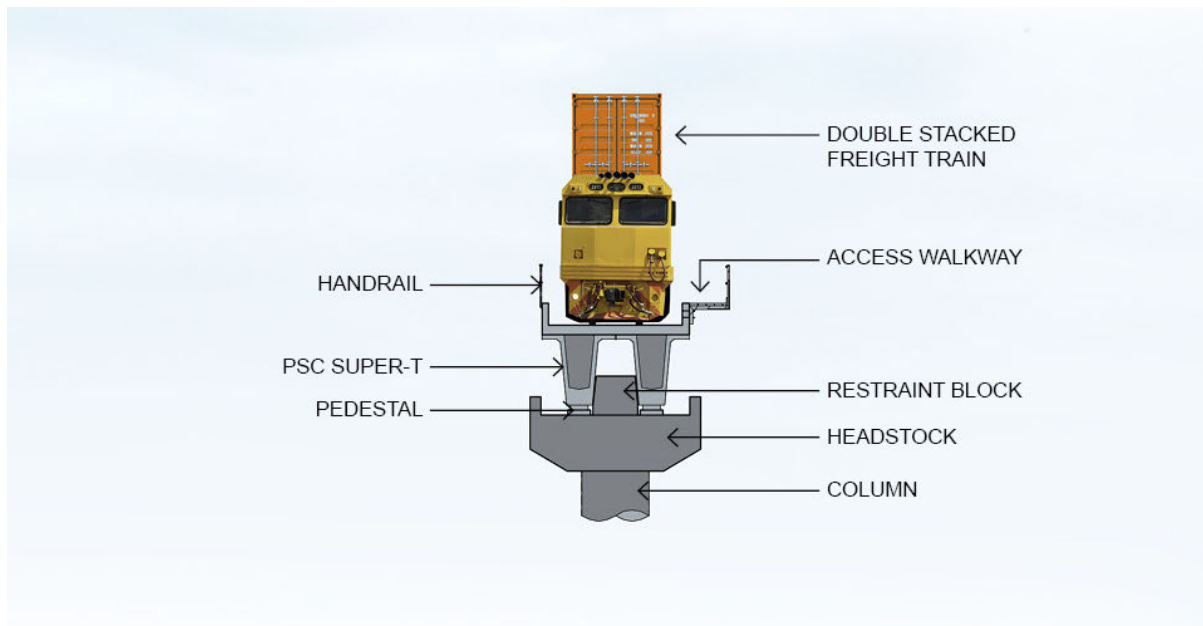


Figure 21: Typical viaduct with access walkway and handrail

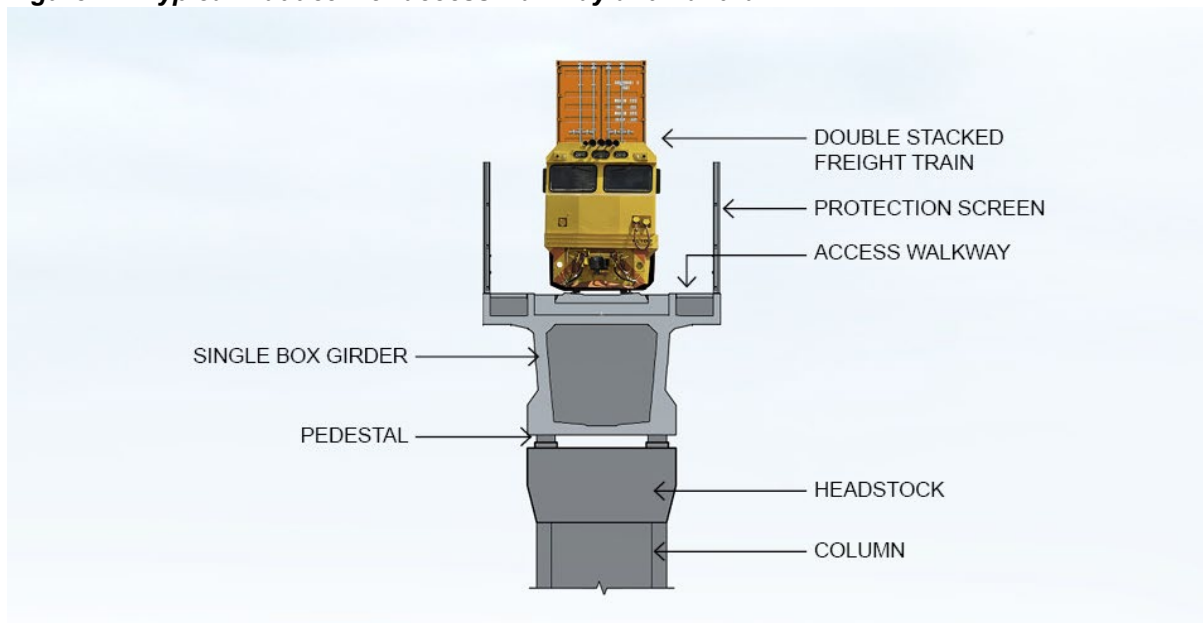


Figure 22: Typical viaduct with access walkway and protection screens



Figure 23: Gowrie Junction Road bridge indicative elevation

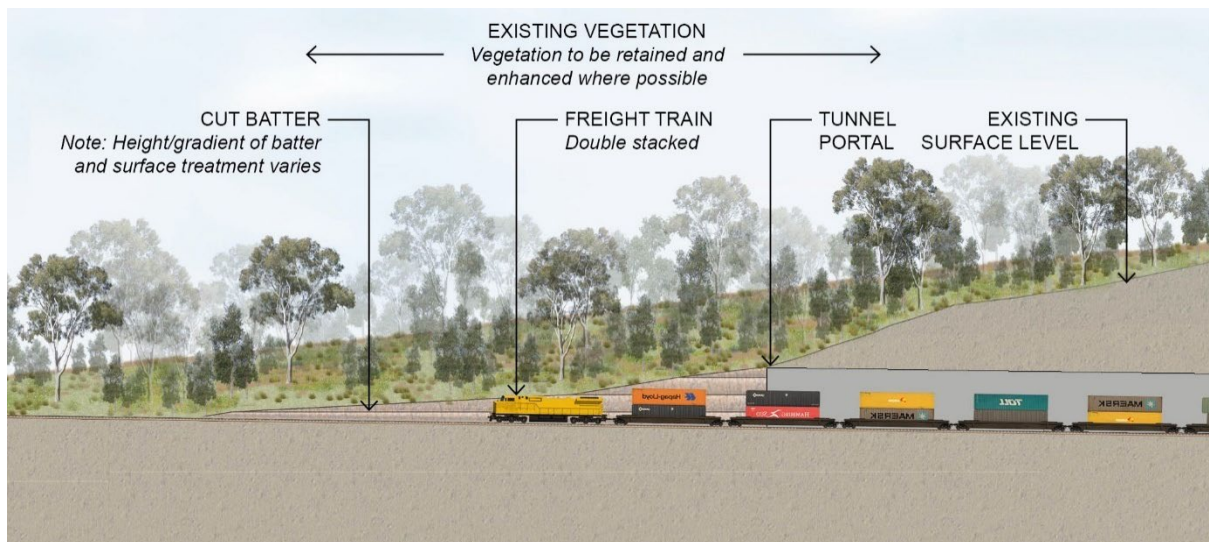


Figure 24: Typical tunnel portal

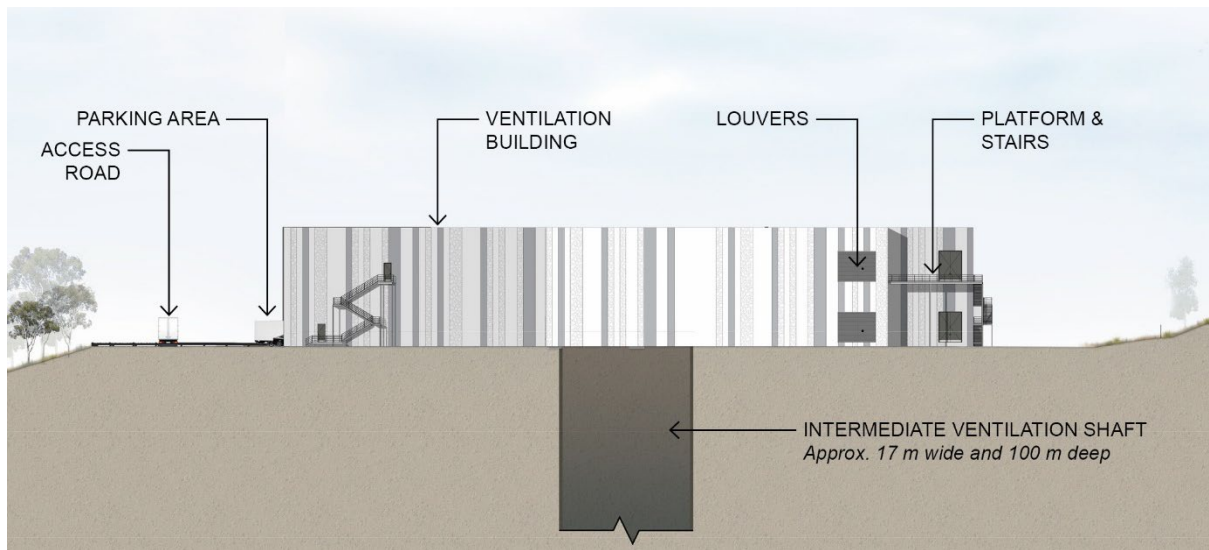


Figure 25: Intermediate ventilation shaft building elevation

7 Landscape impact assessment

7.1 Landscape character impact assessment

Eight LCTs have been identified within the LVIA study area (refer **Table 17**). These are identified in **Figure 7: Landscape character assessment** (refer Appendix 1). Seven of these LCTs are directly intersected by the Project:

- LCT A: Vegetated Watercourses - Creeks and Channels
- LCT B: Irrigated Croplands
- LCT C: Dry Croplands and Pastures
- LCT D: Vegetated Grazing
- LCT E: Rural Settlement
- LCT F: Rural Living
- LCT G: Forested Uplands.

One other LCT, LCT H: Transitional Landscapes, is present in the wider LVIA study area, however as this is not intersected by the Project any impacts would be indirect and as no meaningful impacts are anticipated it has not been considered further.

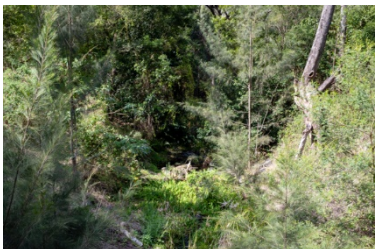
The LCTs are described in **Table 22** to **Table 28**. These tables also assess the likely sensitivities for each identified LCT in relation to the Project and provide a preliminary indication of the likely magnitude of change and consequently the likely significance of that effect on landscape amenity.

Construction impacts on landscape character are temporary and relate to activities such as removal of vegetation which persist into the operational phase, including preliminary earthworks, and cut slopes. Operational impacts include permanent infrastructure as well as the rehabilitation of vegetation. Therefore, the assessment presented below is a combined assessment of impacts during both construction and operation, reflecting elements removed or disturbed during construction as well as the introduction of structures that affect the perception and character of the landscape over the longer term.

7.1.1 Landscape Character Type A

Table 22: Landscape impact assessment of LCT A: Vegetated Watercourses – Creeks and Channels

Type A: Vegetated Watercourses - Creeks and Channels	
Landscape Baseline Assessment	
Location and boundaries	This landscape type is located throughout the LVIA study area, associated with several watercourses within the Condamine-Balonne rivers catchment and Lockyer catchment. There are 13 LCAs associated with this LCT – the <i>Gowrie Creek Vegetated Watercourse</i> (LCA A1), <i>Westbrook Creek Vegetated Watercourse</i> (LCA A2), <i>Upper Westbrook Creek Vegetated Watercourse</i> (LCA A3), <i>Dry Creek Vegetated Watercourse</i> (LCA A4), <i>Spring Creek Vegetated Watercourse</i> (LCA A5), <i>Meringandan Creek Vegetated Watercourse</i> (LCA A6), <i>Klein Creek Vegetated Watercourse</i> (LCA A7), <i>Reedy Creek Vegetated Watercourse</i> (LCA A8), <i>Lockyer Creek Vegetated Watercourse</i> (LCA A9), <i>Six Mile Creek Vegetated Watercourse</i> (LCA A10), <i>Soda Spring Creek Vegetated Watercourse</i> (LCA A11), <i>Flagstone Creek Vegetated Watercourse</i> (LCA A12) and the <i>Sandy Creek Vegetated Watercourse</i> (LCA A13).

Type A: Vegetated Watercourses - Creeks and Channels		
Typical character images:		
		
		
Key characteristics	• Includes creeks, and low-lying effluent channels within extensive floodplains that form part of Condamine-Balonne rivers catchment • Creeks within the Lockyer catchment are typically situated in steep terrain with more intact riparian vegetation • These creeks convey large amounts of runoff away from the steep and elevated surrounding ranges and tablelands in rainfall events • Remnant areas of flood-dependent forest/woodlands and wetlands • Natural landscape with few built infrastructure elements.	
Precedent modifications and infrastructure elements	• Relatively natural landscape with minimal infrastructure, comprising road and existing rail bridges over the main creek channels within the LVIA study area • In some instances, fringing vegetation has been retained and creates a buffer between adjacent land uses • Telecommunication infrastructure including telegraph poles typically follows the road alignment • Presence of gas pipeline infrastructure in some parts of this landscape type.	
Landscape character sensitivity assessment	• Moderate degree of perceived naturalness, with some instances of evidence of human uses and modifications to the watercourses • Significant fringing vegetation in some areas contain views to and from creek lines, reducing the sensitivity. Vegetation is sparser in low lying agricultural areas • The overall sensitivity is considered to be Low. This recognises that there are no formal landscape designations associated with this LCT and the landscape does not appear to be used by the local community for recreation. Additionally, parts of the LCT are already affected by the presence of road and rail infrastructure (albeit some of the rail infrastructure is no longer in active use) so it has capacity to accommodate further change.	
Impact Assessment		
Magnitude of change assessment	• The Project traverses a variety of landscapes and land uses, including rural landscapes, intensive agricultural areas, urban areas fringing existing townships and the vegetated undulating foothills of the Great Dividing Range	

Type A: Vegetated Watercourses - Creeks and Channels	
	- The introduction of new road and rail infrastructure into the rural and urban setting will include five key creek crossings, where the Project crosses the upper tributary of Gowrie Creek, Gowrie Creek, Oaky Creek, Six Mile Creek and Lockyer Creek - LCA A1: Gowrie Creek, A9: Lockyer Creek and A10: Six Mile Creek would be traversed by the Project and/or associated road infrastructure (noting that the upper tributaries of Gowrie Creek and Oaky Creek are not identified as distinct LCAs and the impacts on these watercourses are considered within their broader context) - The Project runs parallel to LCA A1: Gowrie Creek for approximately 10 km, of which 5 km is underground within tunnel and therefore not visible - New road and rail bridge, viaduct and railway infrastructure, as well as associated drainage infrastructure (e.g. culverts) will result in localised removal of vegetation - Changes to the landscape character associated with creek and floodplain infrastructure will be evident to residents of Gowrie, as well as from Toowoomba Bypass, Gowrie Junction Road, Krienke Road, Morris Road, Old Homebush Road, Ambrose Street, Gowrie Birnam Road, Paulsens Road, East Paulsens Road, Cattos Road, Jones Road and Gittins Road - The overall magnitude of change is predicted to be Moderate.
Significance of effect	The effect of the Project on LCT A: Vegetated Watercourses – Creeks and Channels is Low.

7.1.2 Landscape Character Type B

Table 23: Landscape impact assessment of LCT B: Irrigated Croplands

Type B: Irrigated Croplands	
Landscape Baseline Assessment	
Location and boundaries	This landscape type is located within the fertile floodplains of the Darling Downs and Lockyer Valley. There are 32 LCAs associated with this LCT – the <i>Oakey North Irrigated Croplands</i> (LCA B1), <i>Oakey South Irrigated Croplands</i> (LCA B2), <i>Westbrook Creek Irrigated Croplands</i> (LCA B3), <i>Brimblecombe Road Irrigated Croplands</i> (LCA B4), <i>Wellcamp Airport Irrigated Croplands</i> (LCA B5), <i>Yalungur Irrigated Croplands</i> (LCA B6), <i>Glencoe Irrigated Croplands</i> (LCA B7), <i>Kingsthorpe Irrigated Croplands</i> (LCA B8), <i>Charlton Irrigated Croplands</i> (LCA B9), <i>Westbrook Irrigated Croplands</i> (LCA B10), <i>Wellcamp Irrigated Croplands</i> (LCA B11), <i>Lilydale West Irrigated Croplands</i> (LCA B12), <i>Lilydale East Irrigated Croplands</i> (LCA B13), <i>Meringandan Irrigated Croplands</i> (LCA B14), <i>Klein Road Irrigated Croplands</i> (LCA B15), <i>Highfields Road Irrigated Croplands</i> (LCA B16), <i>Highfields Irrigated Croplands</i> (LCA B17), <i>Gowrie Irrigated Croplands</i> (LCA B18), <i>Morris Road Irrigated Croplands</i> (LCA B19), <i>Birnam Irrigated Croplands</i> (LCA B20), <i>Upper Lockyer Irrigated Croplands</i> (LCA B21), <i>Murphys Creek Road Irrigated Croplands</i> (LCA B22), <i>Lockyer Irrigated Croplands</i> (LCA B23), <i>Airforce Road Irrigated Croplands</i> (LCA B24), <i>Helidon Irrigated Croplands</i> (LCA B25), <i>Flagstone Creek West Irrigated Croplands</i> (LCA B26), <i>Flagstone Creek Irrigated Croplands</i> (LCA B27), <i>Flagstone Creek East Irrigated Croplands</i> (LCA B28), <i>Grantham North Irrigated Croplands</i> (LCA B29), <i>Sandy Creek Road Irrigated Croplands</i> (LCA B30), <i>Grantham South Irrigated Croplands</i> (LCA B31) and the <i>McLucas Road Irrigated Croplands</i> (LCA B32). These LCAs are typically located in areas with highly fertile vertosol soils.

Type B: Irrigated Croplands		
Typical character images:		
		
		
Key characteristics	• Extensively developed agricultural areas • Typically located in areas with highly fertile vertosol soils • The vertosols, are typically cracking clay soils with high nutrients capable of supporting agriculture • Extensive large and relatively flat open fields of irrigated cropland • Landscape substantially cleared of vegetation, except at the periphery, along creek lines (LCT A) on the skyline and local roads • In addition to irrigated production, current land use activities include grazing and dryland farming with localised recreation • This LCT is not the subject of any landscape planning designations but likely to be valued locally for scenic amenity, while the high-quality agricultural land of the Darling Downs is noted in the Toowoomba Regional Council Scenic Amenity Study as one of the region's best rural assets.	
Precedent modifications and infrastructure elements	• To enhance agricultural productivity, modifications have been made to the floodplains and low-lying alluvial areas of the Darling Downs and Lockyer Valley to improve land used for grazing, dryland cropping and irrigated cropping.	
Landscape character Sensitivity assessment	• The Irrigated Croplands landscape type is predominantly visually open, with a sparsely settled rural character and no large-scale infrastructure elements. It has long distant views and strong skylines • Vegetation within low-lying areas is extensively cleared and very sparse, with denser remnant vegetation along watercourses. Due to the extensively modified character of the landscape and local value of the landscape in terms of landscape amenity the overall inherent sensitivity is considered to be Low.	
Impact Assessment		
Magnitude of change assessment	• The primary impact will be on private land where new rail infrastructure is being introduced • The Project typically follows the existing West Moreton System rail corridor when passing through this LCT. Where the Project transitions to the B2G project, it deviates from the existing rail corridor west of Gowrie, impacting	

Type B: Irrigated Croplands	
	upon LCA B8: Kingsthorpe. The impact of the B2G project upon the LCA is discussed within the B2G LVIA (ARTC, 2020) . - LCA B9: Charlton will be affected; however, the Project typically follows the existing rail corridor therefore any impacts would be minor - The impact on private land including irrigated farmland will be most evident near Gowrie and affect LCA B19: Morris Road, where the Project deviates from the existing rail corridor - New Project infrastructure, in particular earthworks required to facilitate the Project will not be inconsistent with the current landscape character of this LCT - The overall magnitude of change is predicted to be Low.
Significance of effect	The effect of the Project on LCT B: Irrigated Croplands is Negligible.

7.1.3 Landscape Character Type C

Table 24: Landscape impact assessment of LCT C: Dry Croplands and Pastures

Type C: Dry Croplands and Pastures		
Landscape Baseline Assessment		
Location and boundaries	This landscape extends across a considerable part of the LVIA study area and is largely defined by extensively cleared, often undulating, open rural properties utilised for agriculture and livestock production. There are 14 LCAs associated with this LCT – the <i>Kings Siding Dry Croplands and Pastures</i> (LCA C1), <i>Oakey Dry Croplands and Pastures</i> (LCA C2), <i>Gowrie Mountain Dry Croplands and Pastures</i> (LCA C3), <i>Biddeston Dry Croplands and Pastures</i> (LCA C4), <i>Gowrie Little Plain Dry Croplands and Pastures</i> (LCA C5), <i>Glencoe Dry Croplands and Pastures</i> (LCA C6), <i>Mt Kingsthorpe Dry Croplands and Pastures</i> (LCA C7), <i>Gowrie Dry Croplands and Pastures</i> (LCA C8), <i>Charlton Dry Croplands and Pastures</i> (LCA C9), <i>Wellcamp Dry Croplands and Pastures</i> (LCA C10), <i>Klein Road Dry Croplands and Pastures</i> (LCA C11), <i>Black Flagstone Road Dry Croplands and Pastures</i> (LCA C12), <i>Helidon Croplands and Pastures</i> (LCA C13) and the <i>Verdilla Dry Croplands and Pastures</i> (LCA C14).	
Typical character images:		
		
		

Type C: Dry Croplands and Pastures	
Key characteristics	- The landscape is typically found on the undulating, poorer foothills of the LVIA study area surrounding the low-lying alluvial floodplains (LCT B – Irrigated Croplands) - West of the Great Dividing Range soils within this LCT are typically comprised of vertosols and to a lesser extent, dermosols, with some instances of ferrosols in the vicinity of Toowoomba, Cranley and Highfields - To the east of the Great Dividing Range soils typically comprise chromosols and sodosols, with rare patches of hydrosols, vertosols and rudosols scattered throughout - Vertosols are cracking clay soils, with high agricultural potential - Ferrosols and dermosols are associated with previous volcanic activity and are found in higher rainfall coastal regions. They are used for intensive crop production. - The sodosols have a gravelly, sandy character, often exposed in areas and vulnerable to tunnel and gully erosion - Chromosols are defined as strong textural contrast soils with moderate agricultural potential - Sodosols are predominately found in poorly drained sites, are highly erodible and have limited agricultural potential due to their low permeability - Land use is predominately rural, characterised by dryland cropping and pastoral properties for livestock production - Vegetation comprises native roadside shelter belts and sporadic riparian vegetation associated with creek lines - Transport corridors within this LCT are typically straight in character reflecting the flat topography, with subtle kinks associated with topographic variation that connect the key settlements and rural properties. Main roads are sealed but other roads are typically unsealed gravel. - Open and exposed character with long distant views and strong skylines, except where views are contained by roadside or creek-side vegetation - Sparsely settled landscape, with only property homesteads and cottages, and small rural 'villages' and towns such as Kingsthorpe, Gowrie and Meringandan. Homesteads are typically located on gently elevated areas, while rural residential pockets can be found on elevated peaks. - Harmonious but fairly typical rural character, which is valued at a local level by local communities and visitors, with the high-quality agricultural land of the Darling Downs noted in the Toowoomba Regional Council Scenic Amenity Study as one of the region's best rural assets - Some areas within this LCT, particularly undulating elevated land associated with the isolated mesas and hills of Mt Kingsthorpe and Gowrie Mountain are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study.
Precedent modifications and infrastructure elements	- Highly modified for agricultural practices, including clearing and levelling of land for cultivation of arable farmland and pastures for grazing - Presence of roads, railways and bridges - Telecommunication infrastructure including telegraph poles.
Landscape character sensitivity assessment	- The Dry Croplands and Pastures LCT is predominantly visually open, with a sparsely settled rural character and little large-scale infrastructure. It has long distant views and strong skylines. - Roadside shelter belts and sporadic riparian vegetation associated with creek lines and flood channels provide some screening - Due to the simple character of the landscape and local value of the landscape, which is not protected in any planning scheme, the overall inherent sensitivity is considered to be Low.

Type C: Dry Croplands and Pastures	
Impact Assessment	
Magnitude of change assessment	- Parts of LCA C3: Gowrie Mountain, C4: Biddeston and C9: Charlton would be directly affected - Impact on private land, including agricultural and pastoral areas will be evident in the vicinity of Biddeston, Wellcamp, Gowrie Mountain and Gowrie (LCA C3, C4 and C9), where the Project deviates from the existing West Moreton System rail corridor - The Project will be introducing new infrastructure, including tunnel portals and an intermediate ventilation shaft location and associated buildings into what is a relatively intact rural environment - Impacts within this LCA will be due to localised vegetation removal, major earthworks (e.g. cuts and embankments), proposed road and rail over creek bridges as well as tunnel infrastructure - Overall, therefore, the impact on this LCT is High.
Significance of effect	The effect of the Project on LCT C: Dry Croplands and Pastures is Moderate.

7.1.4 Landscape Character Type D

Table 25: Landscape impact assessment of LCT D: Vegetated Grazing

Type D: Vegetated Grazing	
Landscape Baseline Assessment	
Location and boundaries	This landscape type is typically located in elevated parts of the LVIA study area, and is characterised by poorer quality soils, remnant vegetation and cattle and sheep grazing. There are 25 LCAs associated with this LCT – the <i>Meringandan West Vegetated Grazing</i> (LCA D1), <i>Meringandan Vegetated Grazing</i> (LCA D2), <i>Glencoe West Vegetated Grazing</i> (LCA D3), <i>Glencoe East Vegetated Grazing</i> (LCA D4), <i>Gowrie Vegetated Grazing</i> (LCA D5), <i>Highfields Road Vegetated Grazing</i> (LCA D6), <i>Highfields Vegetated Grazing</i> (LCA D7), <i>Kleinton Road Vegetated Grazing</i> (LCA D8), <i>Cabarlah Park Road Vegetated Grazing</i> (LCA D9), <i>Birnam Vegetated Grazing</i> (LCA D10), <i>Wellcamp Vegetated Grazing</i> (LCA D11), <i>Westbrook Vegetated Grazing</i> (LCA D12), <i>Glenvale Vegetated Grazing</i> (LCA D13), <i>Cabarlah Vegetated Grazing</i> (LCA D14), <i>Fifteen Mile Vegetated Grazing</i> (LCA D15), <i>Murphys Creek South Vegetated Grazing</i> (LCA D16), <i>Murphys Creek North Vegetated Grazing</i> (LCA D17), <i>Murphys Creek Vegetated Grazing</i> (LCA D18), <i>Upper Lockyer Vegetated Grazing</i> (LCA D19), <i>Postmans Ridge Vegetated Grazing</i> (LCA D20), <i>Withcott Vegetated Grazing</i> (LCA D21), <i>Derrymore Vegetated Grazing</i> (LCA D22), <i>Gatton Vegetated Grazing</i> (LCA D23), <i>Lilydale Vegetated Grazing</i> (LCA D24) and the <i>Volp Road Vegetated Grazing</i> (LCA D25).
Typical character images:	
	 

Type D: Vegetated Grazing	
Key characteristics	• Very sparsely settled landscape with large land holdings and scattered homesteads • Pastureland with broad areas of open wooded remnant vegetation, typically denser along creek and drainage lines and hill tops • Roads are typically straight in character and unsealed gravel. Views in most instances are contained by roadside shelter belts. • Harmonious but fairly typical rural character • Landscapes associated with Mt Davidson (Sugarloaf), in the vicinity of Blanchview, Derrymore and Silver Ridge, and Stringybark Mountain, in the vicinity of Derrymore, Flagstone Creek and Iredale are identified as being of high value in the regionally significant scenic amenity overlay area as defined in ShapingSEQ • In addition, some areas within this LCT, particularly undulating and vegetated elevated land in the vicinity of West Toowoomba, Blue Mountain Heights and Highfields, are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study.
Precedent modifications and infrastructure elements	• Typically, limited levels of modification for agricultural practices, with some localised vegetation clearing • Roads are typically unsealed.
Landscape character sensitivity assessment	• The Vegetated Grazing LCT is predominantly visually contained, with a sparsely settled rural character and little large-scale infrastructure. Long distant views are possible at breaks in roadside shelter breaks. • Harmonious but fairly typical rural character, which is valued at a local level by local communities and visitors • Due to the simple character of the landscape and local value of the landscape the overall inherent sensitivity is considered to be Low.
Impact Assessment	
Magnitude of change assessment	• Parts of LCA D20: Postmans Ridge would be directly affected. • Impact on private land, including vegetated pastoral areas will be most evident near Postmans Ridge in LCA D20. The Project will introduce new infrastructure into what is a relatively intact rural environment. • This region has already been impacted by the construction of the Toowoomba Bypass. Only a small portion of the Project within this LCA follows the Toowoomba Bypass alignment. • Impacts within this LCT will be due to localised vegetation removal, major earthworks (e.g. cuts and embankments, including those associated with the eastern tunnel portal approach) and proposed bridges and viaducts • Overall, therefore, the impact on this LCT is High.
Significance of effect	The effect of the Project on LCT D: Vegetated Grazing is Moderate.

7.1.5 Landscape Character Type E

Table 26: Landscape impact assessment of LCT E: Rural Settlement

Type E: Rural Settlement	
Landscape Baseline Assessment	
Location and boundaries	Ten rural settlements are located within the LVIA study area. They include the city of Toowoomba and the settlements of Kingsthorpe, Meringandan West, Meringandan, Meringandan South, Gowrie, Highfields, Murphys Creek, Withcott and Helidon.

Type E: Rural Settlement			
		There are 10 LCAs associated with this LCT – <i>Kingsthorpe</i> (LCA E1), <i>Meringandan West</i> (LCA E2), <i>Meringandan</i> (LCA E3), <i>Meringandan South</i> (LCA E4), <i>Gowrie</i> (LCA E5), <i>Highfields</i> (LCA E6), <i>Toowoomba</i> (LCA E7), <i>Murphys Creek</i> (LCA E8), <i>Withcott</i> (LCA E9) and <i>Helidon</i> (LCA E10).	
Typical character images:			
			
			
			
			
Key characteristics		• Toowoomba is the largest settlement within the LVIA study area, and is a regional city servicing the Darling Downs region • Small rural towns, villages and communities are low-scale built form with limited services • Within rural towns buildings are typically single storey and of varying age and condition, while Toowoomba's urban centre is denser, it still has a low-scale built form and several heritage listed buildings • Toowoomba and the larger settlements of Kingsthorpe, Meringandan, Gowrie, Highfields, Murphys Creek, Withcott and Helidon have social infrastructure including parks, public schools and sport facilities • The Project is typically greenfield development, with 5.6 km of brownfield development where the Project is collocated with the existing rail corridor (Western Line) between Charlton and Gowrie and east of Lockyer Creek (Main Line) near Helidon • The existing West Moreton System rail corridor (heritage listed in parts) and remnants of the historic branch railway lines are located throughout the LVIA study area • Kingsthorpe (LCA E1) is a town situated approximately 20 km northwest of Toowoomba. A short distance from the town centre is Mt Kingsthorpe, the summit of which at 610 m provides elevated panoramic views of the town and surrounding landscape. • Meringandan West (LCA E2) is a locality situated to the west of Meringandan township • Meringandan (LCA E3) is a small country town located near Highfields, approximately 19 km north-northwest of Toowoomba • Meringandan South (LCA E4) is a locality situated to the south of Meringandan township • Gowrie (LCA E5) is a town and locality situated approximately 10 km northwest of Toowoomba	

Type E: Rural Settlement	
	- Highfields (LCA E6) is a town and locality situated approximately 13 km to the north of Toowoomba and serves as a satellite suburb of the city of Toowoomba - Toowoomba (LCA E7) is the largest settlement in the LVIA study area and is a regional city situated on an escarpment on the western side of the Great Dividing Range, approximately 700 m above sea level and 130 km west of Brisbane. Several scenic lookouts are located within this LCA. - Murphys Creek (LCA E8) is a small town located at the foot of the Great Dividing Range, 18 km northeast of Toowoomba. The existing Main Line runs through the centre of the town and the decommissioned Murphys Creek railway complex is heritage listed. - Withcott (LCA E9) is a small town located on the Warrego Highway, 10 km east of Toowoomba at the base of the Great Dividing Range - Helidon (LCA E10) is a small town situated on Lockyer Creek, 21 km east of Toowoomba. The Warrego Highway runs to the south of the town centre, with a small outlying area located to the south of the highway. To the north of the town, sandstone mining operations are discreetly tucked into the undulating and forested foothills of the Great Dividing Range, large extents of which are part of Lockyer National Park.
Precedent modifications and infrastructure elements	- Highly modified for urban and rural land uses, including clearing of remnant vegetation and levelling of land for construction - Presence of roads, railways and bridges - Telecommunication infrastructure including telegraph poles - Scenic lookouts with views towards the Project.
Landscape character Sensitivity assessment	- The Rural Settlement LCT has a settled rural character and includes the more urban areas associated with Toowoomba. Smaller rural communities such as Meringandan are very sparsely settled. - Buildings, street trees and existing vegetation provide some screening effect - Typically, residential areas within these settlements are situated on elevated land overlooking the Project. In the vicinity of Kingsthorpe and Gowrie elevated views down onto the Project are possible. - Residential properties situated on the Toowoomba Escarpment provide open views towards the Project, where it transects landscapes within LCT G: Forested Uplands, parts of which are protected for their scenic qualities - The landscape sensitivity of these settlements is considered to be Moderate. While not valued within planning schemes, these settlements have a distinctive character with some elements of interest (such as buildings) and are also likely to be valued by the people that reside in or visit them.
Impact Assessment	
Magnitude of change assessment	The Project will not directly affect any of the discussed towns and cities. Therefore, all impacts would be indirect and will relate to impacts on the landscape setting of these areas. - The primary impact will be on the setting of residential areas (particularly where private residential properties are elevated and overlooking the Project), particularly in areas where new road and rail infrastructure is being introduced - This will be particularly evident in the vicinity of Kingsthorpe, Gowrie, the northern and eastern outer residential areas of Toowoomba (including Cotswold Hills, Wilsonton Heights, Torrington, Harlaxton, Mount Lofty, Prince Henry Heights, East Toowoomba and Rangeville), the southwestern elevated residential properties of Highfields and Helidon, which are either situated close to existing railway infrastructure and/or expected to experience impacts on their landscape settings (LCA E1, E5, E6, E7 and E10)

Type E: Rural Settlement	
	• Most notably, the provision of viaducts, large cuts and embankments within LCT D and LCT G may impact the arrival experience to Toowoomba from the east (LCA E7) • The Project deviates from the existing West Moreton System rail corridor between Gowrie and Kingsthorpe, where it adjoins the B2G project. While within the LVIA study area, the impact of Inland Rail Program on Kingsthorpe is better considered within the B2G LVIA due to its proximity to the B2G project and due to the presence of Mt Kingsthorpe that contains views towards the Project. • Near Gowrie, the Project typically follows the existing rail corridor and would be consistent with the current landscape character. The proposed Gowrie Junction Road bridge will however be highly evident from nearby rural residents and residents of Gowrie. The western tunnel portal will also be evident from some parts of Gowrie. • Highfields is approximately 6 km north of the Project, and the town centre will not be impacted, however the setting of newer urban growth areas to the southwest of the locality (with elevated views towards the Project and proposed western tunnel portal) is likely to be affected • Near Helidon the Project deviates from the existing rail corridor. While within the LVIA study area, the impact of Inland Rail Program on LCA E10 Helidon is better considered within the H2C LVIA (ARTC, 2020) due to its closer proximity to the H2C project. • Due to their distance from the Project, as well as the undulating and vegetated nature of the surrounding landscape, the settlements of Meringandan West, Meringandan, Meringandan South, Murphys Creek and Withcott will not be impacted • The impact on this LCT is considered to be indirect and at most Moderate.
Significance of effect	The effect of the Project on LCT E: Rural Settlement is Moderate.

7.1.6 Landscape Character Type F

Table 27: Landscape impact assessment of LCT F: Rural Living

Type F: Rural Living	
Landscape Baseline Assessment	
Location and boundaries	This landscape type is typically located in elevated parts of the LVIA study area, near major transport infrastructure with access to towns and services, and is characterised by large lot rural residential development, and is typically somewhat vegetated. There are 24 LCAs associated with this LCT – the <i>Westview Rural Living</i> (LCA F1), <i>Meringandan West Rural Living</i> (LCA F2), <i>Glencoe Rural Living</i> (LCA F3), <i>Redlands Drive Rural Living</i> (LCA F4), <i>Hilltop Drive Rural Living</i> (LCA F5), <i>Gowrie Rural Living</i> (LCA F6), <i>Highfield Ridge Rural Living</i> (LCA F7), <i>Gowrie Mountain Rural Living</i> (LCA F8), <i>Torrington Rural Living</i> (LCA F9), <i>Cranley Rural Living</i> (LCA F10), <i>Glenvale Rural Living</i> (LCA F11), <i>Weale Street Rural Living</i> (LCA F12), <i>Blue Mountain Heights Rural Living</i> (LCA F13), <i>Cabarlah Rural Living</i> (LCA F14), <i>Silver Ridge Rural Living</i> (LCA F15), <i>Withcott South Rural Living</i> (LCA F16), <i>Murphys Creek North Rural Living</i> (LCA F17), <i>Murphys Creek South Rural Living</i> (LCA F18), <i>Upper Lockyer Rural Living</i> (LCA F19), <i>Withcott Rural Living</i> (LCA F20), <i>Postmans Ridge Rural Living</i> (LCA F21), <i>Helidon Spa Rural Living</i> (LCA F22), <i>Helidon Rural Living</i> (LCA F23) and the <i>Grantham Rural Living</i> (LCA F24).

Type F: Rural Living		
Typical character images:		
		
		
Key characteristics	- Private residential dwellings on large lots, typically on elevated and undulating topography, with low-scale built form and limited local services - Typically, single storey buildings of varying age and condition - Major residential growth areas can be seen on the fringe of Toowoomba city, in particular near Highfields, Gowrie, Gowrie Mountain and Toowoomba West - Some rural residential areas (typically to the east of the Great Dividing Range) are densely vegetated, while others are quite open - Generally, an enclosed landscape, with the exception of elevated properties where vegetation has been cleared and views towards the Project can be achieved, particularly evident from Gowrie (particularly Redlands Drive and Hilltop Drive), Highfield Ridge, Gowrie Mountain, Torrington, Cranley and Blue Mountain Heights (LCA F4, F5, F6, F7, F8, F9, F10 and F13) - Highly visible landscape type throughout the LVIA study area.	
Precedent modifications and infrastructure elements	- Highly modified for urban land uses, including clearing of vegetation and levelling of land for construction - Presence of roads, railways and bridges - Telecommunication infrastructure including telegraph poles.	
Landscape character sensitivity assessment	- The Rural Living LCT is predominantly visually closed, with the exception of elevated residential properties west of the Great Dividing Range, which typically include large lot areas. - Street trees and existing vegetation provide some screening effect - The sensitivity of these rural residential areas is considered to be Moderate. They have a distinctive character and are likely to be highly valued by residents who live there but have limited features considered to be of landscape or scenic amenity value.	
Impact Assessment		
Magnitude of change assessment	The Project directly affects LCA F21: Postmans Ridge, while other impacts on this LCT are indirect	

Type F: Rural Living	
	- It is considered that the Project will mostly affect the setting of the rural residential areas of Gowrie (particularly Redlands Drive, Hilltop Drive), Highfield Ridge, Gowrie Mountain, Torrington, Blue Mountain Heights and Postmans Ridge (LCA F4, F5, F6, F7, F8, F9, F13 and F22) as from these locations, elevated views towards the Project are possible - The impact on Gowrie Mountain (LCA F8) is also assessed in the B2G LVIA due to its proximity to the B2G project - While elevated and situated within close proximity to the Project, impacts on Cranley (F10) are limited due to screening by vegetation, natural topography and embankments of Toowoomba Bypass - Rural residential properties in Postmans Ridge (F21), particularly properties on Ashlands Drive, will be very close to the Project (approximately 100 m) and the setting of these areas will be affected due to direct views towards the Project (subject to the removal of existing vegetation) - While rural residential areas of this type near Helidon Spa (LCA F22) are within relatively close proximity to the Project, the proposed Project follows the existing rail corridor and is typically screened by remnant vegetation associated with Lockyer Creek, and therefore not considered to be significant - The rural residential areas of Cabarlah, Silver Ridge, Withcott South, Murphys Creek North, Murphys Creek South, Upper Lockyer, and Withcott (LCA F15, F16, F17, F18, F19 and F20), are at a significant distance from the Project and typically screened by existing vegetation and topography, so impacts would be indirect and insignificant due to the distance - Due to the distance of residential areas of Helidon and Grantham (LCA F23 and F24) from the Project, the impact of Inland Rail Program on these rural residential areas is discussed in the H2C LVIA (ARTC, 2020) as the H2C project lies closest to these LCAs - Impacts upon the setting of this LCT will be due to localised vegetation removal, major earthworks (e.g. cuts and embankments), proposed road and creek bridges, viaducts, tunnel portals and associated infrastructure and the intermediate tunnel ventilation shaft and associated buildings - Overall, therefore, the impact on this LCT is, at most, Moderate.
Significance of effect	The effect of the Project on LCT F: Rural Living is Moderate.

7.1.7 Landscape Character Type G

Table 28: Landscape impact assessment of LCT G: Forested Uplands

Type G: Forested Uplands	
Landscape Baseline Assessment	
Location and boundaries	This landscape type is typically associated with elevated, undulating areas of the Great Dividing Range and remnant volcanic mountains of the Darling Downs. There are 13 LCAs associated with this LCT – <i>Mt Davidson (Sugarloaf) Forested Uplands</i> (LCA G1), <i>McGregor Mountain Forested Uplands</i> (LCA G2), <i>Storey Mountain Forested Uplands</i> (LCA G3), <i>Mt Kingsthorpe Forested Uplands</i> (LCA G4), <i>Gowrie Mountain Forested Uplands</i> (LCA G5), <i>Wellcamp Forested Uplands</i> (LCA G6), <i>Glenvale Mountain Forested Uplands</i> (LCA G7), <i>Meringandan West Forested Uplands</i> (LCA G8), <i>Kleinton Forested Uplands</i> (LCA G9), <i>Cabarlah Forested Uplands</i> (LCA G10), <i>Great Dividing Range Forested Uplands</i> (LCA G11), <i>Stringybark Mountain Forested Uplands</i> (LCA G12) and the <i>Lockyer National Park Forested Uplands</i> (LCA G13).

Type G: Forested Uplands

Typical character images:



Key characteristics

- Elevated and undulating topography, typically above 100 m AHD
- Areas of very steep slopes
- Distinctive landform including the densely vegetated mountain peaks and prominent ridgelines of the Great Dividing Range and the prominent basalt peaks surrounded by low-lying agricultural landscapes
- Incised dry creek valleys where watercourses drain the elevated area
- Typically, eucalyptus woodland or forest but includes areas of other vegetation including fragment rainforest
- Generally, an enclosed landscape with limited public access in parts and limited views
- Areas near Toowoomba (Redwood Park and Jubilee Park) are utilised for recreation and have multiple publicly accessible trails and lookouts. Mt Kingsthorpe also has a walking trail and lookout. Gowrie Mountain has a reserve that is currently closed to public access.
- Highly visible landscape type throughout the LVIA study area
- Most elevated areas of this type, including peaks of the Great Dividing Range and isolated basaltic peaks amongst the Darling Downs, are considered to have high scenic amenity and are included on the regionally significant scenic amenity overlay area as defined in ShapingSEQ (as shown on **Figure 3: Regional scenic amenity and planning designations**) or acknowledged in the Toowoomba Regional Council Scenic Amenity Study.

Precedent modifications and infrastructure elements

- Due to the undulating steep terrain, much of the vegetation is remnant due to the inaccessibility to clear the areas
- Natural landscape with very limited settlement and little large-scale infrastructure elements. However the Great Dividing Range is traversed by the Warrego Highway and Toowoomba Bypass and the existing West Moreton System rail corridor and the landscape is also traversed by a gas pipeline and includes localised sandstone mines.
- Large numbers of residential properties are situated along the Great Escarpment in Toowoomba, Blue Mountain Heights and Highfields with views overlooking the landscapes of the Great Dividing Range

Type G: Forested Uplands	
	- Small rural residential communities are seen on most elevated basaltic peaks within the Darling Downs, including Gowrie Mountain, Storey Mountain, Mt Davidson (Sugarloaf) and Glenvale Mountain - There are several lookouts within the region offering views over the Great Dividing Range and Lockyer Valley, including Picnic Point Lookout, Katoomba Point Lookout, Prince Henry Drive Lookout, Burrell Outlook, Bill Goulds Lookout, Bob Dodds Lookout, Jubilee Lookout, Mount Lofty Lookout and the Lions Scenic View Rest Area - Mt Tabletop is situated within a bushland reserve, and has an unformed, very steep and unmarked track that provides access to the summit, from which views panoramic views towards Toowoomba, Prince Henry Heights, the Lockyer Valley and Main Range are possible - Mt Kingsthorpe, 15 minutes west of Toowoomba has a graded walking track to a scenic lookout that provides expansive westerly views over the surrounding farmland and portions of the Darling Downs - Infrastructure such as telecommunications towers, gas pipelines and powerlines in elevated locations (with associated cleared easements) - Extensive sandstone quarry operations, both historic and present near Helidon. Typically, these operations are screened by dense native vegetation.
Landscape character sensitivity assessment	- This LCT has little capacity to accommodate development as this would require vegetation clearance which would be visually intrusive in this elevated and undulating landscape - Key areas of this landscape are also protected for their scenic qualities and are considered to be of state significance (e.g. Peaks of the Great Dividing Range), for example within the SEQRP (DSDILGP, 2017). - Landscapes associated with the Toowoomba Escarpment were also formerly identified on the Register of the National Estate, recognised for their contribution to the positive approach to the garden city of Toowoomba from the east - Therefore, the landscape sensitivity of this landscape type is considered to be High.
Impact Assessment	
Magnitude of change assessment	- The Project directly transects LCA G11: Great Dividing Range - Within LCA G11, the Project alignment deviates from the existing rail corridor near Helidon, passing through privately owned land before entering the eastern tunnel portal near Harlaxton Quarry, Mount Lofty. Near Helidon, the Project is approximately 2 km south of the Lockyer National Park - The key impact within this LCT will be as a result of the extensive clearing due to proposed earthworks to facilitate the construction of the rail corridor, embankments, viaducts, bridges, the tunnel and the tunnel portals, which will be visible from elevated residential properties and scenic lookouts along the Great Escarpment (e.g. Picnic Point Lookout and Katoomba Lookout - discussed further in Section 8: Visual impact assessment) - A small portion of the Project within the Great Dividing Range will be tunnelled, reducing the surface impact of the Project on landscape values - Elsewhere this landscape type is not within proximity to the Project, therefore the impacts on this landscape type would be indirect and attributed to views towards the Project from elevated residential properties and scenic lookouts, such as that at Mt Kingsthorpe (Discussed further in Section 8: Visual impact assessment)

Type G: Forested Uplands	
	• It is considered that while the Project will be clearly evident from elevated vantage points such as Picnic Point Lookout, Katoomba Lookout and Mt Kingsthorpe, the railway will become another element in the natural and rural landscape and will not fundamentally change the character of the landscape • This results in a High magnitude of change.
Significance of effect	The effect of the Project on LCT G: Forested Uplands is Major.

8 Visual impact assessment

Twenty viewpoints have been selected within the LVIA study area to represent potential visual impacts across the LVIA study area. The location of these viewpoints is identified in **Figure 9: Visual receptors and location of representative viewpoints** (refer Appendix 1), the views and, where included representative visualisations, are shown in **Figure 26 to Figure 47** and the impacts on these views are described in **Table 29 to Table 48**.

8.1 Viewpoint assessment

8.1.1 Viewpoint 1

Table 29: Likely visual effect of the Project on Viewpoint 1

Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	
Visual Baseline Assessment	
	
Existing view from Viewpoint 1 Refer to Figure 26: Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°30'41.297" S 151°49'44.328" E • Elevation: 540 m • North-easterly view from Lenora Court, Gowrie Mountain • Closest part of Inland Rail is approximately 2.2 km north of this viewpoint; however this section of the Inland Rail Program is within the B2G section. The closest section of the (G2H) Project is 2.8 km to the northeast of this viewpoint. • Represents typical and accessible elevated views of residents of Gowrie Mountain • Parts of elevated, vegetated landscapes visible within this view, including those associated with Mt Kingsthorpe, are identified within the Toowoomba Regional Council Scenic Amenity Study as having high scenic amenity • North-easterly views from this point provide views towards the Project including landscapes typical of LCT A: Vegetated Watercourses – Creeks and Channels (LCA A1: Gowrie Creek), LCT B: Irrigated Croplands (LCA B8: Kingsthorpe, B9: Charlton and B6: Yalungur), LCT C: Dry Croplands and Pastures (LCA C7: Mt Kingsthorpe and C9: Charlton), LCT E: Rural Settlement (LCA E1: Kingsthorpe), LCT F: Rural Living (LCA F8: Gowrie Mountain, F4: Redlands Drive, F5: Hilltop Drive and F6: Gowrie) and LCT G: Forested Uplands (LCA G4: Mt Kingsthorpe).
Key visual sensitivities	• Moderate sensitivity of receptors, particularly relatively low number of residents of Gowrie Mountain who have elevated views over the Project • The presence of existing infrastructure (Warrego Highway, West Moreton System rail corridor (Western Line) and power poles) reduces the overall sensitivity of this view

Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	
	This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, due to the relatively low number of nearby residential viewers with a specific interest in this view and expansive, elevated views obtained from residential properties of Gowrie Mountain.
Visual Evaluation	
<i>Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology.</i>	
Construction	
Magnitude of change assessment	- This viewpoint will be affected by construction works associated with the Project, as well as construction impacts associated with the construction of the adjoining B2G project, therefore these have been considered below - The Project and earthworks associated with the construction of the Project (and adjacent B2G project) will introduce considerable construction works into the view - The proposed location of a major laydown area including satellite offices and fuel storage on Leasons Road and the provision of two potential flash butt welding facilities near Draper Road (during the construction of B2G) and Paulsens Road (during the construction of G2H) would cause a reduction in visual amenity from this viewpoint, however this would be temporary - Earthworks associated with the Project will require large volumes of material to be removed - The key impacts will relate to the presence of construction plant and disturbance due to the construction of the Project - It is noted that impacts on this view will also arise due to the construction of the Chamberlain Road Bridge and large embankments associated with the B2G project - Due to the distance of this viewpoint from the Project alignment, construction works will be noticeable, while the impact of these works is temporary which represents a noticeable change and Low magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 1 during construction is considered to be Low.
Operation	
Magnitude of change assessment - permanent infrastructure	- This view will be affected by both the Project (G2H), and the adjoining B2G project, viewed as one continuous rail infrastructure - The nearest section of the G2H Project is approximately 2.2 km to the north of this viewpoint. The view is already affected by the presence of powerlines, power poles and the Warrego Highway, while the existing West Moreton System rail corridor can also just be discerned. - The magnitude of change on this receptor is anticipated to be considerable due to the following factors: - Introduction of additional rail infrastructure that deviates from the existing West Moreton System rail corridor into the rural landscape - The West Moreton System rail corridor will be largely on embankment, with heights up to around +18 m above the existing surface level (associated with the B2G alignment). Embankments associated with this Project are visible in this view are up to +2.5 m - Due to the sparse nature of existing vegetation within the Project disturbance footprint, the effect of vegetation clearing for the construction of the Project is considered to be negligible

Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	
	○ Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. • At this distance, the Project and adjoining B2G project will be visible and, together, considerably change the visual character of the landscape, as they will be introducing new rail infrastructure on embankment into what is currently a relatively intact rural setting. This represents a Moderate magnitude of change.
Magnitude of change assessment - Train	• Movement of double stacked freight trains up to 1,800 m long with a height of 6.5 m will be clearly evident due to the open and elevated views of the railway track from this viewpoint. Elevated views to the Project will be possible for nearby residents of Gowrie Mountain. While experienced by a medium number of nearby residential properties these views are of a transient nature. Therefore, the magnitude of change is considered to be Low.
Significance of effect (operation)	The effect of the Project on Viewpoint 1 during operation is considered to be Moderate.

8.1.2 Viewpoint 2

Table 30: Likely visual effect of the Project on Viewpoint 2

Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	
Visual Baseline Assessment	
	
Existing view from Viewpoint 2 Refer to Figure 27: Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°28'58.943" S 151°52'20.885" E • Elevation: 600 m • South-easterly view in the direction of Toowoomba and the western tunnel portal from Hilltop Drive Park • The Project is approximately 1.8 km to the south of this viewpoint • Represents typical and accessible elevated views of those visiting Hilltop Drive Park and of nearby residents of Hilltop Drive and Koala Drive • Location is a local park and is also representative of views attainable from nearby elevated residential properties • Parts of elevated, vegetated landscapes visible within this view, including landscapes in the vicinity of Blue Mountain Heights and Highfields, are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study • South-easterly views from this point provide distant views towards the Project, Gowrie Junction Road bridge, western tunnel portal and landscapes typical of LCT A: Vegetated Watercourses – Creeks and Channels (LCA A1: Gowrie Creek), LCT B: Irrigated Croplands (LCA B18: Gowrie), LCT C: Dry

Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	
	Croplands and Pastures (LCA C8: Gowrie and C9: Charlton), LCT E: Rural Settlement (LCA E5: Gowrie and E7: Toowoomba), LCT F: Rural Living (LCA F10: Cranley) and LCT G: Forested Uplands (LCA G4: Mt Kingsthorpe) Views are partially screened by existing vegetation.
Key visual sensitivities	- Moderate sensitivity of receptors, particularly relatively low number of residents of Hilltop Drive who have elevated views over the Project - The presence of existing infrastructure (Toowoomba Bypass, West Moreton System rail corridor and power poles) reduces the overall sensitivity of this view - This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, which includes park users and the relatively low number of nearby residential viewers with a specific interest in this view and expansive, elevated views obtained from Hilltop Drive Park and nearby residential properties.
Visual Evaluation	
<i>Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology.</i>	
Construction	
Magnitude of change assessment	- The construction of the Project, Gowrie Junction Road bridge, road network changes to Old Homebush Road, Morris Road, Krienke Road, McMahon Road, provision of a new access road for residents on Gowrie Junction Road and upgrade works to East Paulsens Road, construction of the western tunnel portal and western portal tunnel access road and associated earthworks will introduce considerable construction works into the view - Several laydown areas will be visible within this view, including the tunnel construction site, which includes site offices, fuel storage, a precast concrete facility, a concrete batch plant and provision for spoil storage - Earthworks associated with construction of the Toowoomba Range tunnel and realigned local roads will require the movement of large volumes of material - A permanent stockpile at the western tunnel portal is proposed to manage spoil from the excavation of the Toowoomba Range tunnel. The stockpile would be a mound between 6 to 7 m high of compacted tunnel spoil, and it is expected the mound would be shaped to suit the landscape and vegetated. - In addition, while not visible within this view (due to screening foreground vegetation), the proposed location of a potential flash butt welding facility near Paulsens Road for the construction of the Project would be visible from nearby elevated residential properties on Hilltop Drive and Koala Drive would cause an additional reduction in visual amenity from this viewpoint, however this would be temporary also - Due to the relatively sparse nature of existing vegetation within the rail corridor and Project disturbance footprint, the effect of vegetation clearing for the construction of the Project is considered to be negligible - Even at this distance, the presence of Project construction plant and equipment constructing the railway, Gowrie Junction Road bridge, Old Homebush Road, Paulsens Road, East Paulsens Road, Morris Road, Ganzer Road, Krienke Road, McMahon Road and provision of a new access road for residents on Gowrie Junction Road, Toowoomba Range tunnel and portal, access roads, cuts and embankments will temporarily change the character of the landscape, creating a considerable change in the landscape character of this viewpoint. - While construction works will be clearly evident from this vantage point the impact of these works is temporary which represents a considerable change and Moderate magnitude of change.

Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	
Significance of effect (construction)	The effect of the Project on Viewpoint 2 during construction is considered to be Moderate.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 1.8 km to the south of this viewpoint, while the proposed Gowrie Junction Road bridge is approximately 2.1 km to the southeast. The view is already affected by the presence of powerlines, power poles, Toowoomba Bypass and the existing West Moreton System/Western Line railway. - The magnitude of change on this receptor is anticipated to be considerable due to the following factors: - Provision of new road and rail infrastructure, including a crossing loop, Gowrie Junction Road bridge, low embankments (typically less than 2 m above existing surface levels), western tunnel portal and associated infrastructure and road network changes to Old Homebush Road, Morris Road, Ganzer Road, Krienke Road, McMahon Road, resurfacing of East Paulsens Road and provision of a new access road for residents on Gowrie Junction Road. - A permanent stockpile mound between 6 to 7 m high of compacted tunnel spoil (expected to be shaped to suit the landscape and vegetated) - Due to the sparse nature of existing vegetation within the rail corridor, the effect of vegetation clearing for the construction of the Project is considered to be negligible - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character and as per the ARTC fencing strategy. - At this distance, the railway, Gowrie Junction Road bridge, western tunnel portal and associated infrastructure will be clearly evident and will have a considerable impact on the character of the landscape as it will be introducing new rail and road infrastructure into the existing rural setting as experienced from Hilltop Drive Park and nearby elevated residential properties. This represents a Moderate magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1,800 m long with a height of 6.5 m, including presence of two trains on some occasions due to the presence of the crossing loop. Also, potential dispersed, ventilated exhaust fumes from ventilation buildings located at the tunnel portal could be evident due to the open and elevated views of the railway track from this viewpoint. Elevated views to the Project will be possible from Hilltop Drive Park and for nearby residents of Hilltop Drive. While experienced by a medium number of nearby residential properties these views are of transient nature. Therefore, the magnitude of change is considered to be Low.
Significance of effect (operation)	The effect of the Project on Viewpoint 2 during operation is considered to be Moderate.

8.1.3 Viewpoint 3

Table 31: Likely visual effect of the Project on Viewpoint 3

Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	
Visual Baseline Assessment	
	
Existing view from Viewpoint 3 Refer to Figure 28: Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°31'48.599" S 151°52'32.418" E • Elevation: 570 m • North-westerly view towards Gowrie Mountain, Kingsthorpe, the Warrego Highway and Toowoomba Bypass • Proposed rail alignment is approximately 3.4 km to the north of this viewpoint • Represents typical and accessible views of residents of Torrington, Charlton and Cotswold Hills, and of visitors, workers and tourists travelling along the Warrego Highway • Parts of elevated, vegetated landscapes visible within this view, including those associated with Gowrie Mountain and Mt Kingsthorpe, are identified within the Toowoomba Regional Council Scenic Amenity Study as having high scenic amenity • North-westerly views from this point provide open views towards the Warrego Highway, distant views to Gowrie Mountain and Mt Kingsthorpe, as well as landscapes typical of LCT C: Dry Croplands and Pastures (LCA C9: Charlton), LCT E: Rural Settlement (LCA E5: Gowrie and E7: Toowoomba), LCT F: Rural Living (LCA F9: Torrington), LCT G: Forested Uplands (LCA G4: Mt Kingsthorpe and G5: Gowrie Mountain) and LCT H: Transitional Landscapes (LCA H4: Charlton Industrial Precinct and H5: Charlton Raceway).
Key visual sensitivities	• Low sensitivity of receptors, particularly relatively low number of residents of Charlton Pinch Road who have distant elevated views over the Project • The presence of existing infrastructure (Warrego Highway, Toowoomba Bypass, West Moreton System rail corridor and power poles) reduces the overall sensitivity of this view • This viewpoint is considered to have a Low sensitivity overall to the change proposed, due to the presence of existing infrastructure, relatively low number of nearby residential viewers with a specific interest in this view and the distance of these properties from the Project.
Visual Evaluation	
Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology.	

Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	
Construction	
Magnitude of change assessment	- The construction of the Project and the location of several laydown areas and potential locations of a flash butt welding facilities will result in extensive disturbance in the landscape, however due to the distance of this viewpoint from the Project and undulating foreground topography, views towards construction activities will be limited - Due to the sparse nature of existing vegetation within the rail corridor, the effect of vegetation clearing for the construction of the Project is considered to be Negligible - Due to the distance of this viewpoint from the Project, construction works will be barely perceptible from this vantage point and represents a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 3 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 3.4 km to the northwest of this viewpoint. The skyline is already affected by the presence of powerlines, power poles, the Warrego Highway and Toowoomba Bypass. The existing West Moreton System rail corridor is not able to be distinguished in this view. - The magnitude of change on this receptor is anticipated to be barely perceptible due to the following factors: - Project is predominately screened by existing vegetation of variations in topography from this viewpoint - Introduction of new rail infrastructure will be in keeping with the existing rural character - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project will be barely perceptible and will blend into the existing rural view to some extent. This represents a Negligible magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1,800 m long with a height of 6.5 m will be barely perceptible due to the distance of this viewpoint from the Project. Distant views to the Project will be possible for travellers along the Warrego Highway and nearby residents on Charlton Pinch Road and surrounding elevated areas. While anticipated to be experienced by numerous motorists, these views are of transient nature. It is noted that the existing West Moreton System rail corridor currently facilitates freight train movements, albeit single stacked. Therefore, the magnitude of change is considered to be Negligible.
Significance of effect (operation)	The effect of the Project on Viewpoint 3 during operation is considered to be Negligible.

8.1.4 Viewpoint 4

Table 32: Likely visual effect of the Project on Viewpoint 4

Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	
Visual Baseline Assessment	
	
Existing view from Viewpoint 4 Refer to Figure 29: Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°29'53.718" S 151°53'21.438" E • Elevation: 482 m • South-westerly view towards Gowrie Junction Road bridge • Proposed rail alignment is approximately 30 m to the south of this viewpoint, while the Gowrie Junction Road bridge is approximately 220 m to the west of this viewpoint • Represents typical and accessible views of residents of Paulsens Road and communicates impacts on nearby residential properties situated on Morris Road, McMahon Road, Junction Street and Krienke Road • Parts of elevated, vegetated landscapes are visible within the background of this view, including those associated with Gowrie Mountain, which is considered to have high scenic amenity values and is acknowledged in the Toowoomba Regional Council Scenic Amenity Study • South-westerly views from this point provide open views towards the Project and existing West Moreton System rail corridor, as well as views towards landscapes typical of LCT C: Dry Croplands and Pastures (LCA C9: Charlton) and distant views to LCT G: Rural Settlement (LCA G5: Gowrie Mountain Forested Uplands).
Key visual sensitivities	• Moderate sensitivity of receptors, particularly relatively low number of residents of Paulsens Road, Junction Street, Morris Road, McMahon Road,

Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge

	Junction Street and Krienke Road, who have relatively close views towards the Project • The presence of existing infrastructure (West Moreton System rail corridor and power poles) reduces the overall sensitivity of this view. • This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, due to the close proximity of a relatively low number of residential receptors in this location to the Project, with a specific interest in this view – noting the presence of existing rail infrastructure somewhat reduces the sensitivity.
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Visual Evaluation



Photomontage view from Viewpoint 4

Refer to **Figure 29: Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge and Visualisation** in Appendix 2 for appropriate scaled image.

Construction

Magnitude of Change Assessment	• The construction of the Project including the proposed rail alignment, Gowrie Junction Road bridge, road network changes to Morris Road, Krienke Road, provision of a new access road for residents on Gowrie Junction Road and associated earthworks will introduce considerable construction works into the view • The relatively sparse nature of existing vegetation enables open views to be obtained from nearby residential properties towards the Project, laydown areas and road realignment zones • Vegetation clearing to facilitate development will be minimal and limited to vegetation along Gowrie Creek within the construction footprint for the proposed Gowrie Junction Road bridge • The presence of plant constructing the Project, Morris Road, Krienke Road and associated infrastructure, access roads, cuts and embankments will temporarily change the character of the landscape, creating a considerable change in the landscape character of this viewpoint
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Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	
	While construction works will be clearly evident from this vantage point the impact of these works is temporary which represents a considerable change and Moderate magnitude of change.
Significance of effect (Construction)	The effect of the Project on Viewpoint 4 during construction is considered to be Moderate.
Operation	
Magnitude of Change Assessment - Permanent Infrastructure	- The nearest section of the Project is approximately 30 m to the south of this viewpoint, while the proposed Gowrie Junction Road bridge is approximately 220m to the west - The skyline is already affected by the presence of power poles, powerlines, lights and road and rail infrastructure - The introduction of permanent infrastructure is anticipated to be a dominant change due to the following factors: - Introduction of a new single track dual-gauge railway to the south of the existing West Moreton System rail corridor, on low embankment (typically less than + 2 m) - Provision of the Gowrie Junction Road bridge, including associated embankments - Road network changes to Morris Road and Krienke Road, including associated cuts and embankments - Vegetation clearing will be limited to vegetation along Gowrie Creek within the construction footprint for the proposed Gowrie Junction Road bridge - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project will be clearly evident and will change the fundamental visual character of the landscape, as it is introducing additional road and rail infrastructure into the view. This represents a High magnitude of change.
Magnitude of Change Assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m could be evident due to the close, open views of the railway track from this viewpoint. In addition, nearby residents of Morris Road, McMahon Road, Junction Street and Krienke Road are likely to be affected. While these views are experienced by a relatively low number of nearby residential properties who have views towards the existing West Moreton System rail corridor which currently facilitates freight train movements (single stacked) and are of transient nature, the proximity of this viewpoint to the Project increases the impact on nearby receptors. Therefore, the magnitude of change is considered to be Moderate.
Significance of effect (Operation)	The effect of the Project on Viewpoint 4 during operation is considered to be up to High.

8.1.5 Viewpoint 5

Table 33: Likely visual effect of the Project on Viewpoint 5

Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	
Visual Baseline Assessment	
	
Existing view from Viewpoint 5 Refer to Figure 30: Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°29'59.609" S 151°53'25.487" E • Elevation: 502 m • Easterly view towards the western tunnel portal • Proposed rail alignment is approximately 150 m to the north of this viewpoint • Represents typical and accessible elevated views of residents of Junction Street and nearby isolated rural residential properties • Parts of elevated, vegetated landscapes visible within this view, including land in the vicinity of Blue Mountain Heights and Highfields, are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study • Easterly views from this point provide open views towards the Project and western tunnel portal, including landscapes typical of LCT A: Vegetated Watercourses – Creeks and Channels (LCA A1: Gowrie Creek), LCT B: Irrigated Croplands (LCA B19: Morris Road), LCT C: Dry Croplands and Pastures (LCA C9: Charlton), LCT D: Vegetated Grazing (LCA D10: Birnam) and distant views to LCT E: Rural Settlement (LCA E6: Highfields and E7: Toowoomba).
Key visual sensitivities	• Moderate sensitivity of receptors, particularly relatively low number of residents of Junction Street who have relatively close elevated views over the Project • The presence of existing infrastructure (Toowoomba Bypass, West Moreton System rail corridor and power poles) reduces the overall sensitivity of this view • This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, due to the close proximity of a relatively low number of residential receptors in this location to the Project, with a specific interest in this view – noting the presence of existing rail infrastructure somewhat reduces the sensitivity.

Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal

Visual Evaluation



Photomontage view from Viewpoint 5

Refer to **Figure 30: Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal and Visualisation** in Appendix 2 for appropriate scaled image.

Construction

Magnitude of change assessment

- The construction of the Project, road network changes to Morris Road, upgrade works to East Paulsens Road, construction of the western tunnel portal and western portal tunnel access road and associated earthworks will introduce considerable construction works into the view
- Significant construction areas within this viewpoint are proposed including a major construction laydown area and tunnel construction site with site offices, fuel storage, segment storage, spoil stockpiles, precast concrete facility and concrete batch plant facility
- Earthworks associated with construction of the Project, tunnel and realigned local roads will require the movement of large volumes of material
- A permanent stockpile at the western tunnel portal is proposed to manage spoil from the excavation of the Toowoomba Range tunnel. The stockpile would be a mound between 6 to 7 m high of compacted tunnel spoil, and it is expected the mound would be shaped to suit the landscape and vegetated.
- The relatively sparse nature of existing vegetation enables open views to be obtained from nearby residential properties towards the Project, laydown areas and road realignment zones located to both the north and south of the Project. Clearing of existing vegetation to facilitate the construction of the Project will further open up views to construction activities.
- The presence of plant constructing the Project, Morris Road, Paulsens Road, Toowoomba Range tunnel, western tunnel portal and associated infrastructure, access roads, cuts and embankments will temporarily change the character of the landscape, creating a considerable change in the landscape character of this viewpoint
- While construction works will be clearly evident from this vantage point the impact of these works is temporary which represents a considerable change and Moderate magnitude of change.

Significance of effect (construction)

The effect of the Project on Viewpoint 5 during construction is considered to be Moderate.

Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 150 m to the north of this viewpoint, while the proposed western tunnel portal is approximately 1.7 km to the southeast - The skyline is already affected by the presence of power poles, powerlines, lights, rail infrastructure and Toowoomba Bypass - The change in view will be noticeable due to the following factors: - Introduction of a new single track dual-gauge railway to the south of the existing West Moreton System rail corridor, on low embankment (typically less than + 2 m) and transitioning into deep cut, with depths up to – 20 m at the western tunnel portal entry - The Toowoomba Range tunnel portal, for the 6.24 km tunnel through the Toowoomba Range and associated access roads and portal infrastructure, service buildings, substations and ventilation buildings - A permanent stockpile mound between 6 to 7 m high of compacted tunnel spoil (expected to be shaped to suit the landscape and vegetated) - Road network changes to Morris Road and upgrade works to East Paulsens Road - Vegetation clearing for the construction of the Project including laydown areas will increase the visibility of the permanent rail infrastructure - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project will be clearly evident and will change the fundamental visual character of the landscape, as it is introducing new rail infrastructure, a tunnel portal and associated infrastructure into the view. This represents a High magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m and potential dispersed, ventilated exhaust fumes from ventilation buildings located at the tunnel portals could be evident due to the close, open and elevated views of the railway track from this viewpoint. Elevated views to the Project and tunnel portal infrastructure will be possible for residents of Junction Street. While these views are experienced by a relatively low number of nearby residential properties who have views towards the existing West Moreton System rail corridor which currently facilitates freight train movements (single stacked) and are of transient nature, the proximity of this viewpoint to the tunnel portal increases the impact on nearby receptors. Therefore, the magnitude of change is considered to be Moderate.
Significance of effect (operation)	The effect of the Project on Viewpoint 5 during operation is considered to be up to High.

8.1.6 Viewpoint 6

Table 34: Likely visual effect of the Project on Viewpoint 6

Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	
Visual Baseline Assessment	
	
Existing view from Viewpoint 6 Refer to Figure 31: Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°29'32.178" S 151°53'39.456" E • Elevation: 510 m • Southerly view towards Gowrie Creek and the existing rail alignment • Project is located approximately 780 m to the south of this viewpoint, while proposed works associated with the road network changes to Old Homebush Road and the provision of the Gowrie Junction Road bridge are approximately 570 m to the southwest of this viewpoint • Represents typical and accessible elevated views of visitors and residents travelling along Treeline Drive and nearby residents of Gowrie • Southerly views from this point provide open views towards the Project and Gowrie Junction Road bridge from LCT E: Rural Settlement (E5: Gowrie Junction) towards LCT A: Vegetated Watercourses – Creeks and Channels (LCA A1: Gowrie Creek), LCT B: Irrigated Croplands (LCA B18: Gowrie Junction and B19: Birnam), LCT C: Dry Croplands and Pastures (LCA C9: Charlton) and distant views towards LCT E: Rural Settlement (LCA E6: Highfields and E7: Toowoomba) and LCT F: Rural Living (LCA F10: Cranley).
Key visual sensitivities	• Relatively high number of receptors include nearby residents of Gowrie • The urban character and presence of existing infrastructure (power poles, powerlines, and West Moreton System rail corridor) reduces the overall sensitivity of this view • This viewpoint is considered to have a Moderate sensitivity overall to the change proposed, due to the relatively high number but lower sensitivity of views.

Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south**Visual Evaluation****Photomontage view from Viewpoint 6**

Refer to **Figure 31: Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south and Visualisation** in Appendix 2 for appropriate scaled image.

Construction**Magnitude of change assessment**

- The construction of the Project, Gowrie Junction Road bridge, road network changes to Old Homebush Road, Morris Road, Ganzer Road, Krienke Road, McMahon Road, provision of a new access road for residents on Gowrie Junction Road and upgrade works to East Paulsens Road and associated earthworks will introduce considerable construction works into the view
- Vegetation clearing to facilitate development will be minimal and limited to vegetation along Gowrie Creek within the construction footprint for the proposed Gowrie Junction Road bridge and existing vegetation within the rail corridor
- Construction of proposed embankments, cuts, road and rail infrastructure and the Gowrie Junction Road bridge will cause disturbance within the landscape
- At this distance, construction works and laydown areas will be noticeable, however they will not change the visual character of the landscape. As this change will be temporary, this is considered to be a Low magnitude of change.

Significance of effect (construction)

The effect of the Project on Viewpoint 6 during construction is considered to be Low.

Operation**Magnitude of change assessment - permanent infrastructure**

- The Gowrie Junction Road bridge is the main permanent infrastructure that will be visible from this viewpoint, which is located approximately 750 m to the southwest of this viewpoint. The view is already affected by the presence of powerlines, power poles, Toowoomba Bypass and the existing West Moreton System/Western Line railway.
- Within this view, the Project is on low embankment (typically less than +2 m above existing surface level) follows the existing rail corridor and will be partially screened by riparian vegetation along Gowrie Creek

Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	
	- The magnitude of change on this receptor is anticipated to be considerable, due to the following factors: - Provision of new road and rail infrastructure, including the Gowrie Junction Road bridge over Gowrie Creek and the proposed and existing rail alignments (with a minimum clearance of 7.9 m over the Project), low embankments associated with new rail infrastructure and road network changes to Old Homebush Road, Morris Road, Ganzer Road, Krienke Road, McMahon Road, upgrade works to East Paulsens Road and provision of a new access road for residents on Gowrie Junction Road. - Earthworks and embankments for the road network changes to Old Homebush Road, and Gowrie Junction Road, with a maximum proposed height being approximately 9 m above natural ground - Vegetation clearing will have a noticeable impact on riparian vegetation along Gowrie Creek - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project and associated infrastructure will be clearly evident, and represent a considerable change to the view, although will largely accord with the existing character of the landscape. Therefore, it is considered to be a Moderate magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be partially screened from this vantage point by existing vegetation. However, views to the new road bridge will be possible from elevated residential properties of Gowrie and close views to the Project from the new road bridge will be possible. It is noted that existing, albeit single stacked freight trains currently utilise the existing West Moreton System rail corridor. Due to the number of residential properties in this area and their relative proximity to the Project, the magnitude of impact is considered to be Moderate.
Significance of effect (operation)	The effect of the Project on Viewpoint 6 during operation is considered to be Moderate.

8.1.7 Viewpoint 7

Table 35: Likely visual effect of the Project on Viewpoint 7

Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	
Visual Baseline Assessment	
 Existing view from Viewpoint 7 Refer to Figure 32: Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal in Appendix 2 for appropriate scaled image.	
Location and description	- GPS Location: 27°30'15.065" S 151°54'3.15" E - Elevation: 497 m

Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	
	- Easterly view towards existing rural residential properties, Toowoomba Bypass and Boundary Street - Proposed rail alignment is approximately 200 m to the northeast of this viewpoint - Represents typical and accessible views of isolated rural residents of Gowrie and of visitors, workers and drivers travelling along Ganzer Morris Road - Easterly views from this point provide open views towards the proposed rail alignment and western tunnel portal, as well landscapes typical of LCT B: Irrigated Croplands (B19: Morris Road) and LCT C: Dry Croplands and Pastures (C9: Charlton).
Key visual sensitivities	- Low sensitivity of receptors, including small numbers of nearby rural residents of Gowrie to the south of the existing West Moreton System rail corridor - The presence of existing infrastructure (power poles, powerlines, rail lines and Toowoomba Bypass) reduces the overall sensitivity of this view - This viewpoint it is considered to have a Low sensitivity overall to the change proposed, due to the small number and type of viewers (local rural residents of Gowrie).
Visual Evaluation	
Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology, however a birds eye perspective view has been produced to assist in communicating the impacts of the western tunnel portal and associated infrastructure.	
	
<i>Birds eye perspective view of western tunnel portal.</i>	
Refer to Figure 33: Western tunnel portal aerial view in Appendix 2 for appropriate scaled image.	

Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	
Construction	
Magnitude of change assessment	- Construction works for the road network changes to Morris Road, along with the upgrade of Ganzer Morris Road and East Paulsens Road, the construction of the Project, UT1 Gowrie Creek rail bridge, and the western tunnel portal and associated portal infrastructure will be highly evident and have a temporary impact on nearby residents - Some existing rural residential properties shown within the view will be resumed for the construction of the Project - The construction of the Project will include the provision of a major construction laydown area and tunnel construction site with site offices, fuel storage, segment storage, spoil stockpiles, precast concrete facility and concrete batch plant facility - A permanent stockpile at the western tunnel portal is proposed to manage spoil from the excavation of the Toowoomba Range tunnel. The stockpile would be a mound between 6 to 7 m high of compacted tunnel spoil, and it is expected the mound would be shaped to suit the landscape and vegetated. - Clearing of existing vegetation to facilitate the construction of the Project will further open up views to construction activities - Earthworks associated with the Project including the rail alignment and construction of the western tunnel portal and Toowoomba Range tunnel will require large volumes of material to be excavated, and views to spoil stockpiles will be evident in this location - The key impacts will relate to the clearance of existing vegetation for the construction of the Project including laydown areas, presence of construction plant and disturbance due to the construction of the alignment and embankments - Construction works will be clearly evident from this vantage point. As this change will be temporary, this is considered to be a Moderate magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 7 during construction is considered to be Low.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 200 m to the northeast of this viewpoint - The skyline is already affected by the presence of powerlines, power poles, existing rail infrastructure and Toowoomba Bypass - The introduction of permanent infrastructure is anticipated to be a dominant change due to the following factors: - New rail infrastructure south of the existing West Moreton System rail corridor, on low embankment (typically less than + 2 m) and transitioning into deep cut, with depths up to – 20 m at the western tunnel portal entry - A tie-in to the existing West Moreton System rail corridor - The Toowoomba Range tunnel, a 6.24 km tunnel through the Toowoomba Range and associated access roads and portal infrastructure, service buildings, substations and ventilation buildings - A permanent stockpile mound between 6 to 7 m high of compacted tunnel spoil (expected to be shaped to suit the landscape and vegetated) - Road network changes to Ganzer Morris Road, Morris Road and East Paulsens Road - The resumption of existing rural residential properties shown within the view

Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	
	○ Vegetation clearing for the construction of the Project and laydown areas will increase the visibility of the permanent rail infrastructure ○ Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. • At this distance, the Project will be highly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail and road infrastructure into what is currently a relatively intact rural setting. This represents a High magnitude of change.
Magnitude of change assessment - Train	• Movement of double stacked freight trains up to 1,800 m long with a height of 6.5 m and dispersed, ventilated exhaust via ventilation buildings located at the tunnel portal could be evident due to the open views of the railway track from this viewpoint. Close views to the alignment will be possible for travellers along Ganzer Morris Road, Morris Road, East Paulsens Road, Boundary Street and Toowoomba Bypass, as well as isolated rural residents in close proximity to the Project. This view will be experienced by a relatively low number of rural residents and travellers on local roads, however large numbers of motorists on Toowoomba Bypass will also experience views towards the tunnel portal and passing train movements. It is also noted that the existing West Moreton System rail corridor currently facilitates freight train movements, albeit single stacked. Therefore, the magnitude of change is considered to be Moderate.
Significance of effect (operation)	The effect of the Project on Viewpoint 7 during operation is considered to be Moderate.

8.1.8 Viewpoint 8

Table 36: Likely visual effect of the Project on Viewpoint 8

Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	
Visual Baseline Assessment	
 Existing view from Viewpoint 8 Refer to Figure 34: Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°30'25.349" S 151°54'32.532" E • Elevation: 530 m • North-westerly view over the Toowoomba Bypass towards the western tunnel portal and tie in to existing railway • Viewpoint is directly over the proposed Toowoomba Range tunnel, with the western tunnel portal situated approximately 320 m to the northwest of this viewpoint • Represents typical and accessible views of nearby isolated rural residents and of visitors, workers and tourists travelling along Boundary Street and Toowoomba Bypass

Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	
	- Parts of elevated, vegetated landscapes visible within this view, including those associated with Mt Kingsthorpe, are identified within the Toowoomba Regional Council Scenic Amenity Study are identified as having high scenic amenity - North-westerly views from this point provide views towards the proposed rail alignment, western tunnel portal and Toowoomba Bypass, as well landscapes typical of LCT B: Irrigated Croplands (B19: Morris Road) and LCT C: Dry Croplands and Pastures (C9: Charlton). Distant views to LCT E: Rural Settlement (E5: Gowrie), LCT F: Rural Living (F5: Hilltop Drive and F6: Gowrie) and LCT G: Forested Uplands (G4: Mt Kingsthorpe) are also possible.
Key visual sensitivities	- Low sensitivity of transient receptors, predominately travellers along Boundary Street (1,900 AADT, 2019 data) - Also representative of driver views attainable from Toowoomba Bypass. The presence of existing infrastructure (power poles, powerlines and Toowoomba Bypass) reduces the overall sensitivity of this view. - This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, due to the large number of viewers tempered with the transience of and lack of specific interest in the views (e.g. travellers along Boundary Street and similar views attainable from drivers on the Toowoomba Bypass).
Visual Evaluation	
<i>Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology.</i>	
Construction	
Magnitude of change assessment	- The construction of the Project alignment, western tunnel portal and associated infrastructure, including earthworks will introduce considerable construction works into the view. This change will be exacerbated by proximity of this viewpoint and Toowoomba Bypass to the works in this location, however it is worth noting that the western tunnel portal and associated infrastructure are situated in a deep cut. - The proposed location of a laydown area approximately 230 m northwest of this viewpoint would cause a reduction in visual amenity from this viewpoint, however this would be temporary - Clearing of existing vegetation to facilitate the construction of the Project will further open up views to construction activities - Earthworks associated with the Project and construction of the western tunnel portal and Toowoomba Range tunnel will require large volumes of material to be excavated, and views to spoil stockpiles will be evident in this location - The key impacts will relate to the clearance of existing vegetation for the construction of the rail alignment and laydown areas, presence of construction plant and disturbance due to the construction of the rail alignment, cuts and embankments - Construction works will be clearly evident from this vantage point. As this change will be temporary, this is considered to be a Moderate magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 8 during construction is considered to be Moderate.

Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 320 m to the northwest of this viewpoint. The skyline is already affected by the presence of existing infrastructure including power poles, powerlines and Toowoomba Bypass - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Introduction of new rail infrastructure within what is currently a relatively intact rural setting, including major earthworks and cuts, with depths up to -20 m at the western tunnel portal entry - A tie-in to the existing West Moreton System rail corridor - The Toowoomba Range tunnel, a 6.24 km tunnel through the Toowoomba Range, associated access roads, portal infrastructure, service buildings, substations and ventilation buildings (noting that these are situated in deep cut and partially obscured from view) - Resumption of existing rural residential properties within this view to facilitate the construction of the Project - Upgrade works to Ganzer Morris Road and provision of UT1 Gowrie Creek rail bridge - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the rail alignment, western tunnel portal and associated infrastructure, upgrade works to Ganzer Morris Road, UT1 Gowrie Creek rail bridge, low embankments and large cuts (up to around -20 m below existing surface level) will be evident, however will not change the visual character of the landscape, as views from Boundary Street and the Toowoomba Bypass will typically be somewhat limited due to the location of Project infrastructure in deep cut. This represents a Moderate magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m and potential dispersed, ventilated exhaust fumes from ventilation buildings located at the tunnel portal could be evident due to the open views of the railway track from this viewpoint, however closer views to train movements will typically be obscured due to the location of Project infrastructure in deep cut. Close views to the Project will be possible for travellers along Ganzer Morris Road, Boundary Street and Toowoomba Bypass, as well as isolated rural residents in close proximity to the Project. This view will be experienced by a relatively low number of rural residents and moderate to high number of travellers on local roads and the Toowoomba Bypass. Typically views experienced by road users are transient in nature, therefore, the magnitude of change is considered to be Moderate.
Significance of effect (operation)	The effect of the Project on Viewpoint 8 during operation is considered to be Moderate.

8.1.9 Viewpoint 9

Table 37: Likely visual effect of the Project on Viewpoint 9

Viewpoint 9: Phoenix Street, Highfields looking southwest	
Visual Baseline Assessment	
	
Existing view from Viewpoint 9 Refer to Figure 35: Viewpoint 9: Phoenix Street, Highfields looking southwest in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°28'44.508" S 151°55'16.133" E • Elevation: 610 m • South-westerly distant view towards the Project and western tunnel portal • Proposed tie-in to the existing West Moreton System rail corridor is approximately 2.8 km southwest of this viewpoint while the Project and western tunnel portal are approximately 3.2 km to the southwest of this viewpoint • Represents typical and accessible elevated views of visitors and residents of Highfields, particularly those situated on Phoenix Street, Federation Drive and Wedgetail Drive. Also representative of views from the nearby Highfield Ridge estate • South-westerly views from this elevated point provide distant panoramic views towards the Project and western tunnel portal, including landscapes typical of LCT A: Vegetated Watercourses - Creeks and Channels (A1: Gowrie Creek), LCT B: Irrigated Croplands (B18: Gowrie, B19: Morris Road and B20: Birnam), LCT C: Dry Croplands and Pastures (C6: Glencoe and C9: Charlton), LCT D: Vegetated Grazing (D10: Birnam), LCT E: Rural Settlement (E5: Gowrie and E7: Toowoomba), LCT F: Rural Living (F10: Cranley) and LCT G: Forested Uplands (G5: Gowrie Mountain) • It is noted that this viewpoint is selected to represent a multitude of views obtainable from elevated residential areas in the vicinity of Highfields, Gowrie and Blue Mountain Heights.
Key visual sensitivities	• High sensitivity of receptors, including residents and visitors of nearby residential properties and estates • Although this view comprises a strong forested and rural character; the presence of the existing rural residential properties, infrastructure and the existing West Moreton System rail corridor detracts from the rural and natural qualities and sense of remoteness • This viewpoint is considered to have a Moderate sensitivity overall to the change proposed, due to the high sensitivity and high number of viewers (e.g. local rural residents of Highfields, Gowrie and Blue Mountain Heights) with a particular interest in this view, tempered by the distance of the receptors from the Project.
Visual Evaluation	
Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology.	

Viewpoint 9: Phoenix Street, Highfields looking southwest	
Construction	
Magnitude of change assessment	- The construction of the Project including the rail alignment, western tunnel portal associated access roads and portal infrastructure, including service buildings, substations and ventilation buildings and associated earthworks will introduce considerable construction works into the view - Due to the distance of this viewpoint and sensitive receptors in the vicinity of Highfields, Gowrie and Blue Mountain Heights from construction activities, it is considered that impact of construction works represents a noticeable change and therefore a Low magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 9 during construction is considered to be Low.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 2.8 km southwest of this viewpoint. This view is already affected by the presence of existing infrastructure including distant views towards Toowoomba Bypass. - The magnitude of change on this receptor is anticipated to be noticeable due to the following factors: - Introduction of new rail infrastructure within what is currently a relatively intact rural setting, including major earthworks and cuts, with depths up to -20 m at the western tunnel portal entry - A tie-in to the existing West Moreton System rail corridor, including the provision of the UT1 Gowrie Creek rail bridge - The Toowoomba Range tunnel, a 6.24 km tunnel through the Toowoomba Range and associated access roads and portal infrastructure, service buildings, substations and ventilation buildings. Potential dispersed, ventilated exhaust fumes from ventilation buildings - Resumption of existing rural residential properties within this view to facilitate the construction of the Project - Upgrade works to Ganzer Morris Road - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project including rail alignment, western tunnel portal and associated infrastructure, upgrade works to Ganzer Morris Road, UT1 Gowrie Creek rail bridge, low embankments and large cuts (up to around -20 m below existing surface level) will be noticeable, however due to the distance of this viewpoint from the alignment will not fundamentally change the visual character of the landscape, as new rail and road infrastructure will blend somewhat into the existing rural setting. This represents a Low magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be barely perceptible due to the distance of this viewpoint from the Project, therefore, the magnitude of change is considered to be Negligible.
Significance of effect (operation)	The effect of the Project on Viewpoint 9 during operation is considered to be up to Low.

8.1.10 Viewpoint 10

Table 38: Likely visual effect of the Project on Viewpoint 10

Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	
Visual Baseline Assessment	
	
Existing view from Viewpoint 10 Refer Figure 36: Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°29'55.314" S 151°55'45.522" E • Elevation: 540 m • Southerly view towards the proposed Toowoomba Range tunnel intermediate ventilation shaft location from Old Goombungee Road near the Toowoomba Christian Fellowship • Project (tunnelled) is approximately 1.4 km to the southwest of this viewpoint. The Toowoomba Range tunnel intermediate ventilation shaft and associated ventilation control building is located approximately 1.4 km to the south-southeast of this viewpoint, in the vicinity of the existing industrial buildings located on Hermitage Road. • Represents typical and accessible views of nearby isolated rural residents and of visitors, workers and tourists travelling along Old Goombungee Road • Parts of elevated, vegetated landscapes are visible within this view, including land in the vicinity of Blue Mountain Heights and Highfields, which are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study • Southerly views from this elevated point provide panoramic views towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated buildings, and as well as including landscapes typical of LCT A: Vegetated Watercourses - Creeks and Channels (A1: Gowrie Creek), LCT C: Dry Croplands and Pastures (C9: Charlton), LCT E: Rural Settlement (E7: Toowoomba), LCT F: Rural Living (F10: Cranley) and LCT H: Transitional Landscapes (H6: Wetalla Sewage Treatment Plant and Toowoomba Waste Management Centre).
Key visual sensitivities	• Low sensitivity of receptors, including nearby rural residents who have elevated views towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated ventilation buildings, visitors of Toowoomba Christian Fellowship and travellers along Old Goombungee Road • The presence of existing infrastructure (Toowoomba Bypass, West Moreton System rail corridor, Toowoomba Waste Management Centre (landfill), Wetalla Sewage Treatment Plant, industrial buildings and power poles), reduces the overall sensitivity of this view

Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	
	This viewpoint is considered to have a Low sensitivity overall to the change proposed, due to the presence of existing infrastructure, relatively low number of nearby residential viewers with a specific interest in this view and the distance of these properties from the Project.
Visual Evaluation	
	
Photomontage view from Viewpoint 10 Refer Figure 36: Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba and Visualisation in Appendix 2 for appropriate scaled image.	
Construction	
Magnitude of change assessment	- Construction works in this location will be limited to the construction of the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, including a ventilation building (approximately 16 m high, parking area, fire pump buildings and tanks, diversion drain, a transformer yard and a new access road - The construction of this facility will require minor earthworks and some localised vegetation removal - Due to the distance of this viewpoint from construction activities and screening provided by localised variations in topography and foreground vegetation associated with Gowrie Creek, it is considered that impact of construction works represents a barely perceptible change, and therefore a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 10 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment - permanent infrastructure	- As the Project is in tunnel in this location, views to permanent infrastructure will be limited to views towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, which are situated approximately 1.4 km to the south-southeast of this viewpoint - The magnitude of change on this receptor is anticipated to be noticeable due to the following factors: - Provision of a ventilation building (approximately 16 m high), parking area, fire pump buildings and tanks, diversion drain, a transformer yard and a new access road, in close proximity to existing industrial buildings - The absence of vegetation (removed during construction) will not be noticeable from this location

Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	
	Due to the distance of this viewpoint from proposed infrastructure and screening provided by localised variations in topography and foreground vegetation associated with Gowrie Creek, it is considered that impact of the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure represents a noticeable change and therefore a Low magnitude of change.
Magnitude of change assessment - Train	The Project is in tunnel in this location, therefore no views towards train movements will be possible, therefore there is No Impact.
Significance of effect (operation)	The effect of the Project on Viewpoint 10 during operation is considered to be Negligible.

8.1.11 Viewpoint 11

Table 39: Likely visual effect of the Project on Viewpoint 11

Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	
Visual Baseline Assessment	
	
Existing view from Viewpoint 11 Refer to Figure 37: Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	- GPS Location: 27°31'20.009" S 151°56'13.854" E - Elevation: 600 m - Northerly view towards the proposed Toowoomba Range tunnel intermediate ventilation shaft location - The Project (tunnelled) is approximately 890 m to the northeast of viewpoint, while the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure is approximately 1 km to the northwest of this viewpoint - Represents typical and accessible views of visitors, staff and patients of the Baillie Henderson Hospital - Parts of elevated, vegetated landscapes visible within this view, including land in the vicinity of Blue Mountain Heights and Highfields, are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study

Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	
	Northerly views from this point provide open elevated views towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated buildings, as well as landscapes typical of LCT A: Vegetated Watercourses - Creeks and Channels (A1: Gowrie Creek), LCT C: Dry Croplands and Pastures (C6: Glencoe and C9: Charlton), LCT D: Vegetated Grazing (D10: Birnam Vegetated Grazing), LCT F: Rural Living (F7: Highfield Ridge F10: Cranley and F12: Weale Street) and LCT H: Transitional Landscapes (H6: Wetalla Sewage Treatment Plant and Toowoomba Waste Management Centre).
Key visual sensitivities	- Moderate sensitivity of receptors, particularly residents and visitors of Baillie Henderson Hospital. The presence of existing infrastructure (Toowoomba Bypass, West Moreton System rail corridor, Toowoomba Waste Management Centre (landfill), Wetalla Sewage Treatment Plant, industrial buildings and power poles), reduces the overall sensitivity of this view. - This viewpoint is considered to have a Moderate sensitivity overall to the change proposed, due to the presence of existing infrastructure, and relatively high number of nearby viewers with a specific interest in this view (including visitors, staff and patients of the Baillie Henderson Hospital) - It is noted that in September 2018, the Queensland Premier announced that the Baillie Henderson Hospital campus will be the site of a future new Toowoomba Hospital, and a detailed Business Case is currently being undertaken to develop a master plan for the whole Baillie Henderson Hospital campus (Queensland Government, 2019). It is not considered that this would affect the sensitivity.
Visual Evaluation	
	
Photomontage view from Viewpoint 11 Refer to Figure 37: Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley and Visualisation in Appendix 2 for appropriate scaled image.	
Construction	
Magnitude of change assessment	- Construction works in this location will be limited to the construction of the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, including a ventilation building (approximately 16 m high), parking area, fire pump buildings and tanks, diversion drain, a transformer yard and a new access road - The construction of this facility will require minor earthworks and some localised vegetation removal - Due to the distance of this viewpoint from construction activities, it is considered that impact of construction works represents a noticeable change and therefore a Low magnitude of change.

Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	
Significance of effect (construction)	The effect of the Project on Viewpoint 11 during construction is considered to be Low.
Operation	
Magnitude of change assessment - permanent infrastructure	- As the Project is in tunnel in this location, views to permanent infrastructure will be limited to views towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, which are situated approximately 1 km to the northwest of this viewpoint - The magnitude of change on this receptor is anticipated to be noticeable due to the following factors: - Noticeable change due to the provision of a ventilation building (approximately 16 m high), parking area, fire pump buildings and tanks, diversion drain, a transformer yard and a new access road, in close proximity to existing industrial buildings - Localised vegetation removal will be barely perceptible from this location. - Due to the distance of this viewpoint from proposed infrastructure, it is considered that impact of the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, represents a noticeable change and therefore a Low magnitude of change.
Magnitude of change assessment - Train	The Project is in tunnel in this location, therefore no views towards train movements will be possible, therefore there is No Impact.
Significance of effect (operation)	The effect of the Project on Viewpoint 11 during operation is considered to be Low.

8.1.12 Viewpoint 12

Table 40: Likely visual effect of the Project on Viewpoint 12

Viewpoint 12: Looking northeast from Hermitage Road, Cranley	
Visual Baseline Assessment	
	
Existing view from Viewpoint 12 Refer to Figure 38: Viewpoint 12: Looking northeast from Hermitage Road, Cranley and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	- GPS Location: 27°30'56.724" S 151°55'49.548" E - Elevation: 560 m

Viewpoint 12: Looking northeast from Hermitage Road, Cranley	
	• North-easterly view towards the proposed Toowoomba Range tunnel intermediate ventilation shaft location • Project (tunnelled) is approximately 350 m to the north of viewpoint, while the Toowoomba Range tunnel intermediate ventilation shaft location and associated ventilation control building is approximately 385 m to the northeast of this viewpoint • Represents typical and accessible views of nearby workers in industrial buildings, people accessing the Toowoomba Waste Management Centre along Hermitage Road and is also considered representative of views from Toowoomba Bypass • Parts of elevated, vegetated landscapes visible within this view, including land in the vicinity of Blue Mountain Heights and Highfields, are considered to have high scenic amenity values and are acknowledged in the Toowoomba Regional Council Scenic Amenity Study • North-easterly views from this point provide open views towards Toowoomba Bypass and the proposed Toowoomba Range tunnel intermediate ventilation shaft location and associated buildings, as well as landscapes typical of LCT A: Vegetated Watercourses - Creeks and Channels (A1: Gowrie Creek), LCT C: Dry Croplands and Pastures (C6: Glencoe and C9: Charlton), LCT D: Vegetated Grazing (D10: Birnam Vegetated Grazing), LCT F: Rural Living (F12: Weale Street) and LCT H: Transitional Landscapes (H6: Wetalla Sewage Treatment Plant and Toowoomba Waste Management Centre).
Key visual sensitivities	• Low sensitivity of transient receptors, predominately travellers along Hermitage Road (186 AADT, 2015 data) • Also representative of driver views attainable from Toowoomba Bypass • The presence of existing infrastructure (Toowoomba Bypass, West Moreton System rail corridor, Toowoomba Waste Management Centre (landfill), Wetalla Sewage Treatment Plant, industrial buildings and power poles), reduces the overall sensitivity of this view • This viewpoint it is considered to have a Low sensitivity overall to the change proposed, due to the low sensitivity of viewers (e.g. industrial workers and travellers along Hermitage Road and Toowoomba Bypass with a lack of specific interest in this view).
Visual Evaluation	
 Photomontage view from Viewpoint 12 Refer to Figure 38: Viewpoint 12: Looking northeast from Hermitage Road, Cranley and Visualisation in Appendix 2 for appropriate scaled image.	

Viewpoint 12: Looking northeast from Hermitage Road, Cranley	
Construction	
Magnitude of change assessment	- Construction works in this location will be limited to the construction of the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, including a ventilation building (approximately 16 m high), parking area, fire pump buildings and tanks, diversion drain, a transformer yard and a new access road - The construction of this facility will require minor earthworks and some localised vegetation removal - Due to the proximity of this viewpoint to construction activities, it is considered that impact of construction works represents a considerable change and therefore a Moderate magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 12 during construction is considered to be Low.
Operation	
Magnitude of change assessment - permanent infrastructure	- As the Project is in tunnel in this location, views to permanent infrastructure will be limited to views towards the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure, which are situated approximately 385 m to the northeast of this viewpoint - The magnitude of change on this receptor is anticipated to be considerable due to the following factors: - Considerable change due to the provision of a ventilation building (approximately 16 m high), parking area, fire pump buildings and tanks, diversion drain, a transformer yard and a new access road, in close proximity to existing industrial buildings - The absence of vegetation (removed during construction) will be noticeable from this location and open views to the Project. - Due to the close proximity of this viewpoint to the proposed infrastructure, it is considered that impact of the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure represents a considerable change and therefore a Moderate magnitude of change.
Magnitude of change assessment - Train	The Project is in tunnel in this location, therefore no views towards train movements will be possible, therefore there is No Impact.
Significance of effect (operation)	The effect of the Project on Viewpoint 12 during operation is considered to be Low.

8.1.13 Viewpoint 13

Table 41: Likely visual effect of the Project on Viewpoint 13

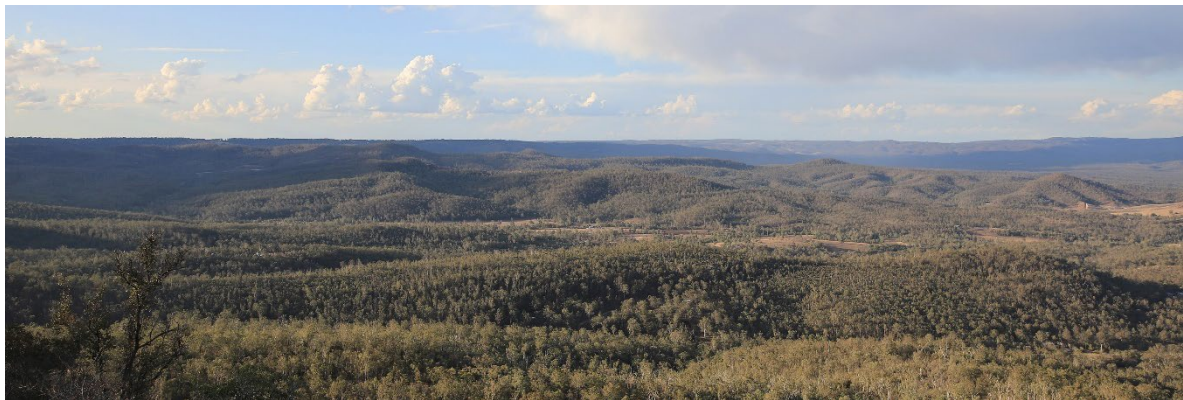
Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	
Visual Baseline Assessment	
	
Existing view from Viewpoint 13 Refer to Figure 39: Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°29'41.915" S 151°58'0.762" E • Elevation: 600 m • South-easterly view towards landscapes of the Great Dividing Range and Toowoomba Escarpment, including elevated residential properties within Mount Lofty and Prince Henry Heights and the Lockyer Valley from Keira Court, Blue Mountain Heights • The Project is approximately 2.6 km to the southeast of this viewpoint, while the eastern tunnel portal is approximately 2.7 km to the south of this viewpoint • Represents typical and accessible elevated views of visitors and residents of Blue Mountain Heights, particularly those situated on Keira Court. Also representative of views from the New England Highway rest area and from private residential properties situated on Murphys Creek Road, Rangeview Road, Skyline Drive, Sirron Street, Buena Vista Crescent, Hilltop Crescent and Rosewall Court • Toowoomba Bypass and the existing West Moreton System rail corridor can be seen in the view • Elevated forested areas visible within this viewpoint are considered to have high scenic amenity and are included (in part) on the regionally significant scenic amenity (ShapingSEQ) overlay; however, this particular viewpoint is not located in the overlay area • South-easterly views from this elevated viewpoint provide elevated views towards the proposed rail alignment and eastern tunnel portal, as well as landscapes typical of LCT D: Vegetated Grazing (D21: Withcott Vegetated Grazing and D22: Derrymore Vegetated Grazing), LCT E: Rural Settlement (E7: Toowoomba and E9: Withcott), LCT F: Rural Living (F13: Blue Mountain Heights Rural Living) and LCT G: Forested Uplands (G11: Great Dividing Range Forested Uplands).
Key visual sensitivities	• Relatively high number of receptors including nearby residents of Blue Mountain Heights with elevated views over the Project • Also representative of views from the New England Highway rest area and Mount Kynoch Lookout • Although this view comprises a strong forested and rural character; the presence of the existing rural infrastructure (Toowoomba Bypass and West Moreton System rail corridor) reduces the overall sensitivity of this view • Receptors have views over landscapes identified within the regionally significant scenic amenity overlay area as defined in ShapingSEQ (see Table 3 in Section 3.2: State and regional).

Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	
	This viewpoint is considered to have a High sensitivity overall to the change proposed, due to the relatively high number and sensitivity of viewers.
Visual Evaluation	
Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology, however a birds eye perspective view has been produced to assist in communicating the impacts of the western tunnel portal and associated infrastructure.	
	
Refer to Figure 40: Eastern tunnel portal aerial view in Appendix 2 for birds eye perspective view of eastern tunnel portal.	
Construction	
Magnitude of change assessment	- The Project and associated earthworks will introduce considerable construction works into the view - In this location, views towards the construction of the Project including the rail alignment, Oaky Creek viaduct and road networks changes to Wallens Road, and two bridge laydown areas for the construction of the Oaky Creek viaduct will be possible in the centre of this view - It is considered likely that views towards construction works associated with the construction of the Toowoomba Range tunnel and the eastern tunnel portal and associated portal infrastructure will be possible from other elevated residential properties within Blue Mountain Heights, however they are obscured from this viewpoint due to foreground landform and vegetation associated with the Great Dividing Range - Earthworks associated with construction of the Project, including significant cuts and the road network changes to local roads will require the movement of large volumes of material

Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	
	- Key impacts will relate to the presence of construction plant as well as the clearance of existing vegetation for the construction of the Project, including the rail alignment, viaduct structures, laydown areas, road network changes to Wallens Road and service roads, which will reduce the density of screening vegetation, increasing the visibility of the alignment from Keira Court and surrounding elevated properties. - At this distance, construction works and laydown areas will be noticeable and will create disturbance to the landscape in this location, and it is anticipated that more open views towards construction activities will be possible for nearby residents of Blue Mountain Heights. While the impact of these is considered to be temporary, impacts on this viewpoint are considered to result in a Moderate magnitude of change due to the extent of the disturbance to the landscape in this location and identification of these landscapes within the ShapingSEQ regionally significant scenic amenity overlay area.
Significance of effect (construction)	The effect of the Project on Viewpoint 13 during construction is considered to be High.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the rail alignment is approximately 2.6 km to the southeast of this viewpoint - This view is already affected by the presence of existing rail infrastructure and Toowoomba Bypass - The magnitude of change on this receptor is anticipated to be considerable due to the following factors: - Considerable change due to the provision of new rail infrastructure in deep cut (with depths up to – 18 m) and the Oaky Creek viaduct - Road network changes to Wallens Road and associated earthworks - Vegetation clearing for the construction of the proposed Project and laydown areas will increase the visibility of the permanent rail infrastructure and be clearly evident due to the vegetated nature of this landscape - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - Even at this distance, the Project (in particular the Oaky Creek viaduct) will be clearly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure into what is currently a relatively intact rural setting, parts of which are within the ShapingSEQ regionally significant scenic amenity overlay area. This represents a Moderate magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be typically screened while in cut, however distant views towards passing train movements will be possible when freight trains pass over the Oaky Creek viaduct. Due to this distance of this viewpoint from the Project, the magnitude of impact is considered to be Low.
Significance of effect (operation)	The effect of the Project on Viewpoint 13 during operation is considered to be High.

8.1.14 Viewpoint 14

Table 42: Likely visual effect of the Project on Viewpoint 14

Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	
Visual Baseline Assessment	
	
Existing view from Viewpoint 14 Refer to Figure 41: Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°32'59.796" S 151°59'50.489" E • Elevation: 600 m • This viewpoint is located within the regionally significant scenic amenity overlay area as defined in ShapingSEQ, and provides northerly views towards landscapes of the Great Dividing Range, Toowoomba Escarpment and Lockyer Valley, including distant views to elevated residential properties within Blue Mountain Heights, lower lying properties within Postmans Ridge and Withcott, landscapes within Lockyer National Park and areas within the regionally significant scenic amenity overlay area as defined in ShapingSEQ (see Table 3 in Section 3.2: State and regional) • Proposed rail alignment is approximately 3.4 km to the north of this viewpoint • Parts of the recently constructed Toowoomba Bypass, and associated cuts and embankments are visible within this view. Katoomba Point Lookout includes the provision of a table and chairs for visitors allowing people to rest in the area to enjoy the view. • Represents typical and accessible views of visitors and tourists visiting Katoomba Point Lookout, a scenic viewpoint with picnic facilities. This viewpoint is also representative of other elevated views possible from Jubilee Park, Mt Tabletop and from private elevated residential properties in Prince Henry Heights, Mount Lofty and Harlaxton. • Northerly views from this elevated viewpoint provide elevated views towards the Project, as well as landscapes typical of LCT D: Vegetated Grazing (D21: Withcott Vegetated Grazing), LCT E: Rural Settlement (E9: Withcott), LCT F: Rural Living (F13: Blue Mountain Heights Rural Living and F20: Withcott Rural Living) and LCT G: Forested Uplands (G11: Great Dividing Range Forested Uplands).
Key visual sensitivities	• Relatively high number of receptors visiting Katoomba Point Lookout, and high number of nearby residential receptors, with a very high level of interest in this environment and views obtained from the lookout, including views over landscapes identified within the regionally significant scenic amenity overlay area as defined in ShapingSEQ

Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights

	- Although this view comprises a strong forested and rural character; the presence of the existing rural infrastructure (Toowoomba Bypass and West Moreton System/Main Line railway) reduces the overall sensitivity of this view - This viewpoint is considered to have a High sensitivity overall to the change proposed, due to the relatively high number and high sensitivity of viewers, identification of this viewpoint as a signed and advertised scenic lookout and the situation of this viewpoint within the regionally significant scenic amenity overlay area.
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Visual Evaluation



Photomontage view from Viewpoint 14

Refer to **Figure 41: Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights and Visualisation** in Appendix 2 for appropriate scaled image.

Construction

Magnitude of change assessment	- The Project including associated earthworks will introduce considerable construction works into the view - Construction works and plant constructing the Project, including the Oaky Creek viaduct, Withcott 1 viaduct, Withcott 2 viaduct, Withcott 3 viaduct, Withcott 4 viaduct and TSRC and Six Mile Creek viaduct, road network changes to Wallens Road and McNamaras Road including the provision of the McNamaras road over rail bridge and associated earthworks and laydown areas will be highly evident and have a temporary impact on views from Katoomba Point lookout and nearby residents - Distant views will also be possible to construction works and plant constructing the Project including the proposed rail alignment, Murphys Creek Road viaduct, Withcott Seedlings viaduct and Lockyer Creek viaduct in the vicinity of Postmans Ridge and Helidon - It is considered likely that views towards construction works associated with the construction of the Toowoomba Range tunnel and the eastern tunnel portal and associated portal infrastructure will be possible from other elevated residential properties, particularly those within Mount Lofty and Harlaxton, however landform and vegetation associated with the Great Dividing Range obscures views to these Project elements from this viewpoint - Earthworks associated with construction of the Project, including significant cuts and road network changes to local roads will require the movement of large volumes of material
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Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	
	- Key impacts will relate to the clearance of existing vegetation for the construction of the Project including rail alignment, viaduct structures, laydown areas, road network changes to local roads and provision of service roads which will reduce the density of vegetation, increasing the visibility of the Project from Katoomba Lookout and surrounding elevated properties - At this distance, construction works, including multiple bridge construction laydown areas will be noticeable and impact a considerable portion of views available from Katoomba Lookout. While the impact of these is considered to be temporary, impacts on this viewpoint are considered to result in a Moderate magnitude of change due to the extent of the disturbance to the landscape in this location, identification of this location as a scenic lookout and its situation within and views towards landscapes within the ShapingSEQ regionally significant scenic amenity overlay area.
Significance of effect (construction)	The effect of the Project on Viewpoint 14 during construction is considered to be High.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 3.4 km to the north of this viewpoint - This view is already affected by the presence of the Toowoomba Bypass - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Dominant change due to the provision of new rail infrastructure, including the Oaky Creek viaduct (736 m), Withcott 1 viaduct (261 m), Withcott 2 viaduct (322 m), Withcott 3 viaduct (174 m), Withcott 4 viaduct (145 m) and TSRC and Six Mile Creek viaduct (966 m) (with heights of up to +44.5 m above existing surface levels) and associated earthworks, including deep cuts with depths up to -30.5 m - Road network changes to Wallens Road and McNamaras Road including the provision of the McNamaras road over rail bridge with a vertical clearance of 7.1 m over the Project's rail alignment - Vegetation clearing for the construction of the proposed Project including laydown areas will increase the visibility of the permanent rail infrastructure and be clearly evident due to the vegetated nature of this landscape - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - Even at this distance, the viaduct structures associated with the Project will be clearly evident and due to the extent of the disturbance to the landscape will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure into what is currently a relatively intact rural setting, parts of which are within the ShapingSEQ regionally significant scenic amenity overlay area. This represents a Moderate magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be typically screened while in cut, however distant views towards passing train movements will be possible when freight trains pass over viaduct structures. Due to this distance of this viewpoint from the Project, the magnitude of impact is considered to be Low.
Significance of effect (operation)	The effect of the Project on Viewpoint 14 during operation is considered to be High.

8.1.15 Viewpoint 15

Table 43: Likely visual effect of the Project on Viewpoint 15

Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	
Visual Baseline Assessment	
	
Existing view from Viewpoint 15 Refer to Figure 42: Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°34'43.686" S 151°59'16.601" E • Elevation: 700 m • Provides north-easterly views towards landscapes of the Great Dividing Range, Toowoomba Escarpment and Lockyer Valley, including distant views to lower lying properties within Postmans Ridge and Withcott, landscapes within Lockyer National Park and areas within the regionally significant scenic amenity overlay area as defined in ShapingSEQ (see Table 3 in Section 3.2: State and regional) • The Project is approximately 6.5 km to the north of this viewpoint • The Picnic Point Lookout is situated at the highest point of the Picnic Point Parklands, which are state heritage-listed and a regionally-popular tourist destination, providing opportunities to enjoy panoramic views and utilise the extensive trails along the escarpment, that provide opportunities for bushwalking, mountain biking and horse riding • Represents typical and accessible views of visitors and tourists visiting Picnic Point Lookout, a scenic viewpoint with visitor amenities and cafe. This viewpoint is also representative of other elevated views possible from Mt Tabletop and from private elevated residential properties in East Toowoomba and Rangeville. • Northerly views from this elevated viewpoint provide elevated views towards the Project, as well as landscapes typical of LCT D: Vegetated Grazing (D21: Withcott Vegetated Grazing), LCT E: Rural Settlement (E9: Withcott), LCT F: Rural Living (F13: Blue Mountain Heights Rural Living and F20: Withcott Rural Living) and LCT G: Forested Uplands (G11: Great Dividing Range Forested Uplands).
Key visual sensitivities	• Very high number of receptors visiting Picnic Point Lookout, a regionally-marketed lookout, with a very high level of interest in this environment and views obtained from the lookout, including views over landscapes identified within the regionally significant scenic amenity overlay area as defined in ShapingSEQ • Although this view comprises a strong forested and rural character; the presence of the existing rural infrastructure (Toowoomba Connection Road) reduces the overall sensitivity of this view • This viewpoint is considered to have a High sensitivity overall to the change proposed, due to the very high number and high sensitivity of viewers and identification of this viewpoint as a signed and advertised scenic lookout.

Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	
Visual Evaluation	
Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual impact assessment methodology. The visualisation from Katoomba Point Lookout (Viewpoint 14) is considered representative of impacts on public lookouts along the Toowoomba Escarpment and, at 3.5 km from the alignment, is 3 km closer to Project than this vantage point.	
Construction	
Magnitude of change assessment	- The Project and associated earthworks will introduce considerable construction works into the view - Distant views will be possible to construction works and plant constructing the Project including the TSRC and Six Mile Creek viaduct (966 m), Postmans Ridge viaduct (644 m), Murphys Creek Road viaduct (690 m), Withcott Seedlings viaduct (1794 m) and Lockyer Creek viaduct (506 m), road network changes to McNamaras Road including the provision of the McNamaras road over rail bridge and associated earthworks and laydown areas will be highly evident and have a temporary impact on views from Picnic Point lookout and nearby residents - Views towards construction works associated with the construction of the Toowoomba Range tunnel and the eastern tunnel portal and associated portal infrastructure will not be possible from this location, due to foreground landform and vegetation associated with the Great Dividing Range - Earthworks associated with construction of the Project, including significant cuts and the road network changes to local roads will require the movement of large volumes of material - Key impacts will relate to the clearance of existing vegetation for the construction of the Project, viaduct structures, laydown areas, road network changes to local roads and provision of service roads which will reduce the density of screening vegetation, increasing the visibility of the Project from Picnic Point Lookout and surrounding elevated properties - At this distance, construction works, including multiple bridge construction laydown areas will be noticeable and impact a considerable portion of views available from Picnic Point Lookout. While the impact of these is considered to be temporary, impacts on this viewpoint are considered to result in a Moderate magnitude of change due to the extent of the disturbance to the landscape in this location and identification of this location as a scenic lookout.
Significance of effect (construction)	The effect of the Project on Viewpoint 15 during construction is considered to be High.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 6.5 km to the north of this viewpoint - This view is already affected by the presence of the Toowoomba Connection Road - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Provision of new rail infrastructure, including the TSRC and Six Mile Creek viaduct, Postmans Ridge viaduct, Murphys Creek Road viaduct, Withcott Seedlings viaduct and Lockyer Creek viaduct (with heights of up to +44.5 m above existing surface levels) and associated earthworks, including deep cuts with depths up to -30.5 m - Road network changes to McNamaras Road including the provision of the McNamaras road over rail bridge with a vertical clearance of 7.1 m over the Project's rail alignment

Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	
	- Vegetation clearing for the construction of the Project including the proposed rail alignment and laydown areas will increase the visibility of the permanent rail infrastructure and will be clearly evident due to the existing vegetated nature of this landscape - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - Even at this distance, the rail alignment and viaduct structures will be clearly evident, however, due to existing infrastructure and residential development within the view, it is not anticipated that the Project will change the fundamental visual character of the landscape. It is also noted, that while landscapes within this view impacted by the Project are not within the ShapingSEQ regionally significant scenic amenity overlay area, they are acknowledged within the <i>Scenic Amenity of the Lockyer</i> report as being of high scenic amenity value. Overall, it is considered that this represents a Moderate magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1,800 m long with a height of 6.5 m will be typically screened while in cut, however distant views towards passing train movements will be possible when freight trains pass over viaduct structures. Due to this distance of this viewpoint from the Project, the magnitude of impact is considered to be Low.
Significance of effect (operation)	The effect of the Project on Viewpoint 15 during operation is considered to be High.

8.1.16 Viewpoint 16

Table 44: Likely visual effect of the Project on Viewpoint 16

Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	
Visual Baseline Assessment	
	
Existing view from Viewpoint 16 Refer to Figure 43: Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north in Appendix 2 for appropriate scaled image.	
Location and description	- GPS Location: 27°31'5.52" S 151°58'57.029" E - Elevation: 320 m - Northerly view from Jones Road towards foothills of the Great Dividing Range, and areas within the regionally significant scenic amenity overlay area as defined in ShapingSEQ (see Table 3 in Section 3.2: State and regional) - The Project is approximately 280 m to the north of this viewpoint - Represents typical and accessible views of isolated rural residents and of those travelling along Jones Road

Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	
	Northerly view from this point provides open views towards the Project, Oaky Creek and its tributaries as well as landscapes typical of LCT D: Vegetated Grazing (D21: Withcott Vegetated Grazing) and LCT G: Forested Uplands (G11: Great Dividing Range Forested Uplands).
Key visual sensitivities	- Low sensitivity of transient receptors, predominately travellers along Jones Road (1,200 AADT, 2018 data), and isolated rural residents - This view comprises a strong forested and rural character - This view is only anticipated to be experienced by a few nearby receptors; therefore this viewpoint is considered to have a Low sensitivity overall to the change proposed.
Visual Evaluation	
<i>Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.9: Visual impact assessment methodology.</i>	
Construction	
Magnitude of change assessment	- The Project and associated earthworks will introduce considerable construction works into the view - Construction works and plant constructing the Project including the rail alignment, the Oaky Creek viaduct (736 m), road network changes to Wallens Road and associated earthworks and laydown areas in close proximity to this location will be highly evident and have a temporary impact on nearby isolated rural residents - Earthworks associated with construction of the Project, including significant cuts and the road network changes to local roads will require the movement of large volumes of material - Key impacts will relate to the clearance of existing vegetation for the construction of the Project including the Oaky Creek viaduct, laydown areas, road network changes to Wallens Road and provision of service roads which will reduce the density of screening vegetation, increasing the visibility of the alignment from surrounding isolated rural properties - At this close distance, construction works and laydown areas will be clearly evident. While the impact of these is considered to be temporary, impacts on this viewpoint are considered to result in a Moderate magnitude of change due to the extent of the disturbance to the landscape in this location, including landscapes within the ShapingSEQ regionally significant scenic amenity overlay area.
Significance of effect (construction)	The effect of the Project on Viewpoint 16 during construction is considered to be Low.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 280 m to the north of this viewpoint - This view comprises a strong forested and rural character and includes landscapes within the regionally significant scenic amenity overlay area as defined in ShapingSEQ - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Dominant change due to the provision of new rail infrastructure, including the Oaky Creek viaduct, with heights of up to +38 m above existing natural surface level and in deep cut, with depths up to -18 m - Road network changes to Wallens Road and associated earthworks

Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	
	○ Vegetation clearing for the construction of the Project and associated laydown areas will increase the visibility of the permanent rail infrastructure and be clearly evident due to the vegetated nature of this landscape ○ Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. • At this close distance, the Project (in particular the Oaky Creek viaduct and visual impacts associated with the removal of vegetation) will be clearly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure into what is currently a relatively intact rural setting, parts of which are within the ShapingSEQ regionally significant scenic amenity overlay area. This represents a High magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be typically screened while in cut, however close views towards passing train movements will be possible when freight trains pass over the Oaky Creek viaduct. Due to this close proximity of this viewpoint to the Project, the magnitude of impact is considered to be Moderate.
Significance of effect (operation)	The effect of the Project on Viewpoint 16 during operation is considered to be Moderate.

8.1.17 Viewpoint 17

Table 45: Likely visual effect of the Project on Viewpoint 17

Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west
Visual Baseline Assessment

Existing view from Viewpoint 17

Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	
Refer to Figure 44: Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west and Visualisation in <i>Appendix 2</i> for appropriate scaled image.	
Location and description	- GPS Location: 27°30'55.992" S 152°1'29.358" E - Elevation: 270 m - Westerly view towards the Toowoomba Bypass and Gittins Road overpass. While elevated and vegetated ridges within this area are not identified within the regionally significant scenic amenity overlay area as defined in ShapingSEQ (see Table 3 in Section 3.2: State and regional), they are identified as being of high value in <i>Scenic Amenity of the Lockyer 2002</i> - The Project is approximately 620 m to the northwest of this viewpoint - Represents typical and accessible views of those travelling along the Toowoomba Bypass (Warrego Highway). Also representative of similar views likely to be obtained from nearby isolated residential properties and by recreational users of the Bicentennial National Trail, which follows Gittins Road in this location and is also directly impacted by the TSRC and Six Mile Creek viaduct, where it crosses Gittins Road approximately 780 m north of this viewpoint. - North-westerly views from this point provide open views towards the Toowoomba Bypass and the proposed Project, as well as landscapes typical of LCT D: Vegetated Grazing (D21: Withcott Vegetated Grazing) and LCT G: Forested Uplands (G11: Great Dividing Range Forested Uplands).
Key visual sensitivities	- While there is currently no data available regarding the number of receptors travelling along the Toowoomba Bypass, DTMR anticipated that up to 80% of the daily vehicle movements using the Warrego Highway prior to the Toowoomba Bypass opening would use the new route (DTMR, 2020). Based on this, it is anticipated that there could be up to 19,680 receptors travelling along the Toowoomba Bypass each day, (of which up to 17 per cent are heavy vehicles) who would experience changes to the view. However, it is noted that these viewers are passing at speed and would only experience transient views. - Also representative of recreational user views attainable from the Bicentennial National Trail, noting that the trail follows Gittins Road in this location - Includes views over landscapes with a strong forested and rural character, identified within the Scenic Amenity of the Lockyer 2002 report as having high scenic amenity value - The presence of existing infrastructure (Toowoomba Bypass and Gittins Road) reduces the overall sensitivity of this view - This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, due to the limited number of recreational users utilising the Bicentennial National Trail and the large number of viewers experiencing the view travelling along the Toowoomba Bypass, with a lack of specific interest in the views due to their transient nature.

Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west

Visual Evaluation



Photomontage view from Viewpoint 17

Refer to Figure 44: Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west and Visualisation in Appendix 2 for appropriate scaled image.

Construction

Magnitude of Change Assessment

- The construction of the Project including the TSRC and Six Mile Creek viaduct and associated earthworks will introduce considerable construction works into the view. This change will be exacerbated by proximity of this viewpoint and accessible views from the Toowoomba Bypass and Gittins Road to the works in this location.
- Substantial clearing of existing vegetation would be required to facilitate the proposed laydown areas situated approximately 580 m to the northwest and west of this viewpoint and an access track along the ridgeline to the north of the Toowoomba Bypass. This would cause a reduction in visual amenity from this viewpoint; however this would be temporary.
- Clearing of existing vegetation to facilitate the construction of the Project will further open up views to construction activities
- Earthworks associated with the Project, including proposed embankments, will require large volumes of material to be removed
- The key impacts will relate to the clearance of existing vegetation for the construction of the Project and associated laydown areas, presence of construction plant and disturbance due to the construction of the alignment, cuts and embankments
- Construction works will be clearly evident from this vantage point the impact of these works is temporary which represents a considerable change and Moderate magnitude of change.

Significance of effect (Construction)

The effect of the Project on Viewpoint 17 during construction is considered to be Moderate.

Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	
Operation	
Magnitude of Change Assessment - Permanent Infrastructure	- The nearest section of the Project is approximately 620 m to the northwest of this viewpoint. The skyline is already affected by the presence of existing infrastructure including Toowoomba Bypass and Gittins Road. - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Provision of new rail infrastructure, including the TSRC and Six Mile Creek viaduct, with heights of up to 31 m above the Toowoomba Bypass and 53 m above Six Mile Creek - Vegetation clearing for the construction of the Project and associated laydown areas will increase the visibility of the permanent rail infrastructure and be clearly evident due to the vegetated nature of this landscape - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this close distance, the Project including the TSRC and Six Mile Creek viaduct will be clearly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure into what is currently a relatively intact rural setting. This represents a High magnitude of change.
Magnitude of Change Assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m, will be highly evident due to the open views of the railway track from this viewpoint. These views will be experienced by a high number of motorists, and limited number of recreational users; however, these views are typically of transient nature. Therefore, the magnitude of change is considered to be Moderate.
Significance of effect (Operation)	The effect of the Project on Viewpoint 17 during operation is considered to be High.

8.1.18 Viewpoint 18

Table 46: Likely visual effect of the Project on Viewpoint 18

Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north
Visual Baseline Assessment

Existing view from Viewpoint 18

Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	
Refer to Figure 45: Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north and Visualisation in <i>Appendix 2</i> for appropriate scaled image.	
Location and description	- GPS Location: 27°31'29.735" S 152°3'54.468" E - Elevation: 224 m - Northerly view towards the Toowoomba Bypass and Murphys Creek Road bridge. While these areas are not identified within the regionally significant scenic amenity overlay area as defined in ShapingSEQ (see Table 3 in Section 3.2: State and regional), they are identified as being of high value in <i>Scenic Amenity of the Lockyer 2002</i> - The Project is approximately 330 m to the north of this viewpoint - Represents typical and accessible views of residents and of those travelling along Murphys Creek Road. Also representative of similar views likely to be obtained by travellers on the Toowoomba Bypass - Northerly views from this point provide open views towards Toowoomba Bypass and the proposed Project, as well as landscapes typical of LCT D: Vegetated Grazing (D20: Postmans Ridge Vegetated Grazing) and LCT G: Forested Uplands (G11: Great Dividing Range Forested Uplands).
Key visual sensitivities	- Moderate sensitivity of transient receptors, predominately travellers along Murphys Creek Road (2,242 AADT, 2019 data) which is part of a local scenic route (Cobb and Co. and Spring Bluff tourist drives) - Also representative of a high number of driver views attainable from Toowoomba Bypass and views from nearby residents situated on Squires Road who may have views towards proposed infrastructure in this location - Includes views over landscapes with a strong forested and rural character, identified within the <i>Scenic Amenity of the Lockyer 2002</i> report as having high scenic amenity value - The presence of existing infrastructure (Toowoomba Bypass and the Murphys Creek Road Bridge) reduces the overall sensitivity of this view - This viewpoint it is considered to have a Moderate sensitivity overall to the change proposed, due to the large number of viewers tempered with the transience of and lack of specific interest in the views (e.g. travellers along Murphys Creek Road and Toowoomba Bypass with a lack of specific interest in this view).
Visual Evaluation	
 Photomontage view from Viewpoint 18 Refer to Figure 45: Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north and Visualisation in <i>Appendix 2</i> for appropriate scaled image.	

Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	
Construction	
Magnitude of change assessment	- The construction of the Project including rail alignment, Murphys Creek viaduct and associated earthworks will introduce considerable construction works into the view. This change will be exacerbated by proximity of this viewpoint and Toowoomba Bypass to the works in this location. - The proposed location of a laydown area approximately 250 m north of this viewpoint would cause a reduction in visual amenity from this viewpoint, however this would be temporary - Clearing of existing vegetation to facilitate the construction of the Project will further open up views to construction activities - Earthworks associated with the Project, including proposed embankment, will require large volumes of material to be removed - The key impacts will relate to the clearance of existing vegetation for the construction of the Project and associated laydown areas, presence of construction plant and disturbance due to the construction of the alignment, cuts and embankments - Construction works will be clearly evident from this vantage point the impact of these works is temporary which represents a considerable change and Moderate magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 18 during construction is considered to be Moderate.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 330 m to the north of this viewpoint. The skyline is already affected by the presence of existing infrastructure including Toowoomba Bypass. - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Provision of new rail infrastructure, including the Murphys Creek Road viaduct, with heights of up to +33 m above existing natural surface level and in cut, with depths up to -6 m - Vegetation clearing for the construction of the Project and associated laydown areas will increase the visibility of the permanent rail infrastructure and be clearly evident due to the vegetated nature of this landscape - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this close distance, the Project including the Murphys Creek Road viaduct will be clearly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure into what is currently a relatively intact rural setting. This represents a High magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m, including occasions when two trains will be present in the vicinity of the crossing loop on viaduct near Withcott Seedlings, will be highly evident due to the open views of the Project from this viewpoint. These views will be experienced by a high number of motorists; however, these views are typically of transient nature. Therefore, the magnitude of change is considered to be Moderate.
Significance of effect (operation)	The effect of the Project on Viewpoint 18 during operation is considered to be High.

8.1.19 Viewpoint 19

Table 47: Likely visual effect of the Project on Viewpoint 19

Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	
Visual Baseline Assessment	
	
Existing view from Viewpoint 19 Refer to Figure 46: Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°31'29.735" S 152°3'54.468" E • Elevation: 214 m • Northerly view towards isolated rural residential properties of Helidon Spa • The Project is approximately 225 m to the northeast of this viewpoint • Represents typical and accessible views of visitors and residents of Ashlands Drive • Westerly views from this point provide open views towards the existing West Moreton System rail corridor and Project, as well as landscapes typical of LCT D: Vegetated Grazing (LCA D20: Postmans Ridge) and LCT F: Rural Living (LCA F21: Postmans Ridge).
Key visual sensitivities	• Moderate sensitivity of receptors, particularly relatively low number of rural residents of Helidon Spa who have close views to the rail alignment • The presence of existing infrastructure (power poles and powerlines) reduces the overall sensitivity of this view • This viewpoint it is considered to have a Low sensitivity overall to the change proposed, due to the low number of nearby residential viewers with a specific interest in this view and the proximity of this viewpoint to the Project.
Visual Evaluation	
	
Photomontage view from Viewpoint 19 Refer to Figure 46: Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north and Visualisation in Appendix 2 for appropriate scaled image.	

Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	
Construction	
Magnitude of change assessment	- The Project and associated earthworks will introduce considerable construction works into the view. This change will be exacerbated by the proximity of rural residences of Helidon Spa to the works in this location - The proposed location of a laydown area for the construction of the Project including the Withcott Seedlings viaduct to the immediate north of the property (shown in the left hand side of the view) and Lockyer Creek viaduct nearby would cause a reduction in visual amenity from this viewpoint, however this would be temporary - Due to the dense nature of existing vegetation, the effect of vegetation clearing for the construction of the Project and associated laydown area will be clearly evident - Earthworks associated with the Project will require large volumes of material to be removed - The key impacts will relate to the removal of vegetation, presence of construction plant and disturbance due to the construction of the rail alignment, Withcott Seedlings viaduct, Lockyer Creek viaduct, cuts and embankments - Construction works will be highly evident in this location due to the proximity of this viewpoint and nearby rural residential properties to the Project, proposed laydown area, as well as the extensive clearance of vegetation required. This represents a High magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 19 during construction is considered to be Moderate.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 225 m to the northeast of this viewpoint - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Dominant change due to the provision of new rail infrastructure on embankment and the Withcott Seedlings viaduct (1,794 m) into what is currently a relatively intact rural environment (noting that the Withcott Seedlings viaduct is somewhat obscured from this view, however it is anticipated that it will be more evident in views from nearby rural residential properties) - Due to the dense nature of existing vegetation, the effect of vegetation clearing will be clearly evident and will open up views towards the Project - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project will be clearly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure into what is a relatively intact rural environment in close proximity to existing rural residential properties who will have open views towards the Project. This represents a High magnitude of change.
Magnitude of change assessment - Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be highly evident due to the open views of the railway track from this viewpoint. Close views to the Project will be possible for nearby rural residents however these views will be experienced by a low number of residents and are of transient nature. Therefore, the magnitude of change is considered to be Moderate.

Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	
Significance of effect (operation)	The effect of the Project on Viewpoint 19 during operation is considered to be Moderate.

8.1.20 Viewpoint 20

Table 48: Likely visual effect of the Project on Viewpoint 20

Viewpoint 20: Airforce Road, Helidon, looking west	
Visual Baseline Assessment	
	
Existing view from Viewpoint 20 Refer to Figure 47: Viewpoint 20: Airforce Road, Helidon, looking west and Visualisation in Appendix 2 for appropriate scaled image.	
Location and description	• GPS Location: 27°32'6" S 152°6'5.748" E • Elevation: 160 m • Westerly view towards the existing West Moreton System rail corridor and the intersection of Airforce Road and Cattos Road. Existing vegetation screens views to isolated rural residential properties situated to the south of the exiting railway (Main Line). • The Project is approximately 6 m to the south of this viewpoint, while the Lockyer Creek viaduct is approximately 685 m to the west of this viewpoint • Represents typical and accessible views of those travelling along Airforce Road, including workers and visitors and residents of nearby isolated residential properties

Viewpoint 20: Airforce Road, Helidon, looking west	
	Westerly views from this point provide close, open views towards the existing West Moreton System rail corridor and Project, as well as filtered views towards landscapes typical of LCT A: Vegetated Watercourses - Creeks and Channels (LCA A9: Lockyer Creek Vegetated Watercourse LCT B: Vegetated Grazing (LCA B24: Airforce Road Irrigated Croplands) and LCT G: Rural Living (LCA F13: Lockyer National Park Forested Uplands).
Key visual sensitivities	- Low sensitivity of receptors, particularly relatively low number of workers and rural residents of Helidon and Lockyer who travel along Airforce Road and have close views to the rail alignment - The presence of existing infrastructure (West Moreton System rail corridor, power poles and powerlines) reduces the overall sensitivity of this view - This viewpoint it is considered to have a Low sensitivity overall to the change proposed, due to the low number of nearby residential viewers with a specific interest in this view and the relatively low number of travellers along Airforce Road.
Visual Evaluation	
 Photomontage view from Viewpoint 20 Refer to Figure 47: Viewpoint 20: Airforce Road, Helidon, looking west and Visualisation in Appendix 2 for appropriate scaled image.	
Construction	
Magnitude of change assessment	The construction of the Project including the proposed rail alignment, Lockyer Creek viaduct, realignment of Cattos Road and associated earthworks will introduce considerable construction works into the view. This change will be exacerbated by the proximity of isolated rural residences of Helidon and travellers along Airforce Road to the works in this location.

Viewpoint 20: Airforce Road, Helidon, looking west	
	- The proposed location of three laydown areas situated to the west and northwest of this viewpoint for the construction of the Project, including the Lockyer Creek viaduct would cause a reduction in visual amenity from this viewpoint, however this would be temporary. The construction laydown area on Airforce Road will contain site offices. - Due to the dense nature of existing vegetation, the effect of vegetation clearing for the construction of the Project and associated laydown area will be clearly evident - Earthworks associated with the Project will require material to be brought in - The key impacts will relate to the removal of vegetation, presence of construction plant and disturbance due to the construction of the rail alignment, Lockyer Creek viaduct, proposed retaining walls and embankments - Construction works will be highly evident in this location due to the proximity of this viewpoint and nearby isolated rural residential properties to the Project, proposed laydown areas, as well as the extensive clearance of vegetation required. This represents a High magnitude of change.
Significance of effect (construction)	The effect of the Project on Viewpoint 20 during construction is considered to be Moderate.
Operation	
Magnitude of change assessment - permanent infrastructure	- The nearest section of the Project is approximately 6 m to the south of this viewpoint - The magnitude of change on this receptor is anticipated to be dominant due to the following factors: - Dominant change due to the provision of new rail infrastructure on a reinforced soil structure with concrete panel facing units with a maximum height of 5.5 m (approximately 5 m to the south of Airforce Road) and embankment and the Lockyer Creek viaduct (506 m) into what is currently a relatively intact rural environment (noting that the Lockyer Creek viaduct is somewhat obscured from this view, however it is anticipated that it will be more evident in views from nearby rural residential properties and further along Airforce Road) - Due to the dense nature of existing vegetation, the effect of vegetation clearing will be clearly evident and will open up views towards the Project - A concrete barrier is to be provided adjacent Airforce Road - Fencing is to be provided for the extent of the rail corridor, typically located on the corridor boundary. Fencing is to extend between the corridor and private land adjoining the railway. Adjacent Airforce Road, rural chain wire fencing is proposed, while standard rural fencing is proposed and will be in keeping with the existing rural character. - At this distance, the Project will be clearly evident and will change the fundamental visual character of the landscape, as it will be introducing new rail infrastructure on high structure into what is a relatively intact rural environment (with the exception of the existing railway at grade and predominately screened by vegetation) in close proximity to existing isolated rural residential properties who will have open views towards the Project and adjacent Airforce Road. This represents a High magnitude of change.
Magnitude of change assessment – Train	Movement of double stacked freight trains up to 1800 m long with a height of 6.50 m will be highly evident due to the open views of the elevated railway track from this viewpoint. Close views to the Project will be possible for nearby isolated rural residents however these views will be experienced by a low number of residents and are of transient nature. Therefore, the magnitude of change is considered to be Moderate.

Viewpoint 20: Airforce Road, Helidon, looking west	
Significance of effect (operation)	The effect of the Project on Viewpoint 20 during operation is considered to be Moderate.

9 Lighting impact assessment

This section considers the impact of Project lighting.

As described in **Section 6: Potential impacts**, construction lighting will only be associated with tunnel portal construction sites, site offices and fuel storage areas and is for safety and security purposes. It may also be used at bridge laydown areas and if provided, with proposed flash butt welding facilities. In terms of operational lighting, the proposed permanent lighting for the Project is associated with security lighting associated with tunnel portal locations, including the intermediate tunnel ventilation shaft location and the provision of standard road lighting associated with the Gowrie Junction Road bridge. There would also be transient lighting associated with the train headlight as the train passes through the landscape.

9.1 Lighting assessment

The viewpoints listed below are expected to be impacted by either construction or operational lighting, or both, the impacts of which have been assessed in **Table 49** to **Table 67**.

- Viewpoint 1 (construction and operation)
- Viewpoint 2 (construction and operation)
- Viewpoint 3 (construction and operation)
- Viewpoint 4 (construction and operation)
- Viewpoint 5 (construction and operation)
- Viewpoint 6 (construction and operation)
- Viewpoint 7 (construction and operation)
- Viewpoint 8 (construction and operation)
- Viewpoint 9 (construction and operation)
- Viewpoint 10 (construction and operation)
- Viewpoint 11 (construction and operation)
- Viewpoint 12 (construction and operation)
- Viewpoint 13 (construction and operation)
- Viewpoint 14 (construction and operation)
- Viewpoint 15 (construction and operation)
- Viewpoint 16 (construction and operation)
- Viewpoint 17 (construction and operation)
- Viewpoint 18 (construction and operation)
- Viewpoint 19 (construction and operation)
- Viewpoint 20 (construction and operation)

9.1.1 Viewpoint 1

Table 49: Likely visual effect of the Project lighting on Viewpoint 1

Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. There will be residential receptors in this location at night with elevated views towards the Project, and the residents of Gowrie Mountain would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night. However, the major laydown area including satellite offices and fuel storage on Leeson Road and the provision of two potential flash butt welding facilities near Draper Road and Paulsens Road for the construction of this Project and the adjoining B2G project (visible within this view) would be lit with security lighting - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 1 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the transient nature of impacts associated with train headlights and distance of sensitive receptors from the alignment in this location, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 1 during operation is considered to be up to Low (as the train passes), noting that the impact is transient.

9.1.2 Viewpoint 2

Table 50: Likely visual effect of the Project lighting on Viewpoint 2

Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. While it is unlikely that there would be receptors in this location at night, this view is also representative of elevated views towards the Project from nearby residents of Hilltop Drive and Koala Drive, who would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	During construction, tunnel construction activities will occur 24 hours a day, 7 days a week

Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	
	- Several laydown areas will be visible within this view, including the tunnel construction site. While not visible within this view, it is considered likely that nearby residential properties would have views to the proposed location of a potential flash butt welding facility near Paulsens Road. These construction laydown areas would be lit with security lighting. - The current light levels are assumed to be 'predominately dark' and it is assumed that, the levels would be up to 'predominantly lit' representing a Low magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 2 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- Permanent standard road lighting will be required for the Gowrie Junction Road bridge, and traffic passing over the bridge will also introduce additional transient light due to vehicle headlights which will be evident to elevated residential properties in the vicinity of Hilltop Drive - Permanent lighting associated with the western tunnel portal and the Toowoomba Range tunnel control centre, ventilation building, and associated infrastructure will be visible in this view, however it is noted that proposed infrastructure and associated permanent lighting is situated within cut on the approach to the tunnel portal - There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - The current light levels are assumed to be 'predominately dark' and it is assumed that due to this distance of this viewpoint from the light sources, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 2 during operation is considered to be Low.

9.1.3 Viewpoint 3

Table 51: Likely visual effect of the Project lighting on Viewpoint 3

Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low as described for daytime assessment. There will be residential receptors in this location at night with distant views towards the Project, and the residents of Charlton Pinch Road would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- The construction of the Project and the location of several laydown areas and potential locations of a flash butt welding facilities will result in extensive disturbance in the landscape, however due to the distance of this viewpoint from the Project and undulating foreground topography, views towards construction activities will be limited - Distant views to several laydown areas and potential flash butt welding facilities will be visible within this view. These construction laydown areas would be lit with security lighting.

Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	
	- Due to the distance of this viewpoint from the Project and undulating foreground topography, views towards lighting associated with construction activities will be limited - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 3 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint. - Due to the distance of this viewpoint from the Project and presence of the Warrego Highway and associated road lighting in the foreground, it is anticipated that any short-term impacts due to the headlight on the passing freight train (which would last for a duration of up to 2.5 minutes) would be barely perceptible. It is therefore considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 3 during operation is considered to be up to Negligible (as the train passes), noting that the impact is transient.

9.1.4 Viewpoint 4

Table 52: Likely visual effect of the Project lighting on Viewpoint 4

Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. There will be residential receptors in this location at night with close views towards the Project, and the residents of Paulsens Road, Morris Road, McMahon Road, Junction Street and Krienke Road would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night, however, the bridge construction laydown areas within this view would be lit with security lighting - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 4 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- There is currently a singular permanent streetlight situated immediately to the right-hand side of this view - Permanent standard road lighting will be required for the Gowrie Junction Road bridge, and traffic passing over the bridge will also introduce additional transient light due to vehicle headlights which will be highly evident to residential properties situated in close proximity to the Gowrie Junction Road bridge

Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	
	• There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes • Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass • This would, at worst, change a 'predominately dark' landscape into a 'predominantly lit' landscape representing a noticeable change considered to have a Low magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 4 during operation is considered to be Low.

9.1.5 Viewpoint 5

Table 53: Likely visual effect of the Project lighting on Viewpoint 5

Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	• Moderate as described for daytime assessment. There will be residential receptors in this location at night with close views towards the Project, and the residents of Junction Street, who would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	• During construction, tunnel construction activities will occur 24 hours a day, 7 days a week • Several laydown areas will be visible within this view, including the tunnel construction site. These construction laydown areas would be lit with security lighting. • The current light levels are assumed to be 'predominately dark' and it is assumed that, the levels would be up to 'predominantly lit' representing a Low magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 5 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	• Permanent lighting associated with the western tunnel portal and the Toowoomba Range tunnel control centre, ventilation building, and associated infrastructure will be visible in this view, however it is noted that proposed infrastructure and associated permanent lighting is situated within cut on the approach to the tunnel portal • There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes • Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass • The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 5 during operation is considered to be Low.

9.1.6 Viewpoint 6

Table 54: Likely visual effect of the Project lighting on Viewpoint 6

Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. There will be a relatively high number of residential receptors in this location at night with views towards the Project and Gowrie Junction Road bridge – residents of Gowrie would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night, however, the bridge construction laydown areas within this view would be lit with security lighting - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 6 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- The intersection of Old Homebush Road, Gowrie-Birnam Road and Gowrie-Lilyvale Road is currently lit with permanent street lighting - Permanent standard road lighting will be required for the Gowrie Junction Road bridge, and traffic passing over the bridge will also introduce additional transient light due to vehicle headlights - There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - This would, at worst, change a 'predominately dark' landscape into a 'predominantly lit' landscape representing a noticeable change considered to have a Low magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 6 during operation is considered to be Low.

9.1.7 Viewpoint 7

Table 55: Likely visual effect of the Project lighting on Viewpoint 7

Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low as described for daytime assessment. Receptors in this location at night with close views towards the Project will be limited to isolated rural receptors.
Construction	
Magnitude of change assessment (construction)	During construction, tunnel construction activities will occur 24 hours a day, 7 days a week

Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	
	- Several laydown areas will be visible within this view, including the tunnel construction site. These construction laydown areas would be lit with security lighting. - The current light levels are assumed to be 'predominately dark' and it is assumed that, due to the close proximity of this viewpoint to the tunnel construction site the levels would be up to 'brightly lit' representing a Moderate magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 7 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- Permanent lighting associated with the western tunnel portal and the Toowoomba Range tunnel control centre, ventilation building and associated infrastructure will be visible in this view, however it is noted that proposed infrastructure and associated permanent lighting is situated within cut on the approach to the tunnel portal - There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - The current light levels are assumed to be 'predominately dark' and it is assumed that, due to the close proximity of this viewpoint to the tunnel portal, with careful planning, the levels would be up to 'predominantly lit' representing a Low magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 7 during operation is considered to be Negligible.

9.1.8 Viewpoint 8

Table 56: Likely visual effect of the Project lighting on Viewpoint 8

Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. Travellers passing along Boundary Street and the Toowoomba Bypass at night, whose interest in the transient views obtained at night is expected to be very low, even compared to daytime interest.
Construction	
Magnitude of change assessment (construction)	- During construction, tunnel construction activities will occur 24 hours a day, 7 days a week - Several laydown areas will be visible within this view, including the tunnel construction site. These construction laydown areas would be lit with security lighting. - The current light levels are assumed to be 'predominately dark' and it is assumed that, due to the close proximity of this viewpoint to the tunnel construction site the levels would be up to 'brightly lit' representing a Moderate magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 8 during construction is considered to be Moderate.

Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	
Operation	
Magnitude of change assessment (operation)	- Permanent lighting associated with the western tunnel portal and the Toowoomba Range tunnel control centre, ventilation building, and associated infrastructure will be visible in this view, however it is noted that proposed infrastructure and associated permanent lighting is situated within cut on the approach to the tunnel portal - There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - The current light levels are assumed to be 'predominately dark' and it is assumed that, due to the close proximity of this viewpoint to the tunnel portal, with careful planning, the levels would be up to 'predominantly lit' representing a Low magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 8 during operation is considered to be Low.

9.1.9 Viewpoint 9

Table 57: Likely visual effect of the Project lighting on Viewpoint 9

Viewpoint 9: Phoenix Street, Highfields looking southwest	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. There will be a high number of residential receptors in this location at night with distant elevated views towards the Project, and the residents of Highfields would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- During construction, tunnel construction activities will occur 24 hours a day, 7 days a week - Several laydown areas will be visible within this view, including the tunnel construction site. These construction laydown areas would be lit with security lighting. - The current light levels are assumed to be 'predominately dark' and it is assumed that, due to this distance of receptors in this location from the Project, the levels would remain 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 9 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- Permanent lighting associated with the western tunnel portal and the Toowoomba Range tunnel control centre, ventilation building, and associated infrastructure will be visible in this view, however it is noted that proposed infrastructure and associated permanent lighting is situated within cut on the approach to the tunnel portal - There would also be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes

Viewpoint 9: Phoenix Street, Highfields looking southwest	
	- Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - The current light levels are assumed to be 'predominately dark' and it is assumed that due to this distance of this viewpoint from the light sources, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 9 during operation is considered to be Low.

9.1.10 Viewpoint 10

Table 58: Likely visual effect of the Project lighting on Viewpoint 10

Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low as described for daytime assessment. Receptors in this location at night with close views towards the Project will be limited to isolated rural receptors and travellers passing along Goombungee Road at night, whose interest in the transient views obtained at night is expected to be very low, even compared to daytime interest.
Construction	
Magnitude of change assessment (construction)	- During construction, tunnel construction activities will occur 24 hours a day, 7 days a week - The intermediate ventilation shaft construction site will be visible within this view, including the tunnel construction site, which will be lit with security lighting - The current light levels are assumed to be 'predominately lit' and it is assumed that, the levels would remain 'predominantly lit' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 10 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment (operation)	- Existing permanent road lighting associated with the Toowoomba Bypass Mort Street Interchange is visible in this view - In addition to this, there is also existing site security lighting associated with the Toowoomba Christian Fellowship, Toowoomba Waste Management Centre (landfill), Wetalla Sewage Treatment Plant and industrial buildings in this area - Lighting associated with residential properties within Toowoomba and the Baillie Henderson Hospital are visible in this view - Permanent lighting associated with the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure will be visible in this view; however it will blend somewhat into the existing setting - The current light levels are assumed to be 'predominately lit' and it is assumed that, with careful planning, the levels would remain up to 'predominantly lit' representing a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 10 during operation is considered to be Negligible.

9.1.11 Viewpoint 11

Table 59: Likely visual effect of the Project lighting on Viewpoint 11

Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. Relatively high number of receptors in this location at night with elevated views towards the Project, particularly visitors, staff and patients of the Baillie Henderson Hospital.
Construction	
Magnitude of change assessment (construction)	- During construction, tunnel construction activities will occur 24 hours a day, 7 days a week - The intermediate ventilation shaft construction site will be visible within this view, including the tunnel construction site, which will be lit with security lighting - The current light levels are assumed to be 'predominately lit' and it is assumed that, the levels would remain 'predominantly lit' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 11 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- Existing permanent road lighting associated with the Toowoomba Bypass Mort Street Interchange is visible in this view - In addition to this, there is also existing site security lighting associated with the Toowoomba Waste Management Centre (landfill), the Wetalla Sewage Treatment Plant and industrial buildings in this area - Lighting associated with residential properties within Highfields and Cranley are visible in this view - Permanent lighting associated with the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure will be visible in this view; however it will blend somewhat into the existing setting - The current light levels are assumed to be 'predominately lit' and it is assumed that, with careful planning, the levels would remain up to 'predominantly lit' representing a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 11 during operation is considered to be Low.

9.1.12 Viewpoint 12

Table 60: Likely visual effect of the Project lighting on Viewpoint 12

Viewpoint 12: Looking northeast from Hermitage Road, Cranley	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low as described for daytime assessment. While it is unlikely that there would be receptors in this location at night, this view is also representative of views from the Toowoomba Bypass at night, whose interest in the transient views obtained at night is expected to be very low, even compared to daytime interest.

Viewpoint 12: Looking northeast from Hermitage Road, Cranley	
Construction	
Magnitude of change assessment (construction)	- During construction, tunnel construction activities will occur 24 hours a day, 7 days a week - The intermediate ventilation shaft construction site will be visible within this view, including the tunnel construction site, which will be lit with security lighting - The current light levels are assumed to be 'predominately lit' and it is assumed that, the levels would remain 'predominantly lit' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 12 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment (operation)	- Existing permanent road lighting associated with the Toowoomba Bypass-Mort Street Interchange is visible in this view - In addition to this, there is also existing site security lighting associated with the Toowoomba Waste Management Centre (landfill), the Wetalla Sewage Treatment Plant and industrial buildings in this area - Lighting associated with residential properties within Highfields and Cranley are visible in this view - Permanent lighting associated with the Toowoomba Range tunnel intermediate ventilation shaft location and associated infrastructure will be visible in this view; however it will blend somewhat into the existing setting - The current light levels are assumed to be 'predominately lit' and it is assumed that, with careful planning, the levels would remain up to 'predominantly lit' representing a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 12 during operation is considered to be Negligible.

9.1.13 Viewpoint 13

Table 61: Likely visual effect of the Project lighting on Viewpoint 13

Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	High as described for daytime assessment. There will be a relatively high number of residential receptors in this location at night with views towards the Project– residents of Blue Mountain Heights would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night. However, the bridge construction laydown areas within this view would be lit with security lighting. - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 13 during construction is considered to be Low.

Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the transient nature of impacts associated with train headlights and distance of sensitive receptors from the alignment in this location, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 13 during operation is considered to be up to Low (as the train passes), noting that the impact is transient.

9.1.14 Viewpoint 14

Table 62: Likely visual effect of the Project lighting on Viewpoint 14

Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	High as described for daytime assessment. While it is considered unlikely that people will be accessing Katoomba Point Lookout at night, this view is also representative of views from nearby residents of Prince Henry Heights with elevated views over the Project.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night. However, the bridge construction laydown areas within this view would be lit with security lighting. - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 14 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - Due to the transient nature of impacts associated with train headlights and distance of sensitive receptors from the alignment in this location, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 14 during operation is considered to be up to Low (as the train passes), noting that the impact is transient.

9.1.15 Viewpoint 15

Table 63: Likely visual effect of the Project lighting on Viewpoint 15

Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	High as described for daytime assessment. While it is considered unlikely that people will be accessing Picnic Point Lookout at night, this view is also representative of views from nearby residents of East Toowoomba and Rangeville with elevated views over the Project.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night, however, the bridge construction laydown areas within this view would be lit with security lighting - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 15 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - Due to the transient nature of impacts associated with train headlights and distance of sensitive receptors from the alignment in this location, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 15 during operation is considered to be up to Low (as the train passes), noting that the impact is transient.

9.1.16 Viewpoint 16

Table 64: Likely visual effect of the Project lighting on Viewpoint 16

Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low sensitivity at night. Receptors in this location at night with close views towards the Project will be limited to isolated rural receptors.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night, however, the bridge construction laydown areas within this view would be lit with security lighting - The current light levels are assumed to be 'intrinsically dark' and it is assumed that, the levels would be up to 'predominantly dark' representing a Low magnitude of change.

Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 16 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - Due to the transient nature of impacts associated with train headlights, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 16 during operation is considered to be up to Negligible (as the train passes), noting that the impact is transient.

9.1.17 Viewpoint 17

Table 65: Likely visual effect of the Project lighting on Viewpoint 17

Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. However, somewhat fewer receptors are anticipated in this location at night as compared to the daytime view. Although travellers will still be passing along the Warrego Highway at night, their interest in the transient views obtained is expected to be low, even compared to daytime interest.
Construction	
Magnitude of change assessment (construction)	- During construction, it is anticipated that minimal works will be undertaken at night, however, the bridge construction laydown areas within this view would be lit with security lighting - The current light levels are assumed to be 'intrinsically dark' and it is assumed that, the levels would be up to 'predominantly dark' representing a Low magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 17 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the transient nature of impacts associated with train headlights, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 17 during operation is considered to be up to Low (as the train passes), noting that the impact is transient.

9.1.18 Viewpoint 18

Table 66: Likely visual effect of the Project lighting on Viewpoint 18

Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Moderate as described for daytime assessment. Travellers passing along Murphys Creek Road and the Toowoomba Bypass at night, whose interest in the transient views obtained at night is expected to be very low, even compared to daytime interest.
Construction	
Magnitude of change assessment (construction)	- Several bridge construction laydown areas will be visible within this view. These construction laydown areas would be lit with security lighting. - The current light levels are assumed to be 'intrinsically dark' and it is assumed that, with careful planning, the levels would remain up to 'intrinsically dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 18 during construction is considered to be Low.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the provision of a crossing loop in this location, there may also be short-term impacts associated with the headlight of stationary trains utilising the crossing loop while other trains pass - It is therefore considered that the impact would result in, at most, a Low magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 18 during operation is considered to be up to Low (as the train passes or a train is stationary in the crossing loop), noting that the impact is typically transient.

9.1.19 Viewpoint 19

Table 67: Likely visual effect of the Project lighting on Viewpoint 19

Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low as described for daytime assessment. There will be isolated rural residential receptors in this location at night with close views towards the Project, in particular residents of Ashlands Drive, who would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- This viewpoint is in close proximity to a bridge construction laydown area will be possible from this location, which would be lit with security lighting - However, it is anticipated that these views would be predominately screened by existing vegetation, and that no construction lighting will be associated with the general construction laydown area immediately to the north of the property shown within this view

Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	
	The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 19 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the transient nature of impacts associated with train headlights, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 19 during operation is considered to be up to Negligible (as the train passes), noting that the impact is transient.

9.1.20 Viewpoint 20

Table 68: Likely visual effect of the Project lighting on Viewpoint 20

Viewpoint 20: Airforce Road, Helidon, looking west	
Lighting Assessment	
Visual Evaluation	
Sensitivity assessment	Low as described for daytime assessment. There will be isolated rural residential receptors in this location at night with close views towards the Project, in particular residents of Airforce Road, Helidon Dip Road and Cattos Road, who would be the key night-time viewers.
Construction	
Magnitude of change assessment (construction)	- This viewpoint is in close proximity to three laydown areas including a site office (on Airforce Road) and two bridge construction laydown areas situated on Cattos Road, however views to these laydown areas which would be lit with security lighting will be somewhat limited from this location. It is anticipated that views to construction lighting would however be possible from nearby isolated rural residential properties. - The current light levels are assumed to be 'predominately dark' and it is assumed that, with careful planning, the levels would remain up to 'predominantly dark' representing a Negligible magnitude of change.
Significance of effect (construction)	The effect of the Project lighting on Viewpoint 20 during construction is considered to be Negligible.
Operation	
Magnitude of change assessment (operation)	- No permanent lighting near this viewpoint - There would be short-term impacts due to the headlight on the passing freight train which would last for a duration of up to 2.5 minutes - Due to the transient nature of impacts associated with train headlights, it is considered that the impact would result in a Negligible magnitude of change.
Significance of effect (operation)	The effect of the Project lighting on Viewpoint 20 during operation is considered to be up to Negligible (as the train passes), noting that the impact is transient.

10 Cumulative impacts

Cumulative impacts are those that result from the successive, incremental and or combined effects of an action, project or activity when added to other existing, planned and or reasonably anticipated future ones (World Bank International Finance Corporation, 2013).

10.1 Cumulative LVIA methodology

The aim of the cumulative LVIA, is to describe and assess the ways in which the Project could have additional impacts when considered in combination with other proposed built developments in the area. For the purposes of cumulative LVIA, the assessment considers if the cumulative impact would be:

- Combined: for example, two or more projects visible from one viewpoint
- Successive: two or more projects visible from one location and with the same view field
- Sequential: developments viewed at different times, for example passing along a road.

The cumulative impact assessment methodology follows a qualitative method based on a three-step process, as follows:

- Identification of proposed developments lying within or around the LVIA study area
- Identification of Area of Influence (AOI) for the landscape and visual assessment, within which it is anticipated that cumulative effects could occur.

Cumulative impact assessment based on the assessment matrix set out in **Table 69** and impact significance assessment matrix set out in **Table 70**.

Table 69: Relevance factors for assessing cumulative impact

Aspect	Relevance Factors		
	Low	Medium	High
Probability of Impact	1	2	3
Duration of Impact	1	2	3
Magnitude/Intensity of Impact	1	2	3
Sensitivity of Receiving Environment	1	2	3

Table 70: Impact significance for assessing cumulative impact

Aspect	Sum of relevance factors	Consequences
Low	1-6	Negative impacts need to be managed by standard environmental management practices. Special approval conditions unlikely to be necessary. Monitoring to be part of general project monitoring program
Medium	7-9	Mitigation measures likely to be necessary and specific management practices to be applied. Specific approval conditions are likely. Targeted monitoring program required, where appropriate.
High	10-12	Alternative actions should be considered and/or mitigation measures applied to demonstrate improvement. Specific approval conditions required, Targeted monitoring program necessary, where appropriate.

10.2 Cumulative impact area and project inclusion

The cumulative LVIA is based on descriptions of other similar scale projects to the extent that such data was publicly available at the time of this assessment. The cumulative situation may change as applications are made or withdrawn.

A provisional review has been conducted to streamline the assessment process to eliminate, or scope out projects, which are anticipated to generate negligible landscape and visual impacts. Due to the potential for sequential impacts, for example when driving through the landscape, a wider AOI than the LVIA study area was considered, extending 50 km (approximately 30 mins drive or more from the Project alignment). Beyond this distance, it is considered that there would be no reasonable expectation of cumulative impact being registered by a viewer.

A number of projects were identified and considered for the cumulative impact assessment but were discounted on the basis of location (distance from the Project) or lack of available information. Projects not included within the LVIA cumulative impact assessment on this basis include:

- Kagaru to Acacia Ridge and Bromelton (part of the Inland Rail Program) – 85 km east of the Project, located close to Jimboomba
- North Star to Border (part of the Inland Rail Program) – 205 km south of the Project, located near Boggabilla, NSW
- Cross River Rail – 90 km east of the Project, within Brisbane CBD

Based on this assessment, the projects that are considered to have potential cumulative landscape and visual impacts are shown on **Figure 13: Cumulative LVIA**. **Table 71** sets out the key criteria for the inclusion of a project. The selected projects are described in **Table 72**.

Table 71: Project inclusion criteria – cumulative impact assessment

No.	Consequences
a)	Have been declared a 'coordinated project' by the Coordinator-General under the SDPWO Act and an EIS is currently being prepared or is complete, or an Initial Advice Statement is available on the QLD Department of State Development, Infrastructure, Local Government and Planning website.
b)	Are currently being assessed under Part 1 of the Chapter 3 of the <i>Environmental Protection Act 1994</i> (Qld) (EP Act), available on the QLD DES website.
c)	May use resources located within the region (including materials, groundwater, road networks or workforces) that are the same as those to be used by the Project.
d)	Could potentially compound residual impacts that the Project may have on environmental or social values.

Table 72: Projects included in the LVIA cumulative impact assessment

Project and Proponent ¹	Location	Description	Project status	Lifespan (years)	Relationship to the Project
Calvert to Kagaru (C2K) (ARTC)	Rail alignment from Calvert to Kagaru, approximately 45 km southeast of the Project	53 km greenfield single-track dual-gauge freight rail line as part of the Inland Rail Program.	Draft EIS being prepared by ARTC	>50 years	Potential overlap of construction finalisation for C2K and commencement of construction for the Project
NSW/QLD Border to Gowrie (B2G) (ARTC)	Rail alignment from NSW/QLD Border to Gowrie	Comprised of approximately 146 km of new dual gauge track and 78 km of upgraded track from the NSW/QLD border, near Yelarbon, to Gowrie, northwest of Toowoomba in QLD.	Draft EIS being prepared by ARTC	>50 years	Potential overlap on construction commencement for B2G and finalisation of construction for the Project. The projects adjoin west of Gowrie (and LVIA study areas overlap) so there is the potential for cumulative landscape and visual effects.
Helidon to Calvert (H2C) (ARTC)	Rail alignment from Helidon to Calvert	53 km of new dual gauge rail corridor approximately 60 m wide, containing a single-track dual gauge railway line with up to four crossing loops. Ancillary works including road and public utility crossings and alignments.	Draft EIS being prepared by ARTC	>50 years	Potential overlap on construction commencement for H2C and finalisation of construction for the Project. The projects adjoin in the Helidon area (and LVIA study areas overlap) so there is the potential for cumulative landscape and visual effects.
Asterion Medicinal Cannabis Facility	Wellcamp	The Asterion Medicinal Cannabis Facility is a high-tech medicinal cannabis cultivation, research and manufacturing facility. The project covers 51 hectares and involves construction of a 40 hectare glasshouse. It is located immediately to the east of Project rail alignment and west of the Wellcamp Business Park.	DA recently approved by TRC	2020-2021	Southwest of the Project rail alignment and west of the Wellcamp Business Park. Potential for combined, successive and sequential visual impacts during operation

Project and Proponent¹	Location	Description	Project status	Lifespan (years)	Relationship to the Project
Yarranlea Solar (Risen Energy)	Yarranlea	Yarranlea Solar Farm will be developed in four stages on up to 250 ha approximately 50 km west of Toowoomba. Once completed the project will have a generation capacity of up to 100 MW.	Under construction	Ongoing	Around 40 km to the southwest of the Project
Defence Housing Australia (DHA) Mount Lofty Development (DHA)	Mount Lofty	DA for the development of 342 residential lots, sized from 400 m ² to 4,000 m ² , on a 52 ha section of the former rifle range site (379 ha) at Mount Lofty.	DA Lodged 2018 (development on hold)	Unknown	Around 1.7 km to the south of the Project
Pittsworth Industrial Precinct Enabling Project (TRC/ Queensland Government)	Pittsworth	New road and sewerage infrastructure at Pittsworth Industrial Precinct to open up industrial land for industries servicing agriculture and the wider region.	Under construction	Ongoing	Around 34 km to the southwest of the Project
Toowoomba Wellcamp Airport (Wagners)	Wellcamp, approximately 10 km west of Toowoomba	The airport operates as an international cargo hub connecting Australia's leading primary producers and processors with growing consumer markets across the globe. The airport was constructed over 19 months from 2012 to 2014 and is the first major greenfield public airport development in Australia in over 50 years. (Wagner Corporation, 2021)	Operational with expansion proposed	Ongoing	Around 8.5 km southwest of the Project
Wellcamp Business Park (Wagners)	Wellcamp, approximately 15 km west of Toowoomba	Wellcamp Business Park incorporating Toowoomba Wellcamp Airport is proposed as the business hub of Toowoomba and regional QLD. With an aviation, logistics, transport, corporate and mining services focus	Operational with expansion proposed	Ongoing	Around 7 km southwest of the Project alignment
Witmack Industry Park (FKG Group)	Near Charlton, approximately 10 km west of Toowoomba	Logistics and warehouse park (part of Toowoomba Enterprise Hub)	Operational with expansion proposed	Ongoing	Around 4 km southwest of the Project
Charlton Logistics Park (FKG Group)	Near Charlton, approximately 10 km west of Toowoomba	Logistics and warehouse park (part of Toowoomba Enterprise Hub)	Operational with expansion proposed	Ongoing	Around 3 km south of the Project

Project and Proponent ¹	Location	Description	Project status	Lifespan (years)	Relationship to the Project
InterLinkSQ – Global Logistics Centre (InterLinkSQ)	13 km west of Toowoomba and (located 8 km from Wellcamp International Airport)	200 ha of new transport, logistics and business hubs. Located on the narrow-gauge regional rail network and interstate network. Located to the north of the junction of the Gore and Toowoomba Bypass/Warrego Highways and within easy accessibility of the New England Highway	Yet to commence construction	2017-2037	Adjoins (potentially ties into) the Project at Drapers Road, Gowrie Junction. Ongoing development could require deconfliction of construction resources. There may also be an increase of heavy vehicles using the surrounding highways. Potential for operational visual impacts.
New Acland Coal Mine Stage 3 - New Acland Coal Pty Ltd (New Hope Corporation Limited)	35 km northwest of Toowoomba	Expansion of the existing New Acland open-cut coal mine to up to 7.5 million tonnes per annum.	EIS approved with conditions, December 2014	Sequential development of resource areas expected to extend coal production until 2042	Ongoing development could require deconfliction of construction resources. There may also be an increase of heavy vehicles using the surrounding highways

Table note: ¹ Refer to **Table 71** for project inclusion criteria.

10.3 Cumulative impact assessment

Cumulative impacts to the landscape and visual amenity of the Project will be largely the product of:

- Temporal construction impacts - presence of construction traffic, workforce and machinery operating on adjoining projects at the same time
- Spatial operational impacts - the residual impact of the visibility of infrastructure of identified projects to sensitive receptors and also including as a result of the introduction of additional visual receptors (including residential receptors) into an area and with potential to view the Project.

In terms of temporal (construction) impacts, it appears likely that the C2K, B2G and H2C projects would have some overlap in construction periods. In addition, ongoing growth and expansion of Toowoomba Wellcamp Airport, Wellcamp Business Park, Asterion Medicinal Cannabis Facility, Witmack Industry Park, InterLinkSQ, Charlton Logistics Park and ongoing mining at the New Acland Coal Mine may result in some temporal overlap. Collectively, these projects have the potential to result in the perception of relatively high amounts of construction activity and ongoing views of the movement of heavy vehicles and plant within the AOI.

The areas of Project that are likely to be most affected by the perception of this cumulative construction activity are the Warrego Highway, Toowoomba Bypass, Toowoomba Connection Road, New England Highway, Millmerran-Inglewood Road and the Gore Highway within the LVIA study area, with the greatest activity centred on Toowoomba. As large vehicles on the highways and key roads would not be unexpected from a visual perspective, and the construction impacts are temporary, the consequence of this cumulative impact during construction is considered to be Low.

In terms of the spatial (operational) impacts of other linear transport infrastructure projects, the B2G and H2C projects immediately adjoin the Project (to the west and east, respectively) and the recently constructed Toowoomba Bypass which traverses and is also located very close to many parts of the Project, particularly in the east of the AOI. Consequently, some receptors will experience views of both B2G/G2H or H2C/G2H, but this Project will, in practice, be viewed as a continuous and integrated rail project (Inland Rail). With regards to Toowoomba Bypass some receptors will experience views of both the Project and Toowoomba Bypass which intensifies the impact of linear infrastructure on the landscapes of the LVIA study area, particularly to the east and west of Toowoomba. The tunnelling aspect of the Project minimises this cumulative impact for part of this alignment since the Project will be hidden from view through much of the tunnelled section. Overall, the cumulative impacts of these linear infrastructure projects are considered to be an impact of Medium consequence.

The cumulative impact of the DHA Mount Lofty Development is largely that it will bring additional visual receptors into the elevated landscape along the northeast of Toowoomba and will also potentially affect views from existing residents located in this part of the city. With regards to the other land development projects, InterLinkSQ, Toowoomba Wellcamp Airport, Wellcamp Business Park, Asterion Medicinal Cannabis Facility and the Toowoomba Enterprise Hub (Charlton and Logistics Park and Witmack Industry Park) lie close to the Project. Consequently, there would be potential for combined, successive and sequential impacts from these projects, resulting in the perception of development intensification, particularly in the west of the LVIA study area in the general area around Gowrie Mountain with potential impacts of up to Medium consequence. Other projects including the New Acland Mine, Gatton West Industrial Zone and Yarranlea Solar Park are at greater distance and lie closer to other Inland Rail projects so cumulative impacts are considered less likely.

Mitigation to address these identified cumulative impacts will generally be as described in **Section 11: Mitigation and residual impact assessment** for the Project (and B2G/H2C projects). Localised enhancements, for example buffer planting, may enhance outcomes and minimise localised impacts on particular receptors.

Due to the low level of lighting proposed for the Project, there are not anticipated to be any significant cumulative lighting impacts associated with these projects.

Overall, the cumulative landscape and visual impact assessment in the region is likely to be up to Medium. This is summarised in **Table 73**.

Table 73: Project inclusion criteria – cumulative impact assessment

Residual cumulative landscape and visual impact.	Consequence
Construction impacts associated with increase in views of construction traffic and construction areas	Low
Operation impacts associated with views of combined, successive and sequential views of adjoining projects	(up to) Medium
Impacts of night lighting	Nil

11 Mitigation and residual impact assessment

11.1 Mitigation

This section outlines the initial mitigation measures included in the Project design and identifies proposed mitigation measures to manage predicted environmental impacts in the preconstruction, construction and construction and operational phases of the Project.

11.2 Initial mitigation – design measures

The mitigation measures presented in **Table 74** have been incorporated into the Project design. These design measures have been identified through collaborative development of the design and consideration of environmental constraints and issues, including proximity to sensitive receptors. These design measures are relevant to both the construction and operational phases of the Project. It is also considered that the Project addresses the relevant provisions of ISCA Version 1.2 in relation to Hea-2 Crime Prevention, Dis-5 Light Pollution and Urb-1 Urban Design to a level appropriate to the current design stage.

Table 74: Initial mitigation measures relevant to landscape and visual amenity

Aspect	Initial mitigation measures
Landscape and visual issues	• The horizontal alignment of the Project has avoided direct impacts on nationally or regionally protected landscape areas such as the Lockyer National Park and Lockyer State Forest. • The design has been developed to utilise the existing rail corridor (5.6 km) to protect and minimise land severance and impacts to natural and rural landscapes to the greatest extent possible. • The Project is generally located within the existing protected Gowrie to Grandchester rail corridor, which was protected as a future rail corridor in 2005. • The Project has been aligned to be co-located with existing road infrastructure where possible. • The disturbance footprint defined in Project design has aimed to minimise vegetation clearing extents to that required to construct and operate the works. • The corridor has been accommodated in a tunnel (for around 6.2 km) that will minimise surface impacts and the intrusion of cut and fill on rural, forested and elevated landscapes associated with the Toowoomba Range. • The Project has minimised impacts on areas noted as being of regional landscape significance defined using the regionally significant scenic amenity methodology (ShapingSEQ) through tunnelling through these areas and location at the edge of these areas to the greatest extent possible. • The Project has sought to reduce the extent of impact on watercourses and their landscape setting. • The extent of cut and fill including the height of structures and embankments has been kept to the minimum consistent with required engineering design and requirements for cross-corridor connectivity for people and vehicles. • The Project has been kept away from settlements to the greatest extent possible, albeit noting that complete avoidance is not possible through this settled landscape around the regional centre of Toowoomba.

11.3 Proposed mitigation measures

In order to manage and mitigate impacts, several mitigation measures have been proposed for implementation in future stages of project delivery. These proposed mitigation measures respond to Project specific issues and opportunities, address legislative requirements, accepted government plans, policy and practice.

Table 75 presents these proposed mitigation measures in accordance with the Project phase during which they would be implemented, as follows:

- Detailed design
- Pre-construction
- Construction
- Operation.

These mitigation measures include Project-wide considerations as well as location or issue specific measures in response to impacts identified in the LVIA.

Table 75: Additional mitigation measures relevant to landscape and visual amenity

Delivery phase	Aspect	Proposed mitigation measures
Detailed design	Landscape and visual impacts due to vegetation removal	Clearing extents of visually significant vegetation are further limited, where feasible, to that required to safely construct, operate and maintain the project. Locations include: - Gowrie Creek impacted by construction works associated with Gowrie Junction Road bridge (approximately Ch 2.0 km) - Toowoomba Range and elevated undulating land near Ballard, Withcott and Postmans Ridge (approximately Ch 10.1 km to Ch 25.0 km), in particular with consideration of reducing the impact on the landscape character of LCT G: Forested Uplands and views towards this landscape from the Toowoomba Escarpment. Develop a Reinstatement and Rehabilitation Plan for areas within the disturbance footprint that do not form part of the permanent works (e.g. construction compounds, laydown areas, temporary access tracks etc). The Plan will include and clearly identify: - Location of areas subject to rehabilitation and/or reinstatement/stabilisation, in accordance with the landscape and rehabilitation design developed during detailed design - Objectives and timeframes for rehabilitation and/or reinstatement/stabilisation works (including the biodiversity, vegetation establishment and erosion and sediment control outcomes to be achieved) - Where appropriate, how the objectives align with relevant recovery plans, threat abatement plans, conservation advices or policy guidance for target species in areas identified for rehabilitation. - Details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas, consistent with the agreed objectives. - Rehabilitation requirements such as: - Milling and removal of bitumen pavement, - Removal of any decommissioned culverts, - Tyning and ripping of base and sub-base material, - Application of soil ameliorants, - Topsoiling and/or compost blanket, - Stabilisation and rehabilitation (e.g. planting and or seeding). - Native flora species endemic to the Darling Downs, Toowoomba and Lockyer regions or other suitable species appropriate to the landscape context and nursery/seed stock sources - Consideration for maintenance or performance issues of rehabilitation e.g. vegetation that does not grow and obscure signals or impact the longevity of rail infrastructure - Procedures, timeframes, measurable performance objectives and responsibilities for monitoring the success of rehabilitation and/or reinstatement/stabilisation areas - Corrective actions if the outcomes of rehabilitation and/or reinstatement/stabilisation are not achieved.

Delivery phase	Aspect	Proposed mitigation measures
		A Reinstatement and Rehabilitation Plan must be developed to define post construction maintenance requirements, monitoring requirements and completion criteria for areas defined in the landscape design, including the identification of areas where degraded (eroded), bare and/or unstable (potentially erodible) soils need to be rehabilitated in accordance with the requirements of the DTMR Soil Management Manual (Soil Management Manual) and soil testing parameters and requirements as set out in MRTS16 Appendix.
	Landscape and visual impacts on watercourses	Develop the detailed design to minimise impacts to watercourses, riparian vegetation and in-stream flora and habitats. Particular locations (noting some of these include rail infrastructure already located on viaduct) include Gowrie Creek (LCA A1), Lockyer Creek (LCA A9) and Six Mile Creek (LCA A10).
	Visual impact of rail infrastructure	Infrastructure (such as structures, embankments/cuttings, tunnel portals, tunnel control centre, viaducts and bridges) should be designed following an integrated design process with regard to landscape character and views as identified in the EIS seeking to: • Legacy: Create consistent design treatments along the Inland Rail Program alignment to enhance the overall recognition and legacy of the Inland Rail Program. • Viaducts and bridges: Viaduct and bridge design considers appropriate design principles at key viewpoints, including: ○ Gowrie Junction Road bridge (approximately Ch 2.0 km) ○ Toowoomba Bypass and TSRC and Six Mile Creek viaduct (approximately Ch 15.8 km to Ch 16.9 km) ○ Murphys Creek Road viaduct (approximately Ch 25.6 km to Ch 26.0 km) • Embankments: At locations where embankments are near roads and/or adjoin bridge structures, minimise the extent to which landform (embankments) restricts views or affects views from nearby residences, to the greatest extent possible, including through sensitive stabilisation, revegetation or – where appropriate – screen planting. These locations may include: ○ Draper Road ○ Paulsens Road (approximately Ch 0.6 km to Ch 1.4 km where residential properties are situated to the north of the Project) ○ Adjacent Toowoomba Bypass between Ch 19.6 km and Ch 20.8 km. • Cuttings: Where practical, minimise the extent of cut batters and undertake sensitive design of these to blend them into their landscape setting (for example considering potential for revegetation, rock pitching, etc.). Locations to consider include: ○ The approach to the eastern and western tunnel portals, ○ Cuts within the vegetated and undulating land near Ballard, Withcott and Postmans Ridge (approximately Ch 10.1 km to Ch 22.0 km) that will be visible from a high number of receptors, including elevated scenic lookouts. • Tunnels: Consider cuts on the approach to tunnels as described above and give consideration to the detailed design of tunnel portals and the Toowoomba Range tunnel intermediate ventilation shaft location, including the provision of vegetation to screen views towards proposed infrastructure such as ventilation buildings, particularly the intermediate ventilation building with respect to its rural and industrial landscape context.

Delivery phase	Aspect	Proposed mitigation measures
		• Ventilation buildings: Consider the urban design of the Toowoomba Range tunnel intermediate ventilation shaft location and associated buildings and design them to minimise the visual impact on the adjacent rural landscape and existing industrial area. • Noise barriers: Minimise the use of noise barriers to the greatest extent possible. Where these are or may be required in the future, particularly in towns and urban areas, ensure they are designed sympathetically to their surroundings and consider CPTED and graffiti issues, where appropriate considering the inclusion of community artwork and urban design. This strategy will be applied to any noise barriers required.
	Landscape design treatments	Develop a Project landscape design with landscaping treatments determined with reference to the key landscape characteristics and elements identified in the EIS with particular emphasis on sensitive design that is appropriate to the setting as described below. The Project landscape design will also define appropriate treatments for areas subject to the Reinstatement and Rehabilitation Plan (or equivalent), and comply with the ARTC <i>Engineering (Track & Civil) Code of Practice Section 17 Right of Way Requirements</i>: • Rural and natural landscapes: The landscape design will respect and enhance the rural landscapes. Considerations include: ○ Design of the landscape earthworks and planting to, screen and integrate the railway and associated structures and features, wherever practicable and appropriate to the character and maintenance of desired views. This includes further opportunity for design of targeted planting of buffer/shelter belts adjacent to major earthworks within the rail corridor to the extent consistent with safety. For example, planting strips may be introduced adjacent to significant embankments to reduce visual impact and assist in integrating the landform into the existing landscape setting (which, it is noted, already includes similar shelter belts beside roads and riparian vegetation along watercourses), as described above, and in the following locations: ○ Adjacent to Gowrie Junction Road, Krienke Road, Morris Road, East Paulsens Road and the realigned Old Homebush Road (including adjacent the Gowrie Junction Road bridge), between approximately Ch 1.7 km to Ch 3.2 km to screen views to the Project from residential properties of Gowrie (to both the north and south of the Project). ○ Adjacent private residential properties on Ashlands Drive impacted by clearance associated with laydown area G2H-LDN023.80 ○ The landscape design will seek to enhance the features and qualities that give the landscape its particular characteristic, ensuring the design responds to the natural patterns of the rural or natural landscape, in particular: ○ Appropriate revegetation of disturbed areas between approximately Ch 10.1 km to Ch 25.0 km. ○ Where appropriate consult with local stakeholders and landowners during design (and construction) in order to understand the landscape context and the particular qualities of existing landscapes. • Ecologically sensitive areas: Design to provide opportunities for ecological gain to benefit biodiversity. This includes: ○ Development of diverse planting for ecological gain. ○ Enhancement of landscape corridors and ecological links across the landscape by, where possible, joining or re-joining fragmented areas of habitat.

Delivery phase	Aspect	Proposed mitigation measures
		○ Landscape design and planting to incorporate ecological requirements to benefit the characteristic and visual amenity of local landscapes including revegetation with locally indigenous species. • Heritage landscapes: Through detailed design: ○ Seek to further limit direct impacts or impacts to the setting of identified items of Indigenous, historic or natural heritage significance including non-Indigenous heritage places (comprising local heritage places and other areas of interest as identified in EIS Chapter 18: Cultural heritage) and Indigenous Heritage places (to be identified through the Cultural Heritage Management Plans (CHMPs)). ○ Consider the development of interpretation strategy and wayfinding to assist in the interpretation of visual elements of heritage significance such as old rail lines, bridges, buildings or other items of visual value.
	Visual impacts of lighting	During detailed design, review assessment of the potential for operational light impacts to residents and identify if/where attenuation measures are required.
Preconstruction	Impacts to landscape and visual values	Implement the relevant aspects of the Reinstatement and Rehabilitation Plan and progressively deliver to minimise disturbance to landscape and visual amenity values during and post the pre-construction period. Where feasible and practicable, construction areas including compounds, stockpiles, fuel storage, laydown areas and staff parking to be located outside the tree protection zone as defined in AS4970-2009 Protection of trees on development sites.
Construction and commissioning	Landscape and visual impacts due to vegetation removal	Establish vegetation protection zones and project clearing extents prior to commencement of works to avoid impacts on adjoining vegetation and habitats as far as practicable, with particular consideration to: ○ Vegetation associated with the Toowoomba Range and elevated undulating land near Ballard, Withcott and Postmans Ridge (approximately Ch 10.1 km to Ch 25.0 km), in particular with consideration of reducing the impact on the landscape character of LCT G: Forested Uplands and views towards this landscape from the Toowoomba Escarpment. ○ Vegetation within the footprint of laydown area G2H-LDN023.80 (retention of a buffer adjacent residential properties on Ashlands Drive). Where feasible and practicable, construction areas including compounds, stockpiles, fuel storage, laydown areas and staff parking to be located outside the tree protection zone as defined in AS4970-2009 Protection of trees on development sites.
	Impacts to landscape and visual values	Avoid or minimise locating construction compounds within close proximity to sensitive receptors to provide as much separation as possible. Minimise the height of all stockpiles to the greatest extent possible to reduce their visual impact. Cover stockpiles with temporary vegetative cover (such as mulch, grass seeding/hydro-mulch, soil binder etc). Temporary treatments (such as hoardings and shade-cloth screens) to site compound fencing will be considered to assist in reducing visual impacts of temporary infrastructure and sun glare within close proximity of sensitive receptors. This may include art-based treatments to assist with screening the works from the public and using information boards (or similar) to inform the public about the construction works.
	Lighting impacts of construction activities	Avoid or minimise unavoidable out of hours works (such as the Toowoomba Range tunnel construction) within close proximity to residences and, where construction light impacts are predicted, implement attenuation measures in discussion with potentially affected residents.

Delivery phase	Aspect	Proposed mitigation measures
	Reinstatement/ rehabilitation	Implement the landscape design and the Reinstatement and Rehabilitation Plan including soil rehabilitation, monitoring and testing in accordance with TMR Soil management Manual and MRTS16, until performance criteria are satisfactorily achieved.
Operation	Visual impact of disturbed areas	As required, implement the relevant requirements of the Reinstatement and Rehabilitation Plan, until performance criteria are satisfactorily achieved and incorporate any specific ongoing management requirements into the Inland Rail Operation and Maintenance Management Plan.

11.4 Residual impact assessment

Potential impacts to landscape and visual amenity associated with the Project in the construction and operation phases are outlined in **Table 20** and **Table 21**. These impacts have been subjected to a significance assessment as per the methodology described in Section 4: Methodology.

The initial impact assessment is undertaken on the basis that the design measures (or initial mitigation measures) detailed in **Table 74** have been incorporated into the Project design.

Proposed mitigation measures, described in **Table 75**, were then applied as appropriate to the phase of the Project to reduce the level of potential impact.

The residual risk level of the potential impacts was then reassessed after the proposed mitigation measures were applied. The initial significance levels were compared to the residual significance levels in order to assess the effectiveness of the proposed mitigation measures.

In conclusion, the Project is assessed to have the impacts that are summarised in **Table 76** on landscape and visual values. It is noted that the proposed mitigation measures are anticipated to reduce impacts over time, for example as proposed vegetation matures, screening views of passing trains and integrating built infrastructure into the surrounding landscape.

Table 76: Impact Assessment summary

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
Landscape impacts	Construction/Operation	LCT A: Vegetated Watercourses – Creeks and Channels	Low	Moderate	Low	Low	Negligible
		LCT B: Irrigated Croplands	Low	Low	Negligible	Low	Negligible
		LCT C: Dry Croplands and Pastures	Low	High	Moderate	Moderate	Low
		LCT D: Vegetated Grazing	Low	High	Moderate	High	Moderate
		LCT E: Rural Settlement	Moderate	Moderate	Moderate	Moderate	Moderate
		LCT F: Rural Living	Moderate	Moderate	Moderate	Moderate	Moderate
		LCT G: Forested Uplands	High	High	Major	Moderate	High
		LCT H: Transitional Landscapes	No impact	No impact	No impact	No impact	No impact
Visual impacts	Construction	Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Low	Low	Low	Low
		Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	Moderate	Moderate	Moderate	Moderate

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
		Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Low	Low	Low	Low
		Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	Moderate	Low	Moderate	Low
		Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Low	Low	Low	Low
		Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Low	Low	Low	Low
		Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Moderate	Low	Moderate	Low
		Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Moderate	High	Moderate	High
		Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Moderate	High	Moderate	High
		Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Moderate	High	Moderate	High
		Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	Moderate	Low	Moderate	Low
		Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	High	High	High	High
		Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	High	Moderate	High	Moderate

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
		Viewpoint 20: Airforce Road, Helidon, looking west	Low	High	Moderate	High	Moderate
Visual impacts	Operation	Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Moderate	Moderate	Low	Low
		Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	High	High	High	High
		Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	High	High	Moderate	Moderate
		Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	High	Moderate	Moderate	Low
		Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Moderate	Moderate	Low	Low
		Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Low	Low	Negligible	Negligible
		Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Low	Negligible	Low	Negligible
		Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Low	Low	Low	Low
		Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Moderate	Low	Moderate	Low
		Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Moderate	High	Moderate	High

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
		Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Moderate	High	Moderate	High
		Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Moderate	High	Moderate	High
		Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	High	Moderate	High	Moderate
		Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	High	High	High	High
		Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	High	High	High	High
		Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	High	Moderate	Moderate	Low
		Viewpoint 20: Airforce Road, Helidon, looking west	Low	High	Moderate	High	Moderate
Lighting impacts	Construction	Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Low	Low	Low	Low
		Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	Low	Low	Low	Low
		Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	Moderate	Low	Moderate	Low

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
		Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Negligible	Low	Negligible	Low
		Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Negligible	Low	Negligible	Low
		Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Negligible	Low	Negligible	Low
		Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	Low	Negligible	Low	Negligible
		Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	Low	Low	Moderate	Low
		Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 20: Airforce Road, Helidon, looking west	Low	Negligible	Negligible	Negligible	Negligible

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
Lighting impacts	Operation	Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible	Negligible	No impact	Negligible
		Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	Low	Low	Low	Low
		Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Low	Low	Low	Low
		Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	Low	Negligible	Low	Negligible
		Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Low	Low	Low	Low
		Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Negligible	Low	Negligible	Low
		Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Negligible	Low	Negligible	Low

Aspect	Phase	Landscape Character Type/Viewpoint	Sensitivity	Initial Significance ¹		Residual Significance ²	
				Magnitude	Significance	Magnitude	Significance
		Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Negligible	Low	Negligible	Low
		Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	Low	Low	Low	Low
		Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	Negligible	Negligible	Negligible	Negligible
		Viewpoint 20: Airforce Road, Helidon, looking west	Low	Negligible	Negligible	Negligible	Negligible

Table notes:

¹ Includes implementation of initial mitigation specified in **Table 74**

² Includes implementation of additional mitigations and controls as identified in **Table 75**

12 Conclusions and recommendations

12.1 Summary of landscape impacts

Eight LCTs with associated LCAs were identified through the landscape assessment process. A summary of the overall likely landscape impact anticipated during the construction and operation of the Project for each LCT is presented in **Table 77**.

Table 77: Summary landscape assessment (construction and operation)

Landscape Character Type (LCT)	Landscape Sensitivity	Magnitude of change	Potential Landscape Effect
LCT A: Vegetated Watercourses – Creeks and Channels	Low	Moderate ¹	Low ¹
		Low ²	Negligible ²
LCT B: Irrigated Croplands	Low	Low ^{1,2}	Negligible ^{1,2}
LCT C: Dry Croplands and Pastures	Low	High ¹	Moderate ¹
		Moderate ²	Low ²
LCT D: Vegetated Grazing	Low	High ^{1,2}	Moderate ^{1,2}
LCT E: Rural Settlement	Moderate	Moderate ^{1,2}	Moderate ^{1,2}
LCT F: Rural Living	Moderate	Moderate ^{1,2}	Moderate ^{1,2}
LCT G: Forested Uplands	High	High ¹	Major ¹
		Moderate ²	High ²
LCT H: Transitional Landscapes	No impact	No impact ^{1,2}	No impact ^{1,2}

Table notes:

¹ Initial mitigation only

² Assessment including additional mitigation measures

The landscape impact assessment concludes that the Project is considered likely to result in impacts of up to Major significance on the landscape character and amenity of one LCT, LCT G: Forested Uplands during construction or operation prior to the application of mitigation measures. This relates to the introduction of highly evident viaduct structures, extensive cut and fill, tunnelling and vegetation clearance within the forested landscapes of the Great Dividing Range east of Toowoomba, that are recognised for their high scenic amenity value. Other impacts of up to Moderate significance are anticipated. Measures to manage these impacts are described in **Section 11: Mitigation and residual impact assessment**.

12.2 Summary of visual impacts

Based on desktop analysis (including VAM) and the field survey, 20 representative viewpoints were selected for detailed assessment. A summary of the baseline analysis and overall likely visual impact anticipated during the construction of the Project (as described in **Section 8: Visual impact assessment**) is summarised for each viewpoint in **Table 78**.

Table 78: Summary preliminary visual assessment (construction)

Viewpoint name	Viewpoint Sensitivity	Magnitude of change	Significance
Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Low ^{1 and 2}	Low ^{1 and 2}
Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible ^{1 and 2}	Negligible ^{1 and 2}
Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Low ^{1 and 2}	Low ^{1 and 2}
Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	Moderate ^{1 and 2}	Low ^{1 and 2}
Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Low ^{1 and 2}	Low ^{1 and 2}
Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Negligible ^{1 and 2}	Negligible ^{1 and 2}
Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Low ^{1 and 2}	Low ^{1 and 2}
Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Moderate ^{1 and 2}	Low ^{1 and 2}
Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Moderate ^{1 and 2}	High ^{1 and 2}
Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Moderate ^{1 and 2}	High ^{1 and 2}
Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Moderate ^{1 and 2}	High ^{1 and 2}
Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	Moderate ^{1 and 2}	Low ^{1 and 2}
Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	High ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 20: Airforce Road, Helidon, looking west	Low	High ^{1 and 2}	Moderate ^{1 and 2}

Table notes:

¹ Initial mitigation only

² Assessment including additional mitigation measures

The visual impact assessment concludes that the Project is considered likely to result in visual impacts up to High significance during construction for three viewpoints, Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights, Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights and Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville. Other impacts of up to Moderate significance are anticipated. Measures to manage these impacts are described in **Section 11: Mitigation and residual impact assessment**.

A summary of the overall likely visual impact on the same 20 representative viewpoints during the operation of the Project is summarised in **Table 79**.

Table 79: Summary preliminary visual assessment (operation)

Viewpoint name	Viewpoint Sensitivity	Magnitude of change	Significance
Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Moderate ¹	Moderate ¹
		Low ²	Low ²
Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible ^{1 and 2}	Negligible ^{1 and 2}
Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	High ^{1 and 2}	High ^{1 and 2}
Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	High ¹	High ¹
		Moderate ²	Moderate ²
Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Moderate ^{1 and 2}	Moderate ^{1 and 2}
Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	High ¹	Moderate ¹
		Moderate ²	Low ²
Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Moderate ¹	Moderate ¹
		Low ²	Low ²
Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Low ¹	Low ¹
		Negligible ²	Negligible ²
Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Low ^{1 and 2}	Negligible ^{1 and 2}
Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Low ^{1 and 2}	Low ^{1 and 2}
Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Moderate ^{1 and 2}	Low ^{1 and 2}
Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Moderate ^{1 and 2}	High ^{1 and 2}
Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Moderate ^{1 and 2}	High ^{1 and 2}
Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Moderate ^{1 and 2}	High ^{1 and 2}
Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	High ^{1 and 2}	Moderate ^{1 and 2}

Viewpoint name	Viewpoint Sensitivity	Magnitude of change	Significance
Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	High ^{1 and 2}	High ^{1 and 2}
Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	High ^{1 and 2}	High ^{1 and 2}
Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	High ¹	Moderate ¹
		Moderate ²	Low ²
Viewpoint 20: Airforce Road, Helidon, looking west	Low	High ^{1 and 2}	Moderate ^{1 and 2}

Table notes:

¹ Initial mitigation only

² Assessment including additional mitigation measures

The visual impact assessment concludes the Project is considered likely to result in impacts of High significance on seven representative views during operation, prior to the application of mitigation measures, relating to impacts on Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north. **Section 11: Mitigation and residual impact assessment** describes measures to manage these impacts.

12.3 Summary of lighting impacts

In summary, the qualitative desktop assessment concludes that the proposed Project and associated infrastructure are unlikely to create any significant obtrusive lighting into the external environment as a result of the likely construction activities or permanent Project lighting.

As there is limited permanent Project lighting proposed, many of the viewpoints assessed during the daytime are not anticipated to be affected by night lighting during operation. **Table 80** presents a summary of the baseline analysis and overall likely visual impact anticipated during the construction and operation phases of the Project for each viewpoint at night.

Table 80: Summary lighting assessment (Construction and Operation)

Viewpoint name	Viewpoint Sensitivity	Magnitude of change	Significance
Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast	Moderate	Negligible (construction and operation)	Low ^{1 and 2} (construction and operation)
Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba	Moderate	Low (construction)	Low ^{1 and 2} (construction and operation)
		Negligible (operation)	
Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway	Low	Negligible (construction and operation)	Negligible ^{1 and 2} (construction and operation)
Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge	Moderate	Negligible (construction)	Low ^{1 and 2} (construction and operation)
		Low (operation)	

Viewpoint name	Viewpoint Sensitivity	Magnitude of change	Significance
Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal	Moderate	Low (construction)	Low ^{1 and 2} (construction and operation)
		Negligible (operation)	
Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south	Moderate	Negligible (construction)	Low ^{1 and 2} (construction and operation)
		Low (operation)	
Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal	Low	Moderate (construction)	Low ^{1 and 2} (construction)
		Low (operation)	Negligible ^{1 and 2} (operation)
Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass	Moderate	Moderate (construction)	Moderate ^{1 and 2} (construction)
		Low (operation)	Low ^{1 and 2} (operation)
Viewpoint 9: Phoenix Street, Highfields looking southwest	Moderate	Negligible (construction and operation)	Low ^{1 and 2} (construction and operation)
Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba	Low	Negligible (construction and operation)	Negligible ^{1 and 2} (construction and operation)
Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley	Moderate	Negligible (construction and operation)	Low ^{1 and 2} (construction and operation)
Viewpoint 12: Looking northeast from Hermitage Road, Cranley	Low	Negligible (construction and operation)	Negligible ^{1 and 2} (construction and operation)
Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights	High	Negligible (construction and operation)	Low ^{1 and 2} (construction and operation)
Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights	High	Negligible (construction and operation)	Low ^{1 and 2} (construction and operation)
Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville	High	Negligible (construction and operation)	Low ^{1 and 2} (construction and operation)
Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north	Low	Low (construction)	Negligible ^{1 and 2} (construction only operation)
		Negligible (operation)	
Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west	Moderate	Low (construction)	Low ^{1 and 2} (construction and operation)
		Negligible (operation)	
Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north	Moderate	Negligible (construction)	Low ^{1 and 2} (construction and operation)
		Low (operation)	
Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north	Low	Negligible (construction and operation)	Negligible ^{1 and 2} (construction and operation)

Viewpoint name	Viewpoint Sensitivity	Magnitude of change	Significance
Viewpoint 20: Airforce Road, Helidon, looking west	Low	Negligible (construction and operation)	Negligible ¹ and ² (construction and operation)

Table notes:

¹ Initial mitigation only

² Assessment including additional mitigation measures

The lighting impact assessment concludes that the most significant effect during construction is up to Moderate for Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass. Other impacts of up to Low significance are anticipated.

During operation, the most significant effect is up to Low for thirteen viewpoints - Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast; Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba; Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south; Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass; Viewpoint 9: Phoenix Street, Highfields looking southwest; Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north).

12.4 Impact assessment summary

In conclusion, the Project is assessed to have the following impacts on landscape and visual values.

Table 81: Impact Assessment summary

Impact	Significance
Landscape impacts during construction and operation	Impacts of up to Major significance on one LCT (LCT G: Forested Uplands) Impacts of Moderate significance on four other LCT's (LCT C: Dry Croplands and Pastures, LCT D: Vegetated Grazing, LCT E: Rural Settlement and LCT F: Rural Living)
Visual impacts during construction	Impacts up to High significance for three representative viewpoints (Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; and Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville). Other impacts of up to Moderate significance for eight representative viewpoints (Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba; Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west; Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north; Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north; and Viewpoint 20: Airforce Road, Helidon, looking west).

Impact	Significance
Visual impacts during operation	Impacts up to High significance for seven representative viewpoints (Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west; and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north). Nine other representative viewpoints have impacts of up to Moderate significance (Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast; Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba; Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south; Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal; Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass; Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley; Viewpoint 15: Near 102-114 Jones Road, Ballard, looking north; Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north; and Viewpoint 20: Airforce Road, Helidon, looking west).
Lighting impacts	Up to Moderate significance for one viewpoint during construction (Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass). 13 other viewpoints have impacts of up to Low significance during construction (Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast; Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba; Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south; Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal; Viewpoint 9: Phoenix Street, Highfields looking southwest; Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north). Up to Low significance for 13 viewpoints during operation (Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast; Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba; Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south; Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass; Viewpoint 9: Phoenix Street, Highfields looking southwest; Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west; and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north).
Cumulative impacts during construction	Low consequence
Cumulative impacts during operation	Medium consequence primarily associated with construction traffic on the Warrego Highway due to the simultaneous construction of B2G and H2C projects.
Cumulative impacts of night lighting	Nil

12.5 Conclusions

The landscape between Gowrie and Helidon is highly varied, comprising irrigated agriculture and dry croplands and pastures interspersed with a network of creeks on the Toowoomba plateau, and densely vegetated landscapes associated with the Great Dividing Range and Lockyer National Park. An existing operational West Moreton System rail corridor is present in parts of the LVIA study area, facilitating both freight and passenger rail movements.

The Project would introduce 28 km of rail into the landscape, of which 5.6 km would be along the existing rail corridor.

It is considered that the Project addresses the relevant provisions of Infrastructure Sustainability Council of Australia (ISCA) Version 1.2 in relation to Hea-2 Crime Prevention, Dis-5 Light Pollution and Urb-1 Urban Design to a level appropriate to the current design stage.

The key landscape and visual impacts of the Project relate to the removal of vegetation, the raising of embankments and creation of new rail bridges and viaducts.

Eight LCTs have been identified, of which seven are potentially affected by the Project. Impacts of up to Major significance were identified for one LCT, LCT G: Forested Uplands, associated with the introduction of highly evident viaduct structures, extensive cut and fill, tunnelling and vegetation clearance within the forested landscapes of the Great Dividing Range east of Toowoomba, that are recognised for their high scenic amenity value.

For part of the LVIA study area there are relatively few visual receptors with the landscape comprising isolated homesteads set on large private farms or rural blocks. However, the landscape around Toowoomba is quite densely settled with numerous settlements located within the potential viewshed of the Project including suburbs to the north and east of Toowoomba, Gowrie Mountain, Gowrie, Kingsthorpe, Withcott, Postmans Ridge, Helidon Spa and Helidon. Visual impacts are typically contained by the presence of vegetation, including along creek lines, and localised undulations in landform. Visual impacts are also contained through the use of a tunnel for a significant length of the Project. Elevated and panoramic views over the Project are also available from the edge of Toowoomba and the Forested Uplands associated with the Toowoomba Range, including from scenic lookouts, walking trails within public parks including Jubilee Park, Redwood Park and Picnic Point Parklands and residential properties with views towards the project, as well as from the Toowoomba Bypass.

As part of the visual assessment, 20 representative viewpoints were selected and assessed for both construction and operation phases of the Project. During construction, the greatest visual impact identified was up to High significance, relating to three viewpoints - Viewpoint 13: Keira Court, Blue Mountain Heights looking southeast; Viewpoint 14: Katoomba Point Lookout, Prince Henry Heights looking north; and Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville.

For visual impacts during operation, seven visual impacts of up to High significance were identified. These are associated with Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge; Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal; Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights; Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights; Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville; Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west; and Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north. These impacts relate to elevated views from significant locations over the wider Project and/or viewpoints situated in close proximity to the Project. Other visual impacts during both construction and operation are of lower

significance, typically relating to views experienced by relatively small numbers of homesteads or with a lower magnitude of change to the existing view.

For lighting impacts, the most significant effect during construction is up to Moderate for Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass, the greatest impact identified during operation is up to Low significance for thirteen viewpoints.

Cumulative impacts, particularly the effects in combination with the adjoining B2G and H2C projects have been considered. Cumulative impacts during both construction and operation are considered to be up to Medium consequence, due to the potential for localised areas (particularly the area around Gowrie Mountain in the west of the Project) to be affected by multiple infrastructure and building projects, dependent upon Project phasing. There are no identified cumulative impacts associated with night lighting.

ARTC will develop an Inland Rail Reinstatement and Rehabilitation Management Plan that will include landscape objectives and principles, as well as outline landscape and rehabilitation treatments for various phases of the Inland Rail Program. These will include reference to the mitigation measures described in **Table 75** that will reduce the residual impact for some of the identified effects on landscape and visual values.

13 Glossary

13.1 Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AILA	Australian Institute of Landscape Architects
AOI	Area of Influence
B2G	Border to Gowrie – Inland Rail project from NSW/QLD border to Gowrie
BBS	Brigalow Belt South
C2K	Calvert to Kagaru – Inland Rail project from Calvert to Kagaru
CBD	Central Business District
CPTED	Crime Prevention Through Environmental Design
Cth	Commonwealth
DES	Queensland Government Department of Environment and Science
DTMR	Department of Transport and Main Roads
DUAC	Department of Urban Affairs and Planning
EIS	Environmental Impact Statement
ECW	Enhanced Compression Wavelet (a raster image format used for georeferenced ortho aerial photography)
EPBC Act	Environmental Protection and Biodiversity Conservation Act
ERIN	(Australian Government) Environmental Resources Information Network
FFJV	Future Freight Joint Venture
FOV	Field of View (H FOV is Horizontal Field of View)
GLVIA2 and 3	Guidelines for Landscape and Visual Impact Assessment (second and third editions)
GNLVA	AILA Queensland Guidance Note for Landscape and Visual Assessment
G2H	Gowrie to Helidon – Inland Rail project from Gowrie to Helidon
H2C	Helidon to Calvert – Inland Rail project from Helidon to Calvert
ha	Hectares
IBRA	Interim Biogeographic Regionalisation for Australia
IFC	Industry Foundation Classes
ISCA	Infrastructure Sustainability Council of Australia
km	Kilometres
LCA	Landscape Character Area

Acronym	Definition
LCT	Landscape Character Type
LGA	Local Government Area
LVIA	Landscape and Visual Impact Assessment
LVR	Lockyer Valley Regional Council
m	metres
m ²	Square metres
NSW	New South Wales
NS2B	North Star to Border – Inland Rail project from North Star to NSW/QLD border
OQTA	Outback Queensland Tourism Association
PSC	Pre-Stressed Concrete
QLD	Queensland
QR	Queensland Rail
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i> (Qld)
SEQ	South-east Queensland
SEQRP	South East Queensland Regional Plan 2017 (ShapingSEQ)
SPP	State Planning Policy
SRTM	Shuttle Radar Topography Mission
Subsp	Subspecies
TIN	Triangular Irregular Network
ToR	Terms of Reference
TRC	Toowoomba Regional Council
VAM	Visibility Analysis Mapping
VP	Viewpoint

13.2 Glossary of Assessment Terms

Term	Definition
Amenity	The pleasantness of a place as conveyed by desirable attributes including visual, noise, odour etc.
Artist's impression	An indicative visual representation illustrating the appearance of a proposal. Typically to communicate a concept when photomontages are not available and/or when accuracy cannot be assured.
Character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, and often conveys a distinctive sense of place. This term does not imply a level of value or importance.
Effect	The landscape or visual outcome of a proposed change. It may be the combined result of sensitivity together with the magnitude of the change.
Impact	The categorisation of effects. Legislative context is considered in defining impacts and their significance.
Landscape	Landscape is an all-encompassing term that refers to areas of the earth's surface at various scales. It includes those landscapes that are: urban, rural, and natural; combining bio-physical elements with the cultural overlay of human use and values.
Landscape Character Type	Distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern
Landscape Character Area	These are single unique areas and are the discrete geographical areas of a particular Landscape Character Type.
Magnitude of change	The extent of change that will be experienced by receptors. This change can be adverse or beneficial. Factors that could be considered in assessing magnitude are: the proportion of the view/landscape affected; extent of the area over which the change occurs; the size and scale of the change; the rate and duration of the change; the level of contrast and compatibility.
Mitigation	Measures to avoid, reduce and manage identified potential adverse impacts.
Project	The Inland Rail Gowrie to Helidon Project
Rail alignment	The exact positioning of the track, accurately defined both horizontally and vertically, along which the rail vehicles operate.

Term	Definition
Rail corridor	The corridor within which the rail tracks and associated rail infrastructure are located.
Route	A primary description of the path which a railway or road will follow.
Receptor	A place, route, visual receptor audience or interest group which may require assessment.
Scenic Amenity	A measure of the relative contribution of each place in the landscape to the collective appreciation of open space as viewed from places that are important to the public. (DSDILGP 2007).
Sensitivity	Capacity of a landscape or receptor to change without losing valued attributes.
Study Area	LVIA study area (discipline study area); comprising land within the potential viewshed of and forming the wider landscape context of the Project
Values	Any aspect of landscape or views people consider to be important. Landscape and visual values may be reflected in local, state or federal planning regulations, other published documents or be established through community consultation and engagement, or as professionally assessed.
View	Any sight, prospect or field of vision as seen from a place, and may be wide or narrow, partial or full, pleasant or unattractive, distinctive or nondescript, and may include background, mid ground and/or foreground elements or features.
Viewpoint	The specific location of a view, typically used for assessment purposes.
Viewshed	Areas visible from a particular location (may be modelled or field-validated).
Visual catchment	Areas visible from a combination of locations within a defined setting (may be modelled or field-validated).
Visual receptor audience	Groups of visual receptors with common attributes and sensitivities to changes in views (e.g. residents, golfers, road travellers, walkers, shoppers, beach goers, farmers, recreational users).
Visual absorption capacity	Potential for a landscape or scene to absorb a particular change without a noticeable loss of valued attributes.
Visual amenity	The attractiveness of a scene or view.

Term	Definition
Photomontages/ Visualisations	A visual representation of a proposal from a particular receptor viewpoint, on a photographic base. The methodology for the preparation of any photomontage and its accuracy should be defined.

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APPENDIX

H

Landscape and Visual Impact Assessment

Appendix 1 Plans

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



APPENDIX 1: PLANS

The following plans prepared by FFJV have been used to inform and illustrate this assessment:

Figure 1: Regional context

Figure 2: LVIA study area

Figure 3: Regional scenic amenity and planning designations

Figure 4: Landform and hydrological context

Figure 5: Land use context

Figure 6: Interim Biogeographic Regionalisation Australia

Figure 7: Landscape character assessment

Figure 8: Tourist drives and sensitive receptors

Figure 9: Visual receptors and location of representative viewpoints

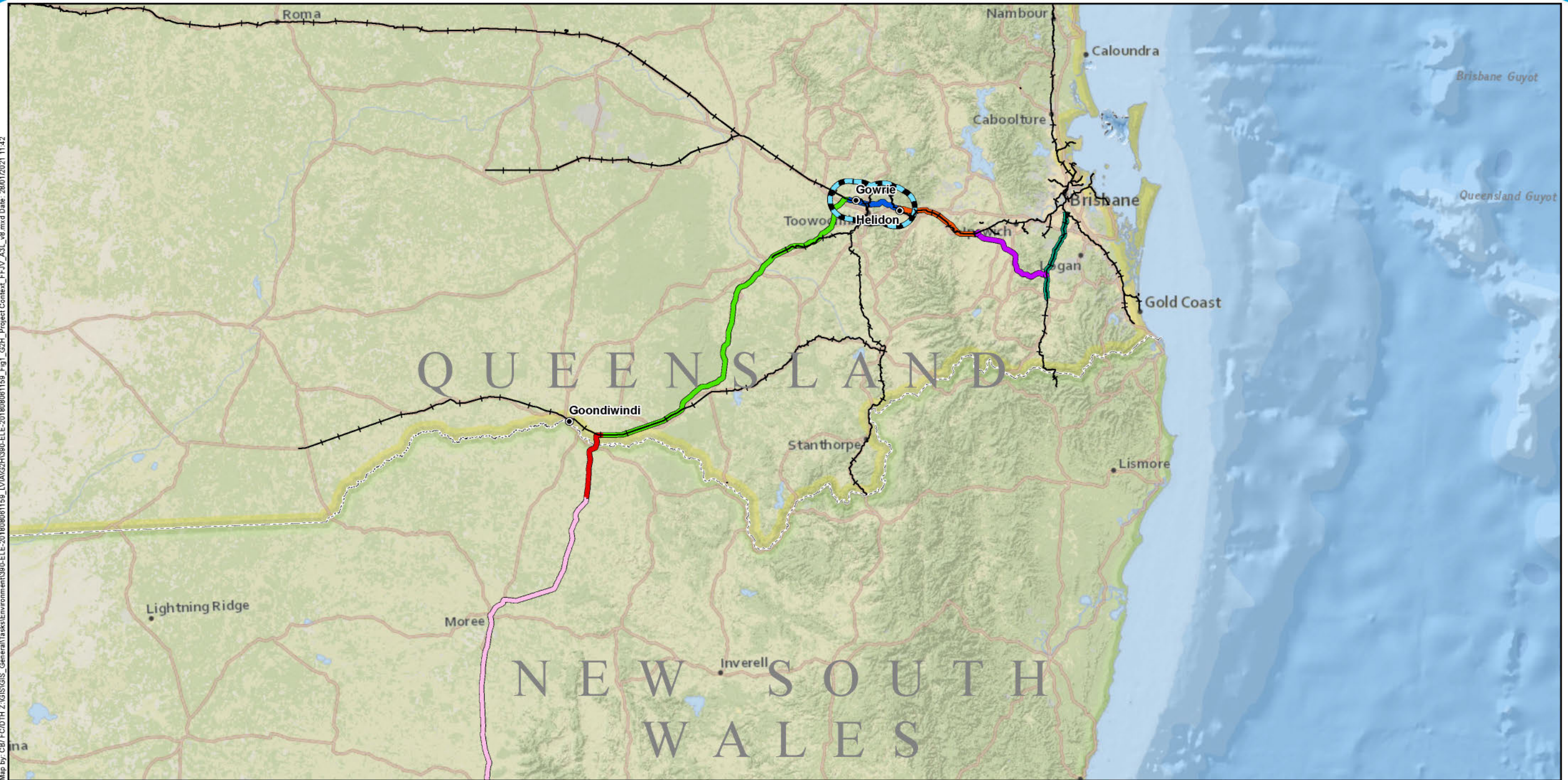
Figure 10: Visibility analysis map – permanent infrastructure

Figure 11: Visibility analysis map – rolling stock

Figure 12: Visibility analysis map – difference

Figure 13: Cumulative LVIA

Map by: CB/FC/DTH Z:\GIS\GIS_General\Tasks\Environment\390-EL-201806061159_LVIA\G2H390-EL-201806061159_Fig1_G2H_ProjectContext_FFJV_A3L_v8.mxd Date: 28/01/2021 11:42



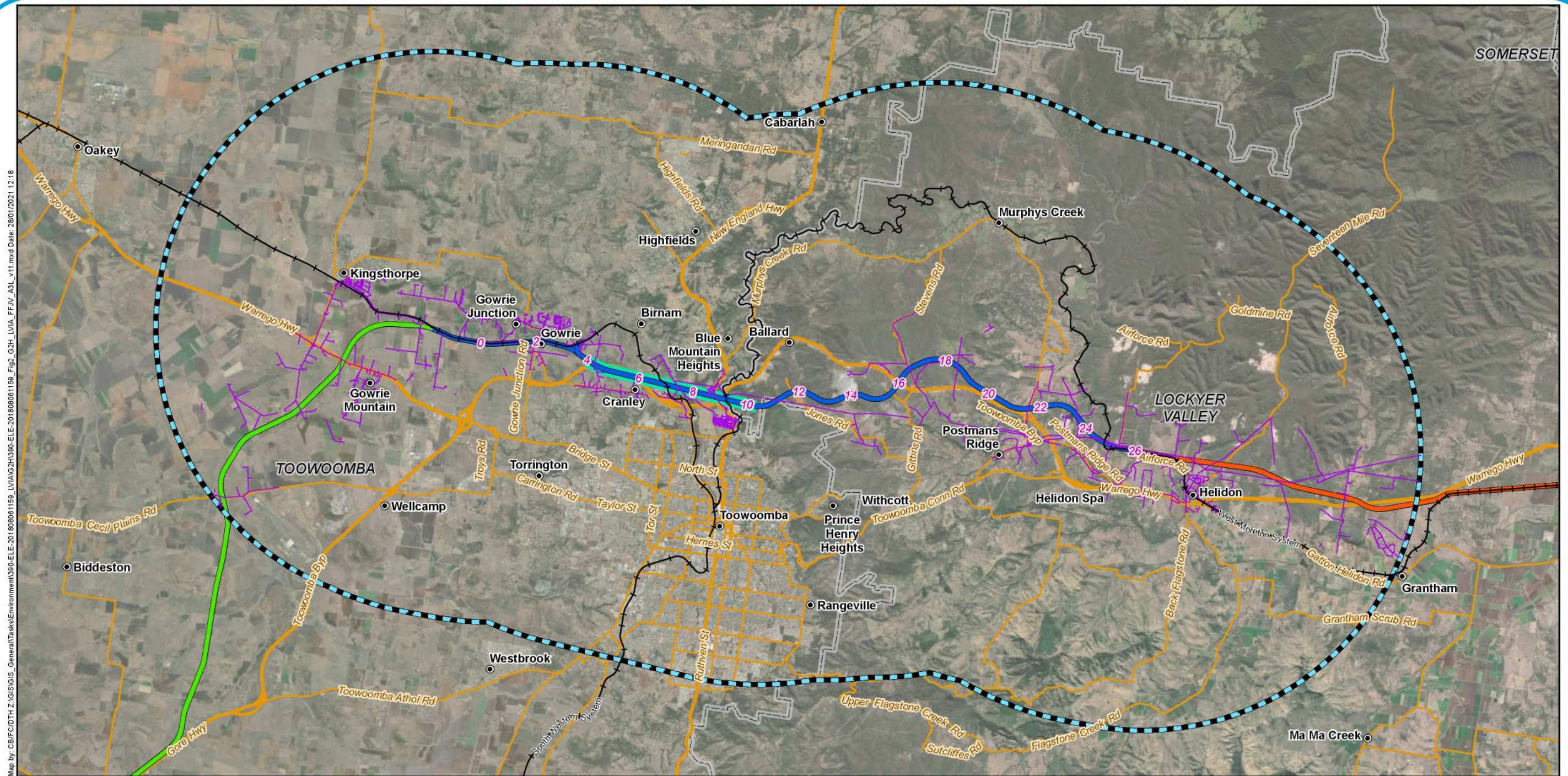
Legend

- Localities
- Existing rail
- Narrabri to North Star project alignment (N2NS)
- North Star to North South Wales/Queensland Border project alignment (NS2B)
- Border to Gowrie project alignment (B2G)
- Gowrie to Helidon project alignment (G2H)
- Helidon to Calvert project alignment (H2C)
- Calvert to Kagaru project alignment (C2K)
- Kagaru to Acacia Ridge / Bromelton project alignment (K2ARB)
- NSW/QLD border
- ▨ LVIA Study Area (10 km from rail alignment)



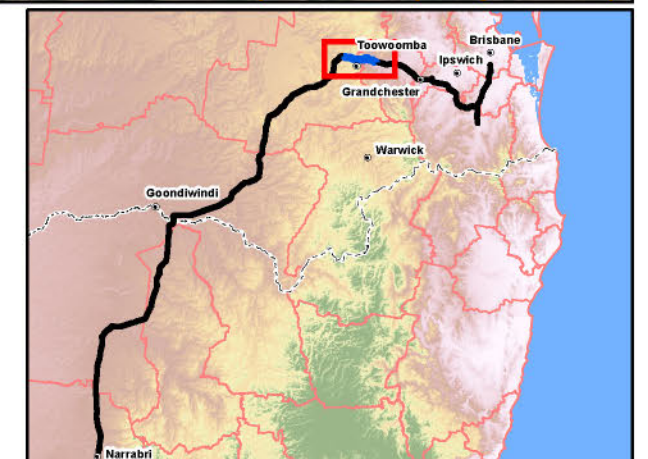
A3 scale: 1:2,250,000





Legend

- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- Powerlines (within 2km of the alignment)
- LVIA Study Area (10 km from rail alignment)
- Existing rail
- Major roads
- Minor roads
- Local Government Areas



A3 scale: 1:150,000
0 1 2 3 4 5 km

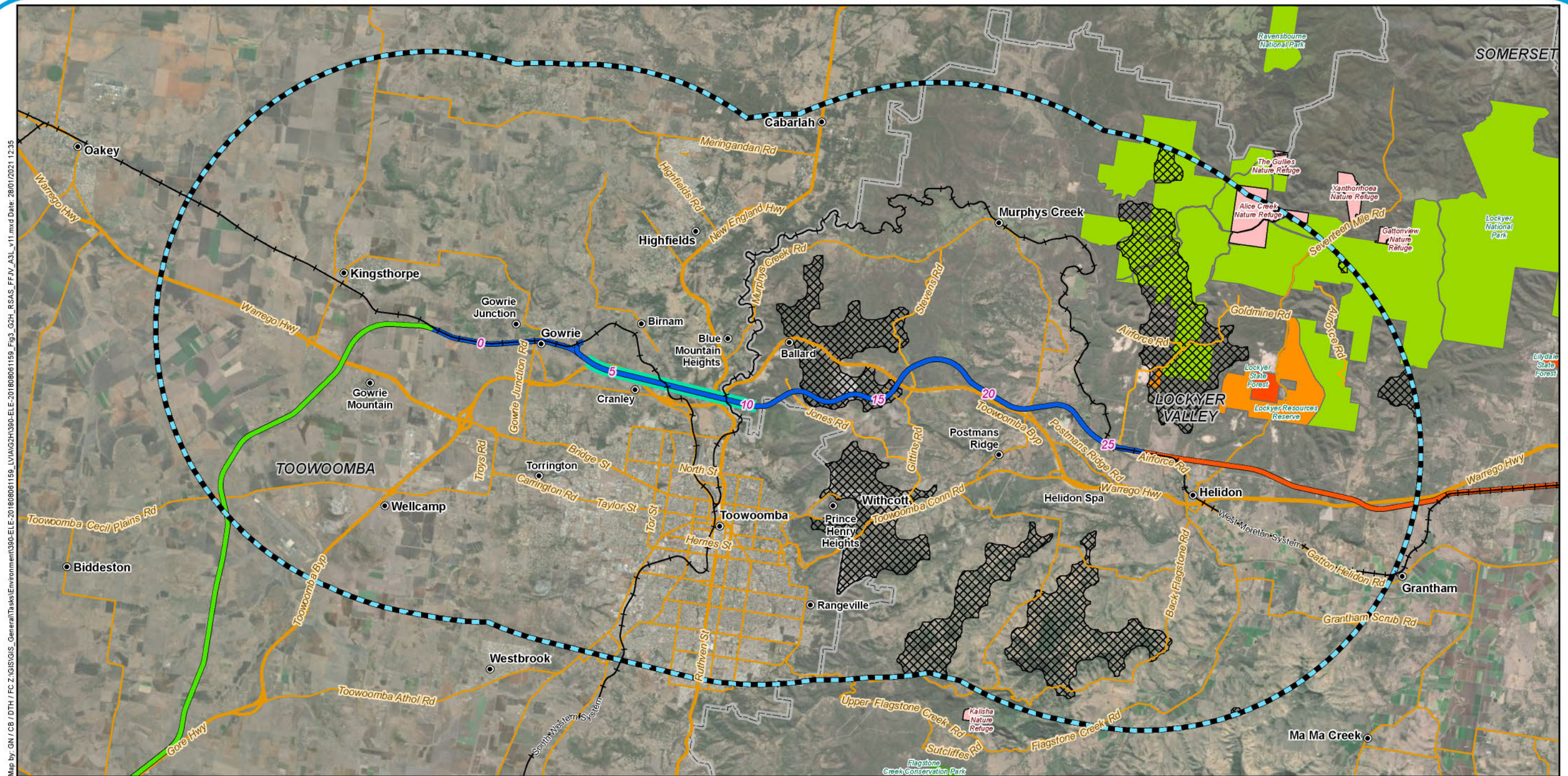


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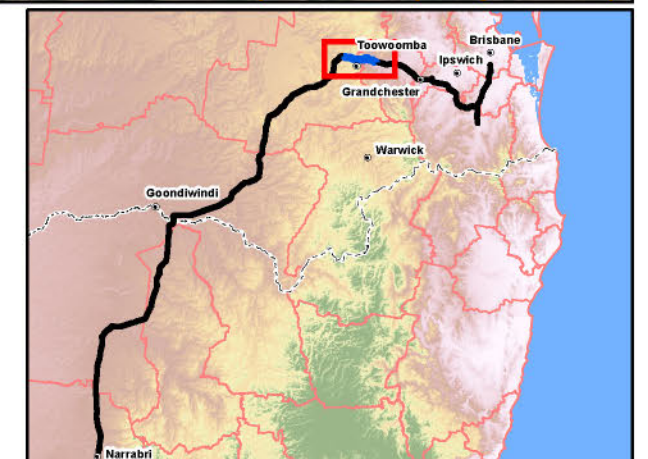
Gowrie to Helidon

Figure 2:
Landscape and visual impact assessment study area

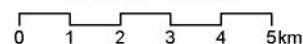


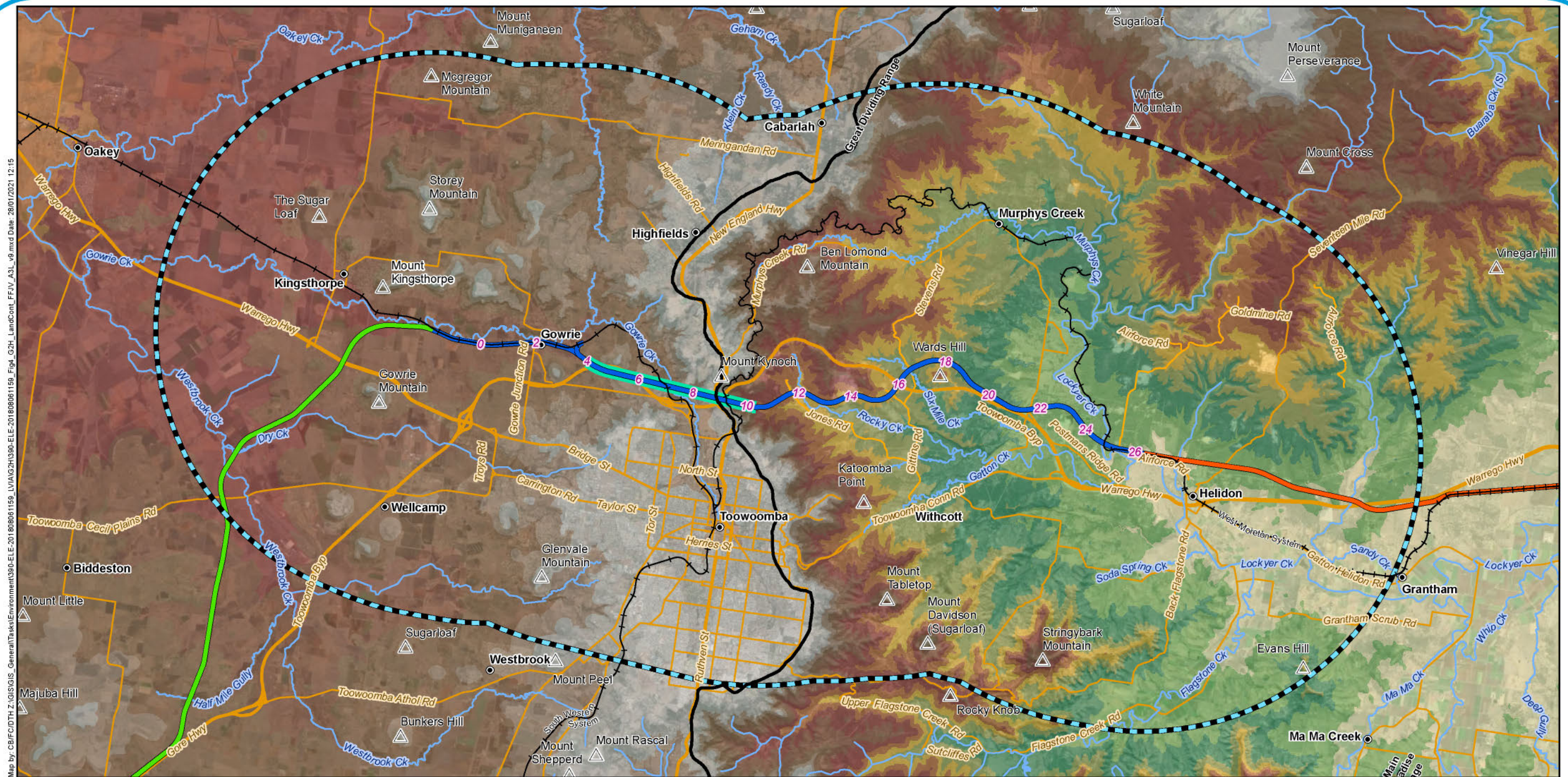
Legend

- Locality_Boundaries_select_points
- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- Existing rail
- Major roads
- Minor roads
- Local Government Areas
- LVIA Study Area (10 km from rail alignment)
- Regionally significant scenic amenity (within LVIA study area)
- Protected areas**
 - Conservation Park
 - National park
 - Resources reserve
 - State forest
 - Nature Refuge



A3 scale: 1:150,000





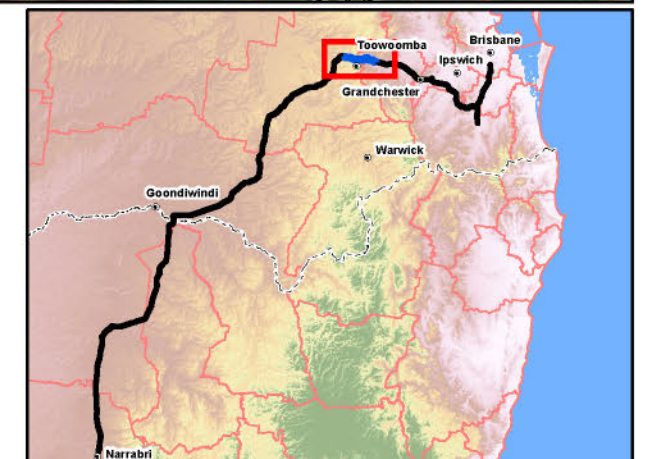
Legend

- 5 Chainage (km)
- Localities
- Mountain
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- LVIA Study Area (10 km from rail alignment)

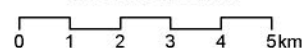
- Existing rail
- Watercourses
- Major roads
- Minor roads
- Range

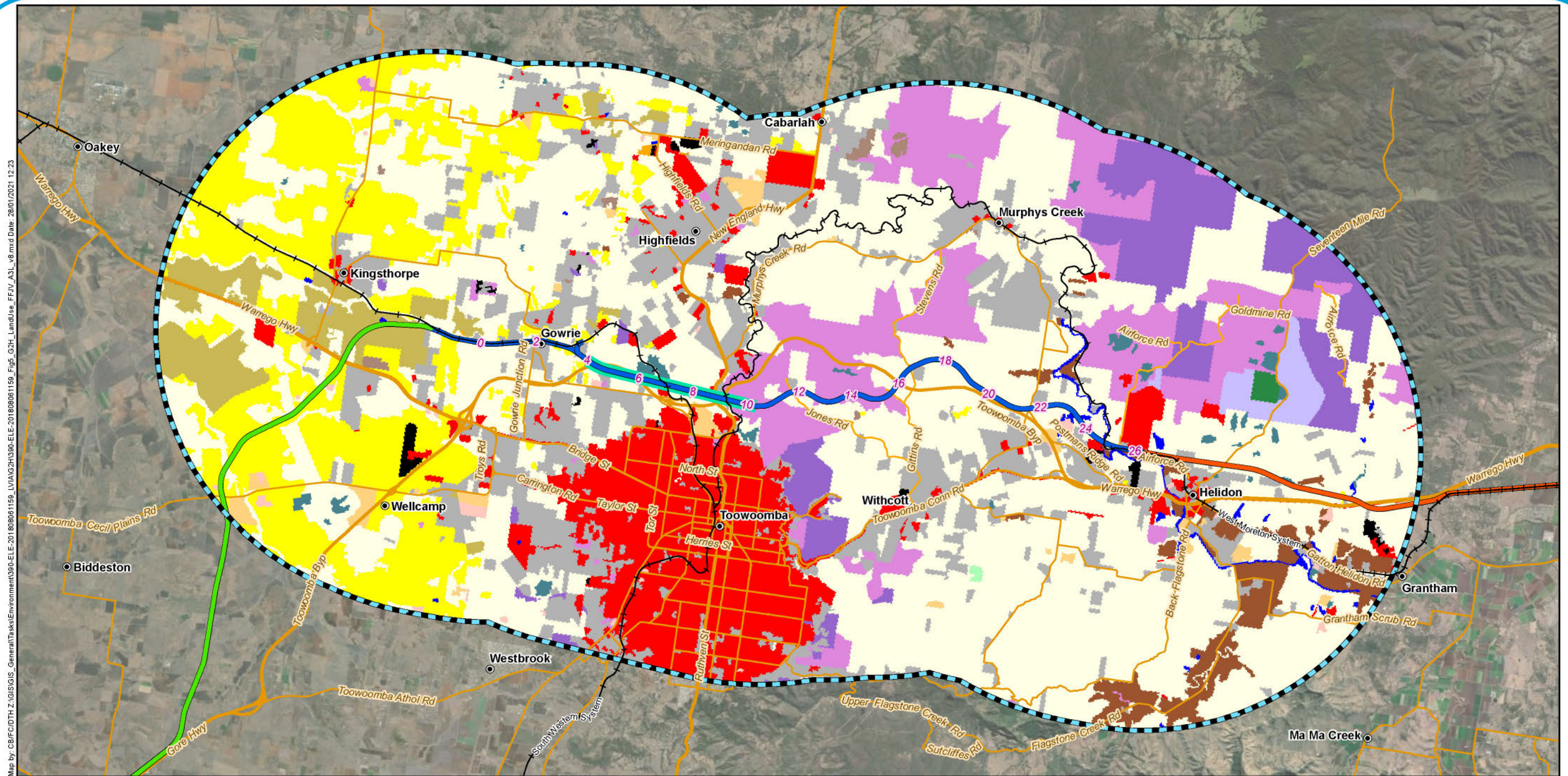
Elevation (m AHD)

- | | | |
|------------|------------|------------|
| 50 to 100 | 250 to 300 | 500 to 550 |
| 100 to 150 | 300 to 350 | 550 to 600 |
| 150 to 200 | 350 to 400 | 600 to 650 |
| 200 to 250 | 400 to 450 | 650 to 700 |
| | 450 to 500 | 700 to 850 |



A3 scale: 1:150,000





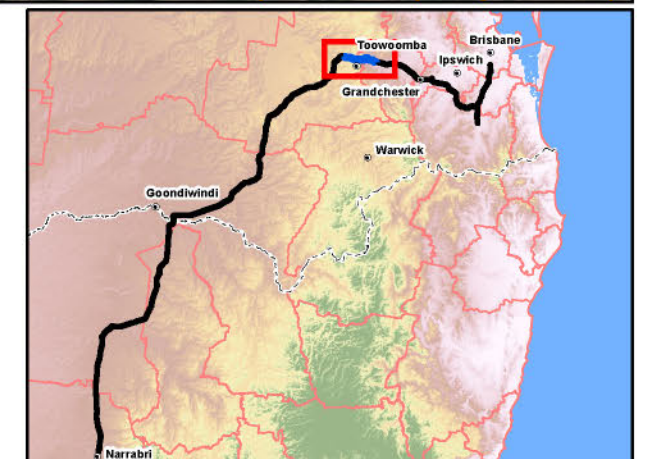
Legend

- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Existing rail
- LVIA Study Area (10 km from rail alignment)

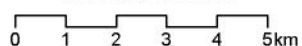
National land use

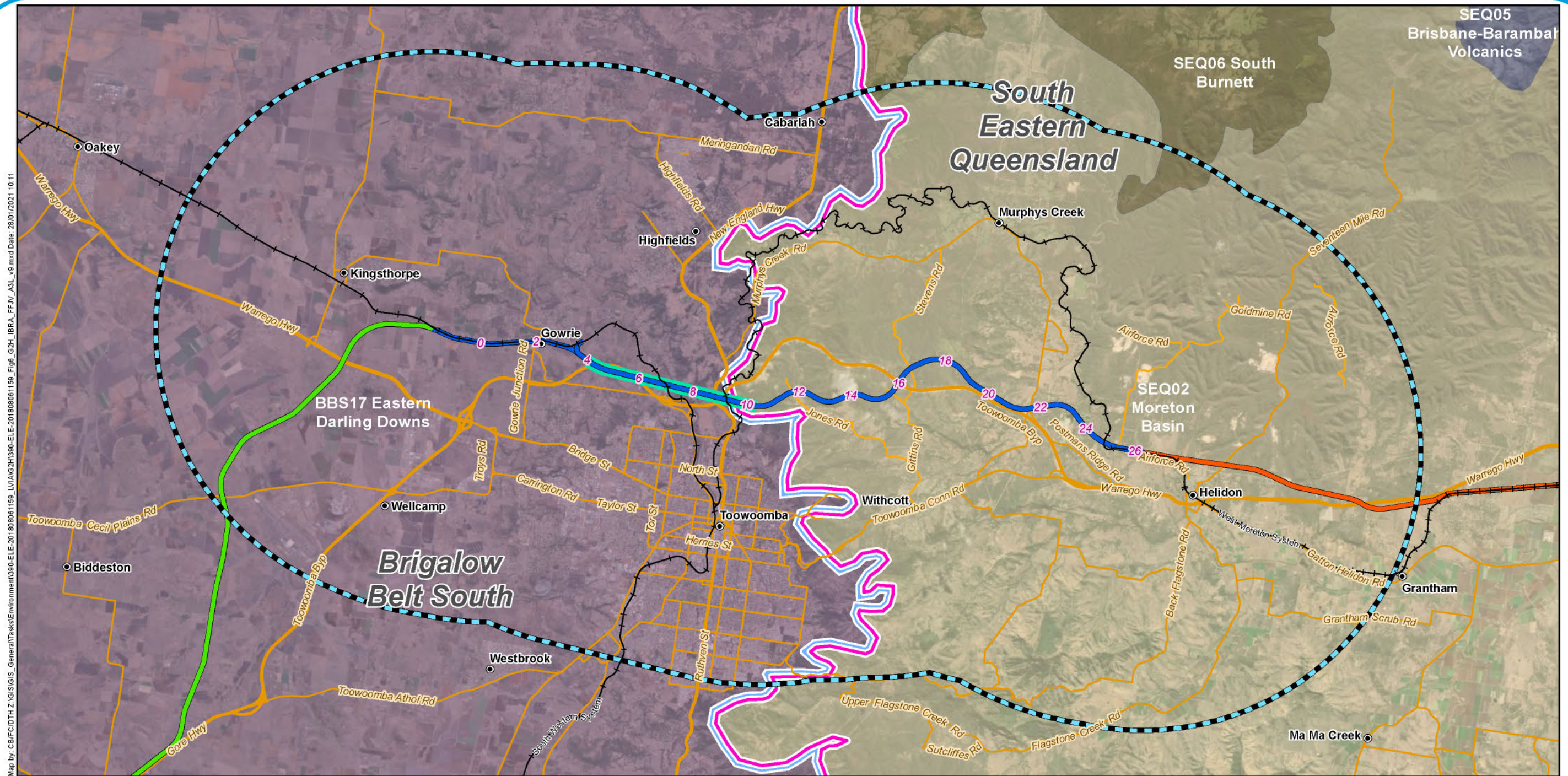
- Nature conservation
- Managed resource protection
- Other minimal use
- Grazing native vegetation
- Production native forests
- Grazing modified pastures
- Plantation forests (commercial and other)
- Dryland cropping
- Dryland horticulture
- Land in transition
- Irrigated pastures
- Irrigated cropping
- Irrigated horticulture

- Urban intensive uses
- Intensive horticulture and animal production
- Rural residential and farm infrastructure
- Mining and waste
- Water



A3 scale: 1:150,000





Legend

- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- L VIA Study Area (10 km from rail alignment)

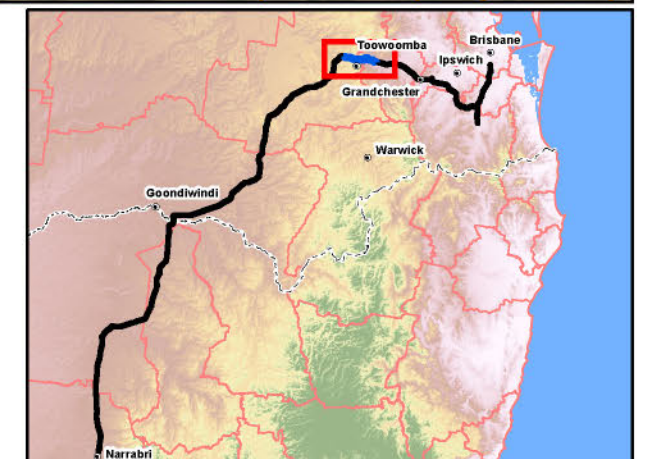
- Existing rail
- Major roads
- Minor roads

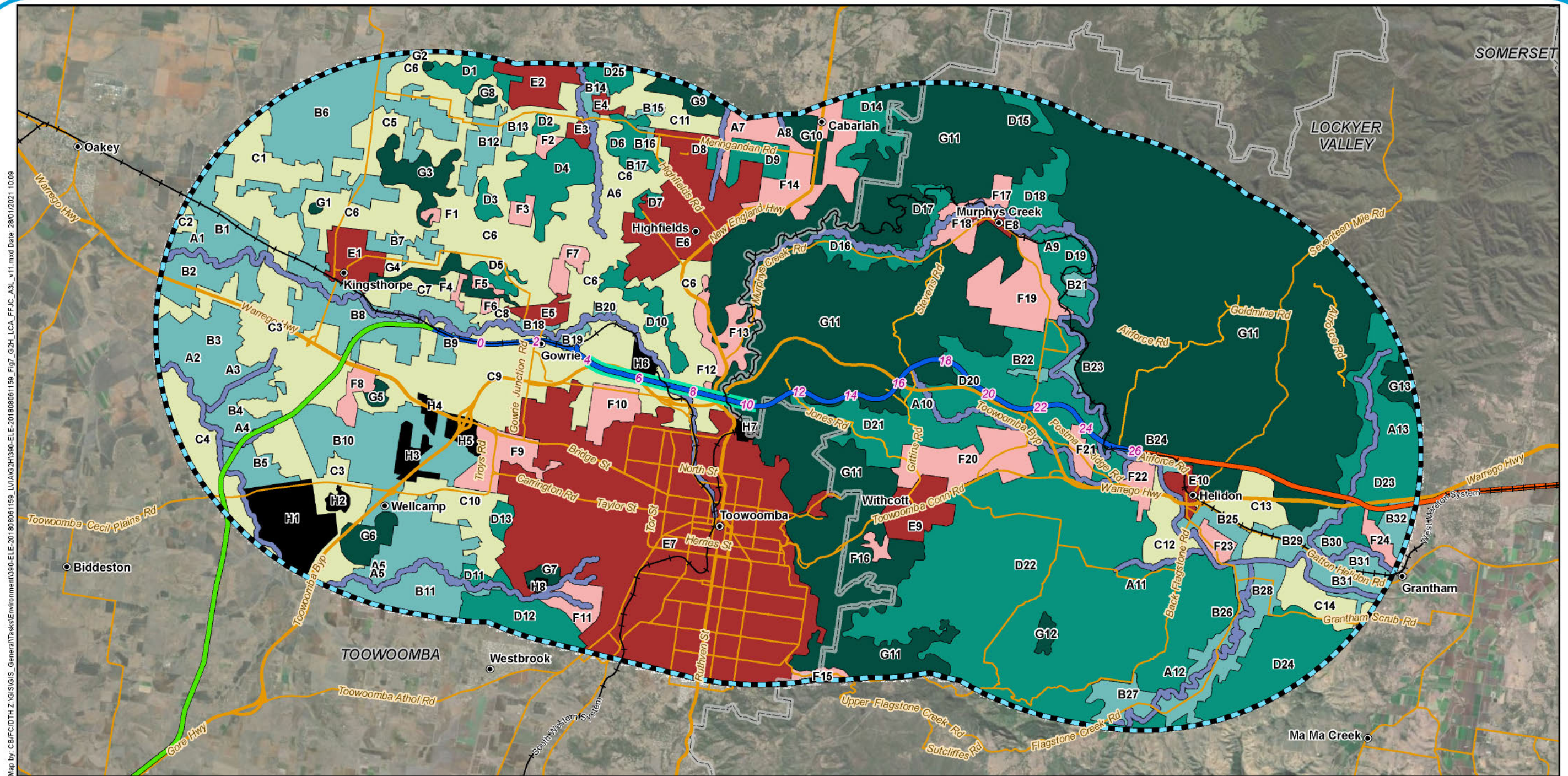
IBRA Regions

- Brigalow Belt South
- South Eastern Queensland

IBRA Subregions

- BBS17, Eastern Darling Downs
- SEQ02, Moreton Basin
- SEQ05, Brisbane-Barambah Volcanics
- SEQ06, South Burnett





Legend

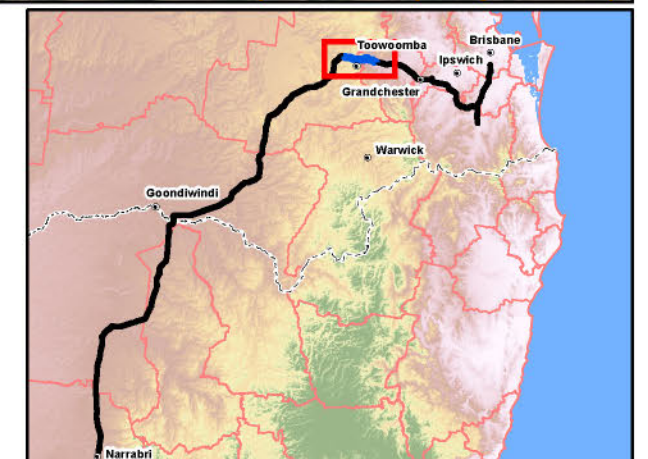
- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- LVIA Study Area (10 km from rail alignment)

- Existing rail
- Major roads
- Minor roads
- Local Government Areas

Landscape character type

- LCT A: Vegetated watercourses - Creeks and Channels
- LCT B: Irrigated Croplands
- LCT C: Dry Croplands and Pastures

- LCT D: Vegetated Grazing
- LCT E: Rural Settlement
- LCT F: Rural Living
- LCT G: Forested Uplands
- LCT H: Transitional Landscapes



A3 scale: 1:150,000
0 1 2 3 4 5km



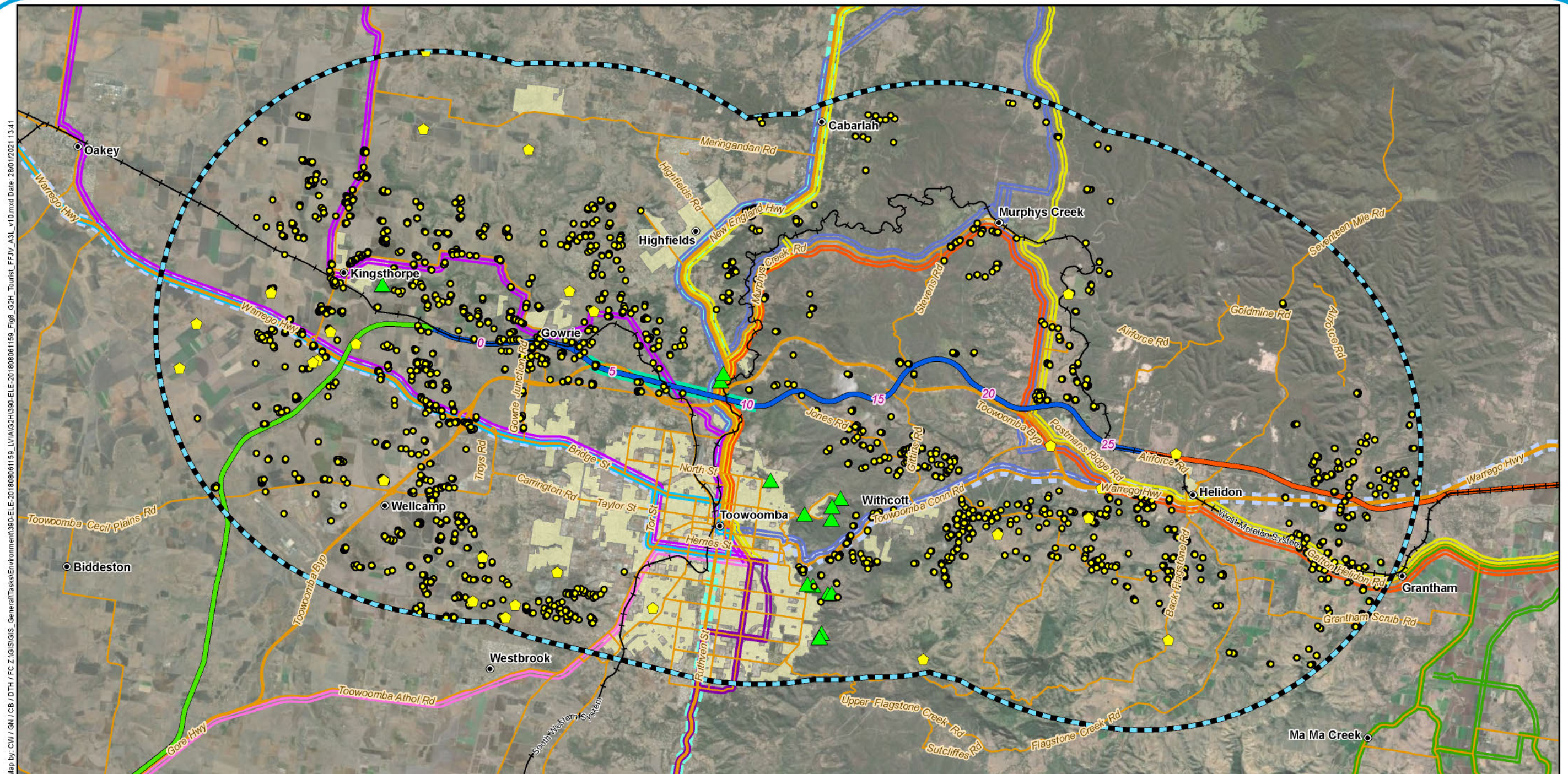
Future Freight
Integrating Community, Environment and Engineering

Issue date: 28/01/2021 Version: 11
Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure 7:
Landscape character assessment

Map by: CW / GN / CB / DTH / FC Z:\GIS\GIS - General\Task\Environment\390-LE-20180801159_LVIA\GPH390-LE-20180801159_Fig8_G2H_Tourist_FFIV_A3L_v10.mxd Date: 28/01/2021 13:41



Legend

- 5 Chainage (km)
- Localities
- Existing rail
- B2G project alignment
- G2H project alignment
- H2C project alignment
- Tunnel
- Major roads
- Minor roads
- Scenic outlooks
- Sensitive receptors 2018 (beyond built-up areas)
- Homesteads 2013
- Built up areas
- LVIA Study Area (10 km from rail alignment)

National Tourist Drives

- Warrego Way & Adventure Way
- Australia's Country Way

Regional Tourist Drives

- Cobb & Co Tourist Drive

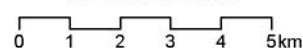
Local Tourist Drives

- Glen Rock Tourist Drive
- Open Plains Country Drive
- Spring Bluff Tourist Drive
- Farmers Country Drive
- Great Bunya Drive
- High Country Drive
- Steele Rudd Country Drive

Tourist drives shown as indicative routes and may be shown offset in cases of overlap.



A3 scale: 1:150,000



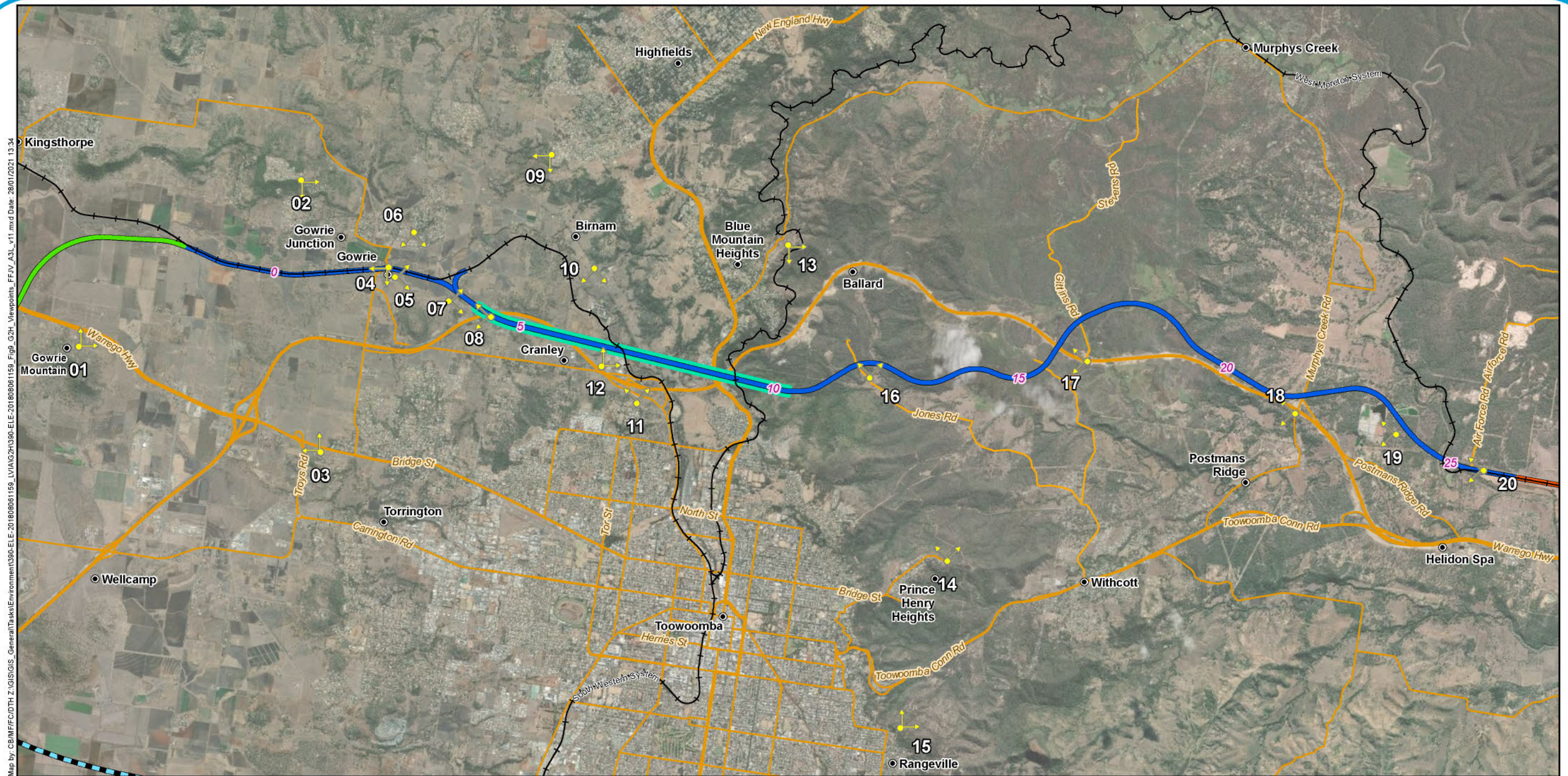
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Issue date: 28/01/2021 Version: 10
Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

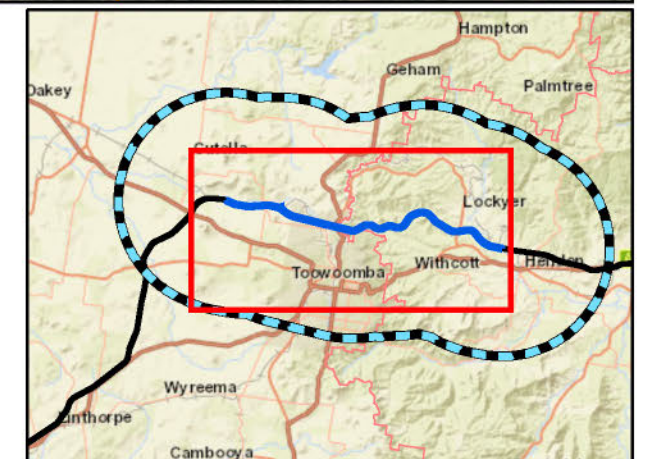
Figure 8:

Tourist drives and sensitive receptors



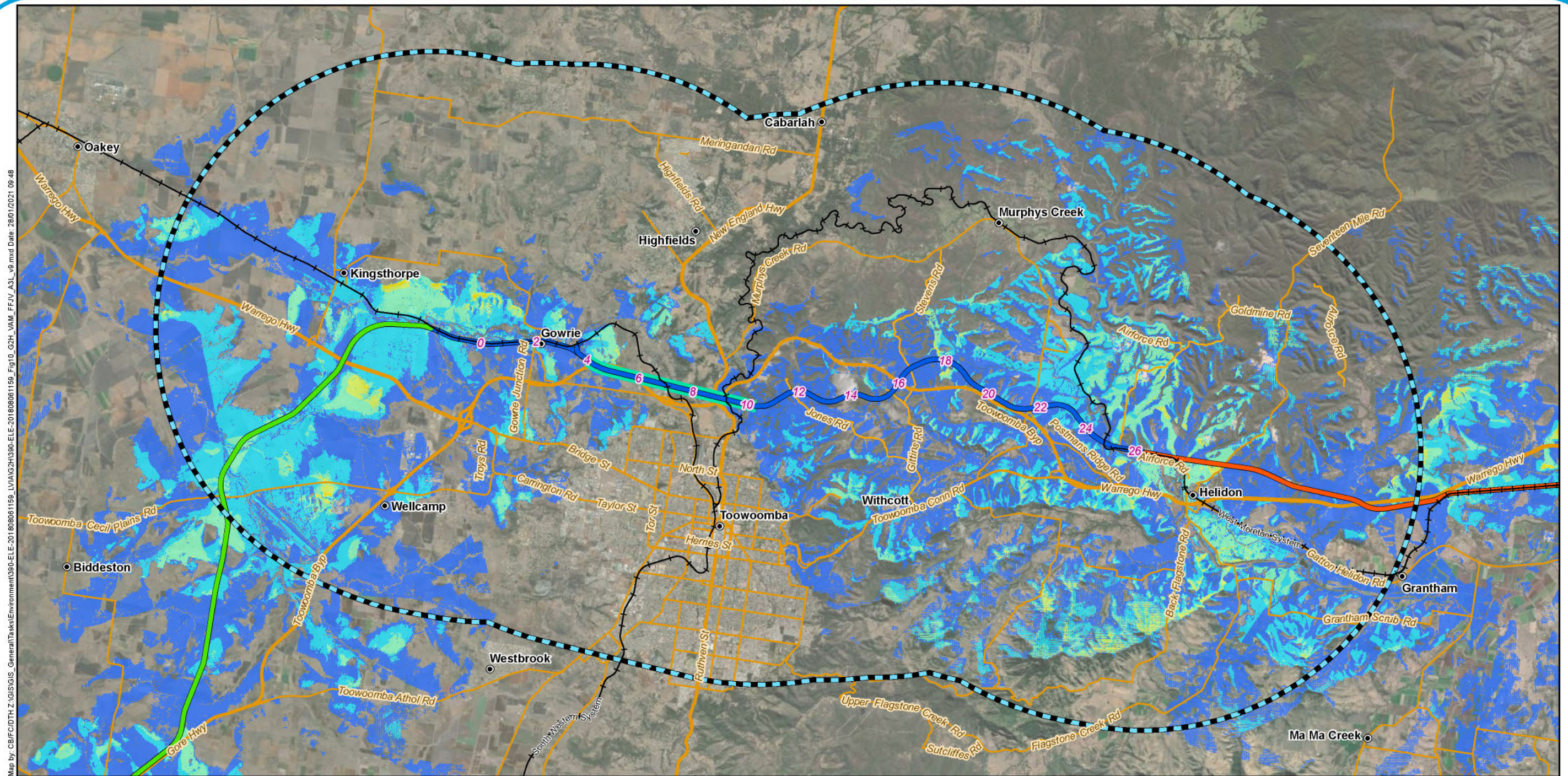
Legend

- 5 Chainage (km)
- Localities
- Viewpoints
- Tunnel
- Existing rail
- B2G project alignment
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- LVIA Study Area (10 km from rail alignment)



A3 scale: 1:80,000





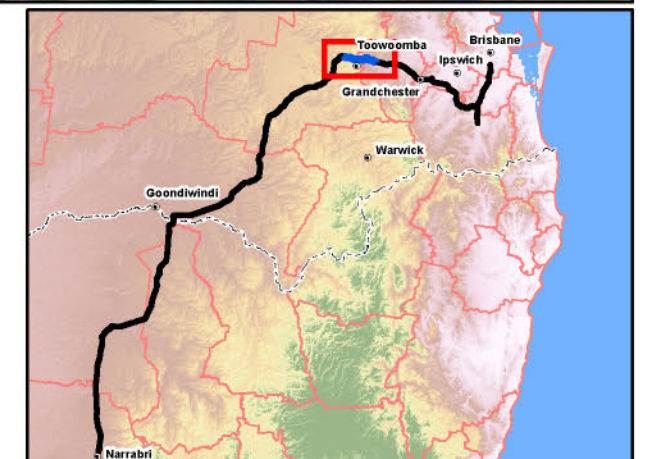
Legend

- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- LVIA Study Area (10 km from rail alignment)

- Existing rail
- Major roads
- Minor roads

Observation points theoretically visible

- | | |
|---------|---------|
| 0 | 16 - 20 |
| 1 - 5 | 21 - 25 |
| 6 - 10 | 26 - 30 |
| 11 - 15 | 31 - 45 |



A3 scale: 1:150,000
0 1 2 3 4 5km



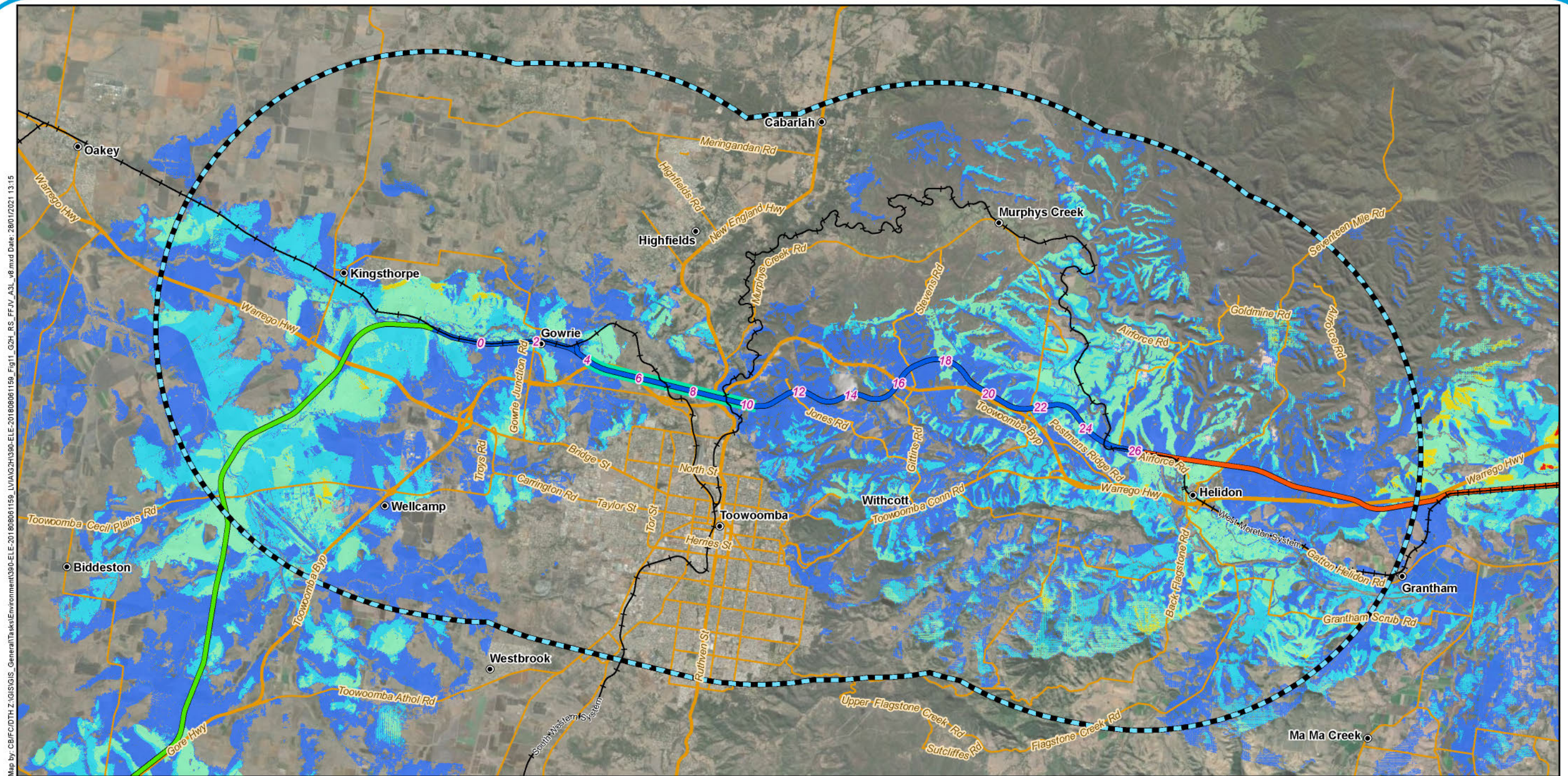
Future Freight
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Issue date: 28/01/2021 Version: 9
Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure 10:

Visibility analysis map - permanent infrastructure



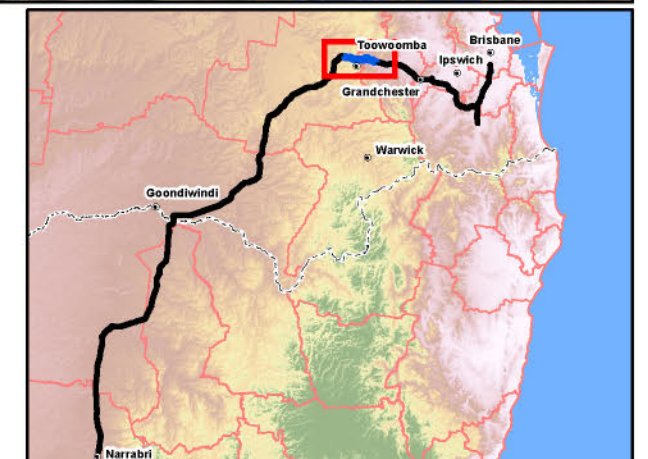
Legend

- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- LVIA Study Area (10 km from rail alignment)

- Existing rail
- Major roads
- Minor roads

Observation points theoretically visible

- | | |
|---------|---------|
| 0 | 16 - 20 |
| 1 - 5 | 21 - 25 |
| 6 - 10 | 26 - 30 |
| 11 - 15 | 31 - 52 |



A3 scale: 1:150,000
0 1 2 3 4 5km



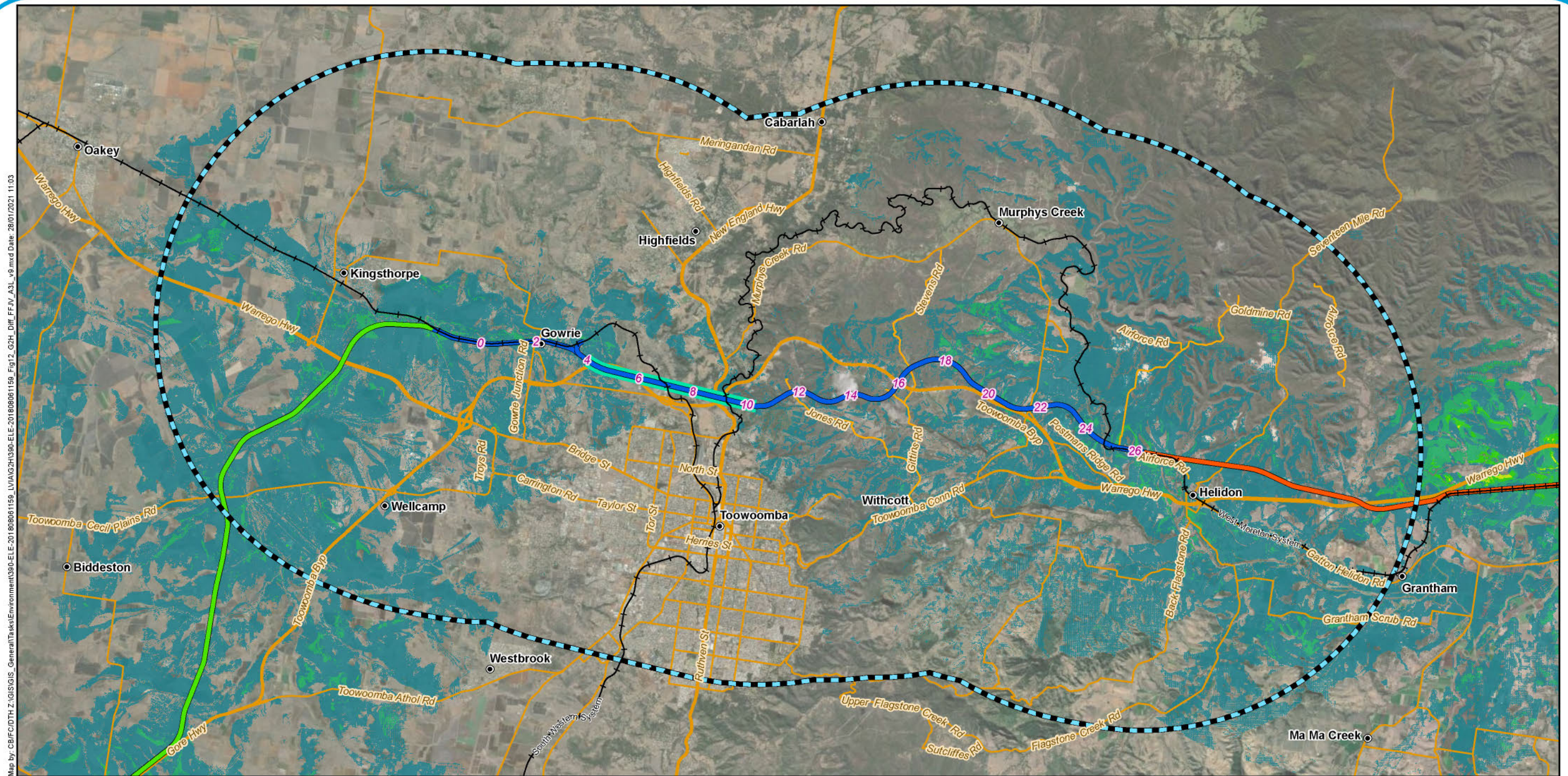
Future Freight
Integrating Community, Environment and Engineering

Issue date: 28/01/2021 Version: 8
Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure 11:

Visibility analysis map - rolling stock



Map by: CB/FC/OT/TH Z:\GIS\GIS_General\Tasks\Environment\390-ELE-201808061159_LVIA\G2H390-ELE-201808061159_Fig12_G2H_Diff_FF_V_A31_v9.mxd Date: 28/01/2021 11:03

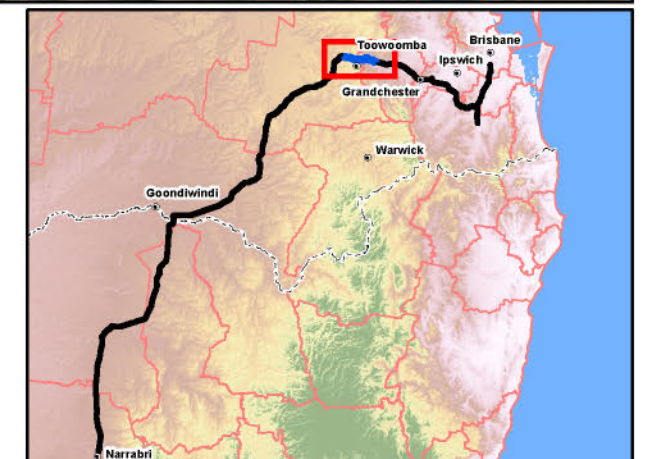
Legend

- 5 Chainage (km)
- Localities
- Tunnel
- B2G project alignment
- G2H project alignment
- H2C project alignment
- LVIA Study Area (10 km from rail alignment)

- Existing rail
- Major roads
- Minor roads

Difference between permanent infrastructure and rolling stock

- | | |
|---------|---------|
| 0 | 16 - 20 |
| 1 - 5 | 21 - 25 |
| 6 - 10 | 26 - 30 |
| 11 - 15 | 31 - 45 |



A3 scale: 1:150,000
0 1 2 3 4 5km



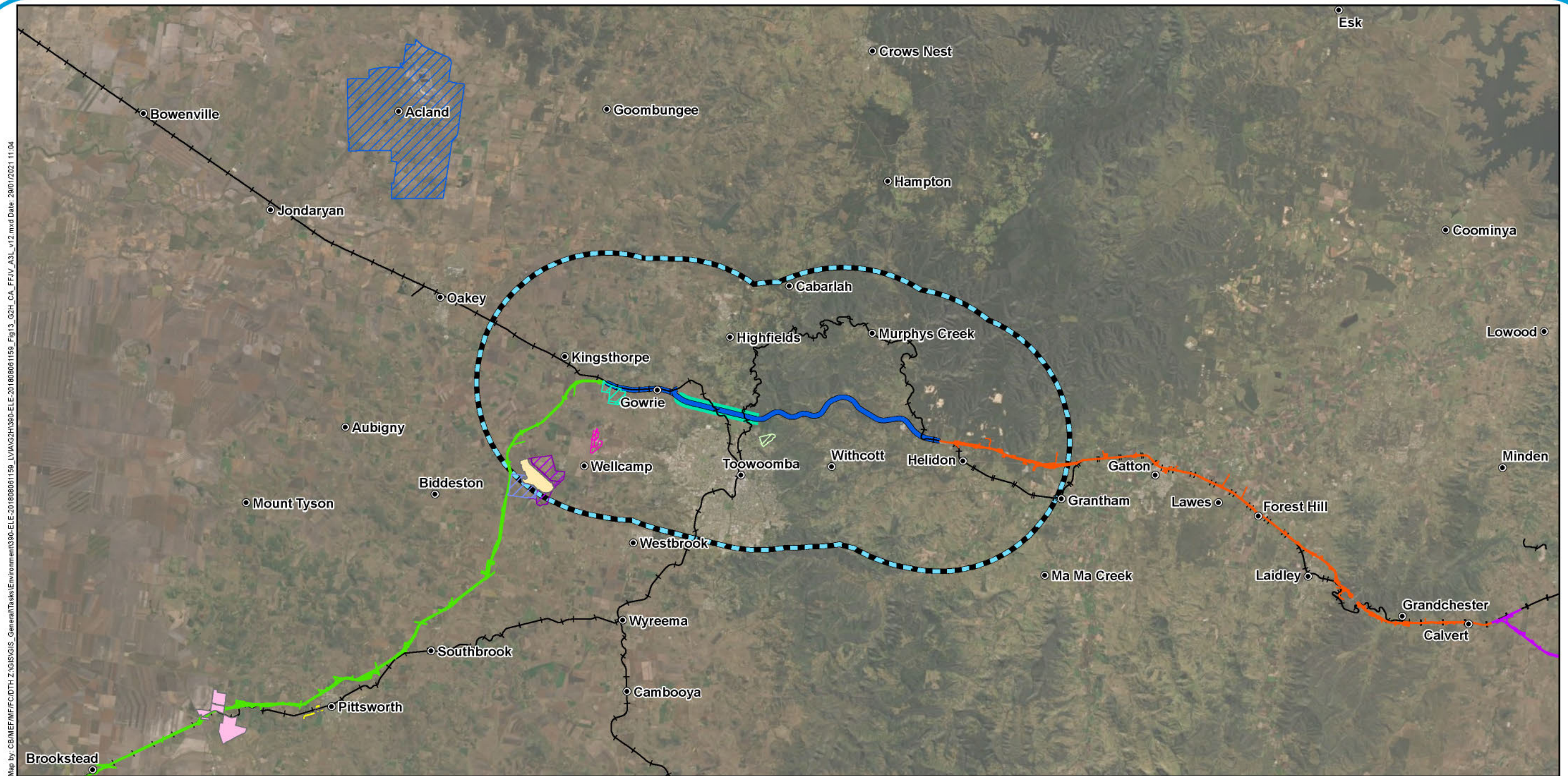
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Issue date: 28/01/2021 Version: 9
Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon

Figure 12:

Visibility analysis map - difference analysis

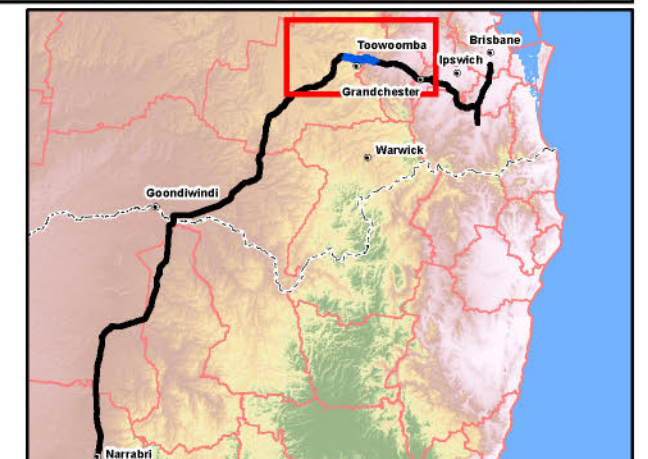


Legend

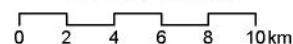
- 5 Chainage (km)
- Localities
- Tunnel
- G2H project alignment
- Existing rail
- Major roads
- Minor roads
- LVIA Study Area (10 km from rail alignment)

Projects included in assessment

- Border to Gowrie
- Calvert to Kagaru
- Helidon to Calvert
- Asterion Medicinal Cannabis Facility
- DHA Mount Lofty Development
- Interlink SQ - Global Logistics Centre
- New Acland Coal Mine Stage 3
- Wellcamp Business Park
- Witmack Industry Park
- Toowoomba Wellcamp Airport
- Pittsworth Industrial Precinct Enabling Project
- Yarranlea Solar



A3 scale: 1:320,000



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Coordinate System: GDA 1994 MGA Zone 56

Gowrie to Helidon
Figure 13:
Cumulative LVIA

APPENDIX

H

Landscape and Visual Impact Assessment

Appendix 2 Viewpoints

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT



APPENDIX 2: VIEWPOINTS

The following viewpoints prepared by FFJV have been used to inform and illustrate this assessment:

Figure 26: Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast

Figure 27: Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba

Figure 28: Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway

Figure 29: Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road bridge and Visualisation

Figure 30: Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal and Visualisation

Figure 31: Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south and Visualisation

Figure 32: Viewpoint 7: 541-549 Ganzer Morris Road, looking east towards western tunnel portal

Figure 33: Western tunnel portal aerial view

Figure 34: Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass

Figure 35: Viewpoint 9: Phoenix Street, Highfields looking southwest

Figure 36: Viewpoint 10: Old Goombungee Road, Birnam looking south towards Toowoomba and Visualisation

Figure 37: Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley and Visualisation

Figure 38: Viewpoint 12: Looking northeast from Hermitage Road, Cranley and Visualisation

Figure 39: Viewpoint 13: Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights

Figure 40: Eastern tunnel portal aerial view

Figure 41: Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights and Visualisation

Figure 42: Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville

Figure 43: Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north

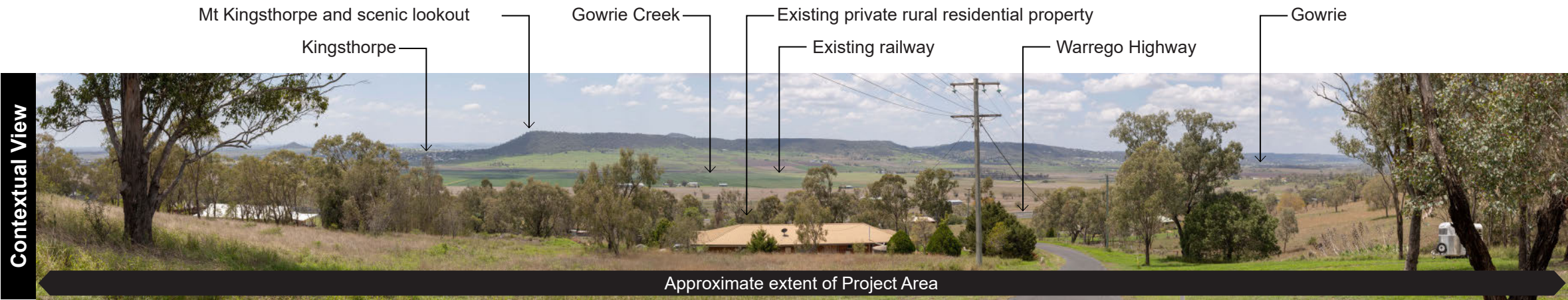
Figure 44: Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west and Visualisation

Figure 45: Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north and Visualisation

Figure 46: Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north and Visualisation

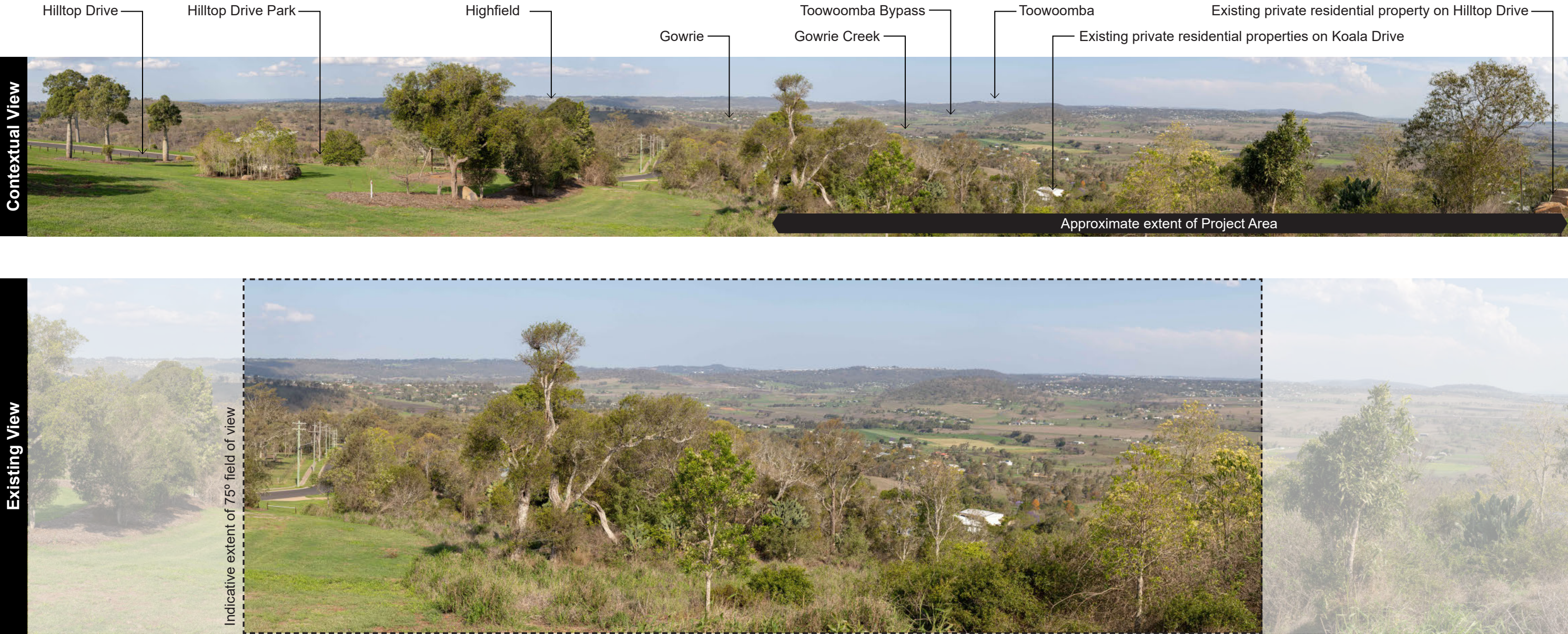
Figure 47: Viewpoint 20: Airforce Road, Helidon, looking west and Visualisation

Figure 26: Viewpoint 1: Lenora Court, Gowrie Mountain, looking northeast



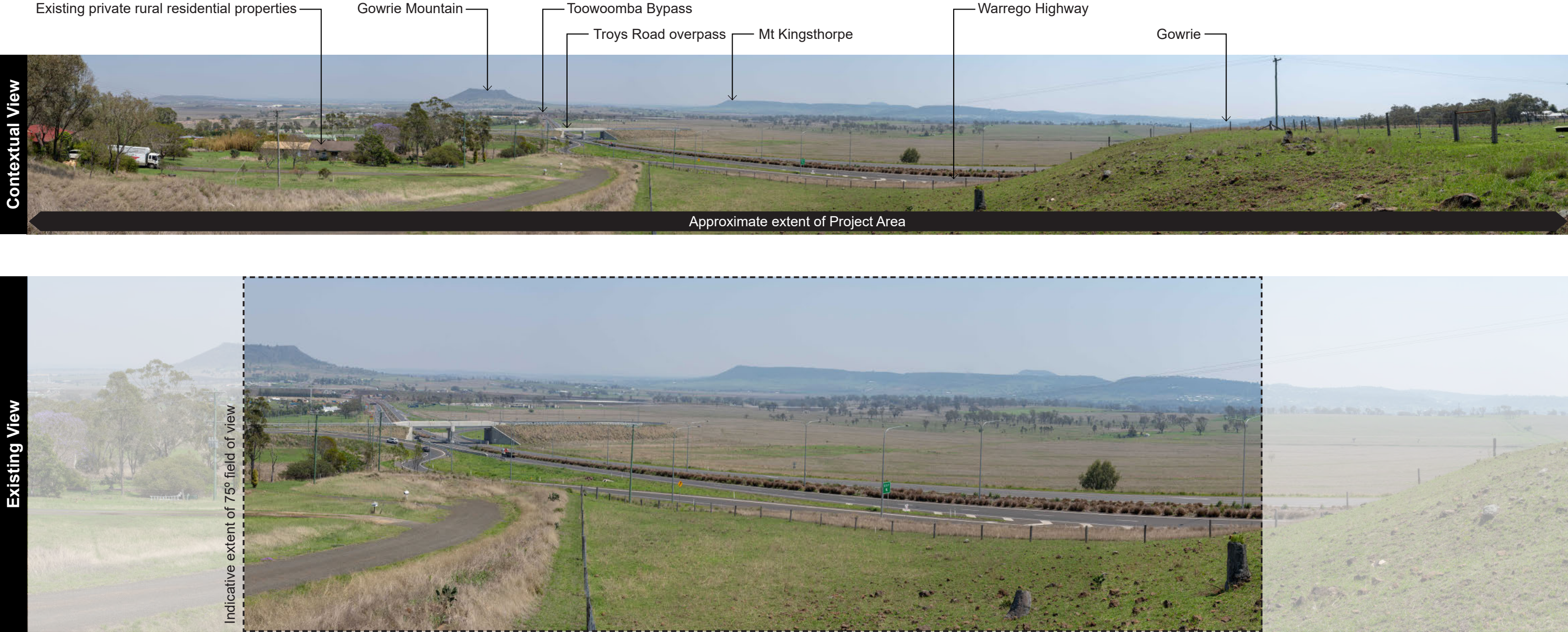
Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 27: Viewpoint 2: Hilltop Drive Park, Gowrie, looking southeast towards Toowoomba



Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 28: Viewpoint 3: Charlton Pinch Road, Torrington, looking northwest over the Warrego Highway



Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 29: Viewpoint 4: Near 10 Paulsens Road, Gowrie, looking southwest towards Gowrie Junction Road Bridge



Figure 30: Viewpoint 5: Near 14 Junction Street, Gowrie, looking east towards western tunnel portal

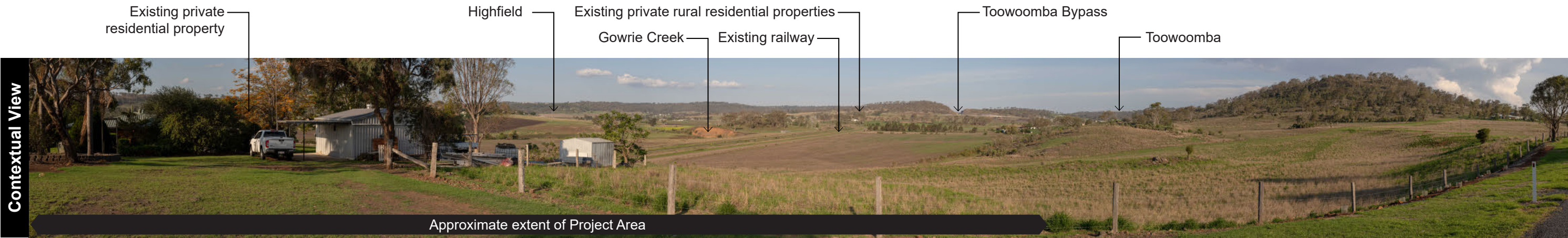


Figure 31: Viewpoint 6: Near 13-18 Treeline Drive, Gowrie, looking south



Inset Plan A



Inset Plan B

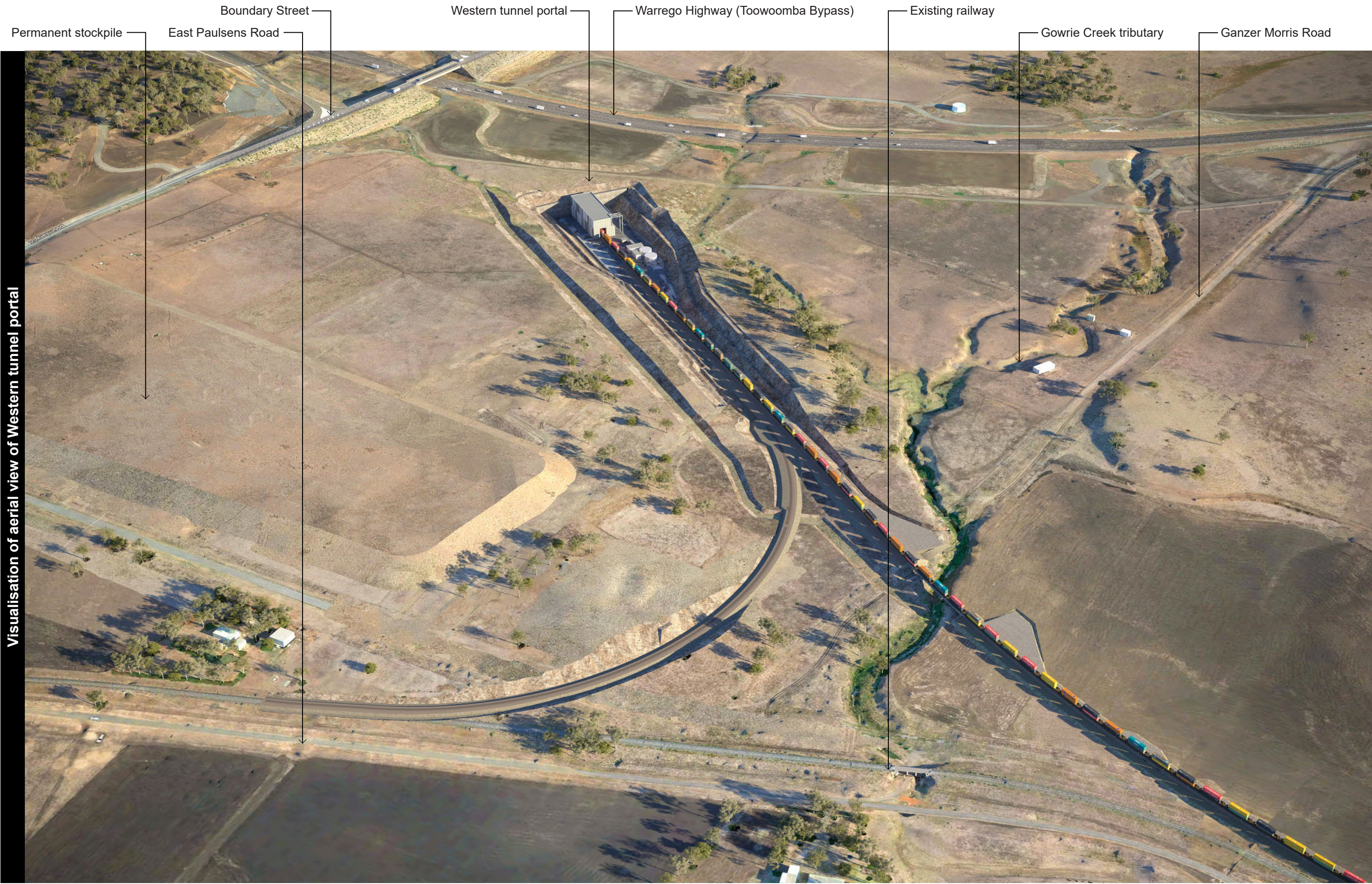


Figure 32: Viewpoint 7: 5541-549 Ganzer Morris Road, looking east towards western tunnel portal



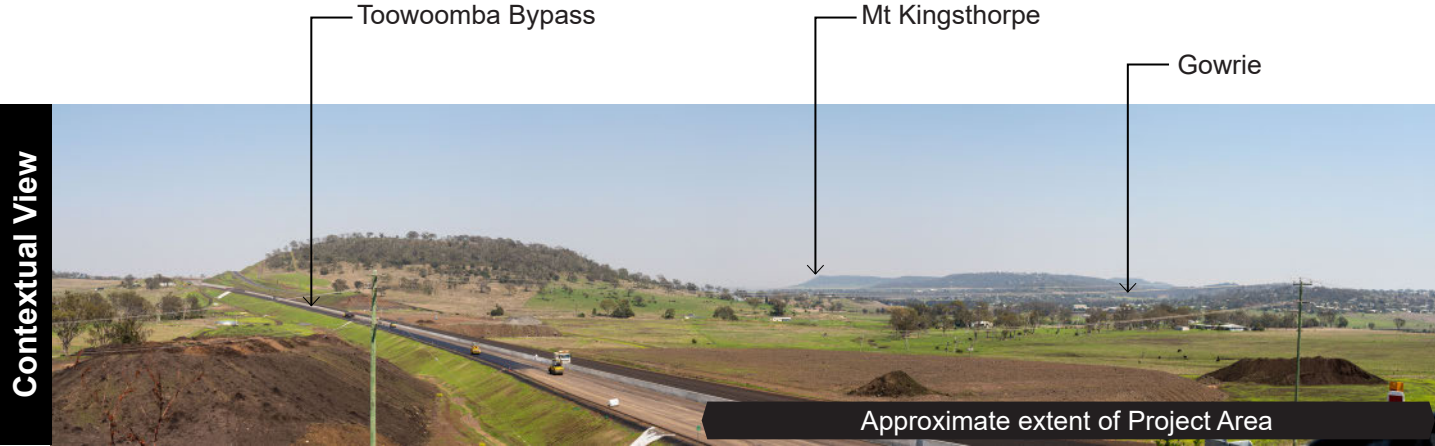
Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 33: Western tunnel portal aerial view



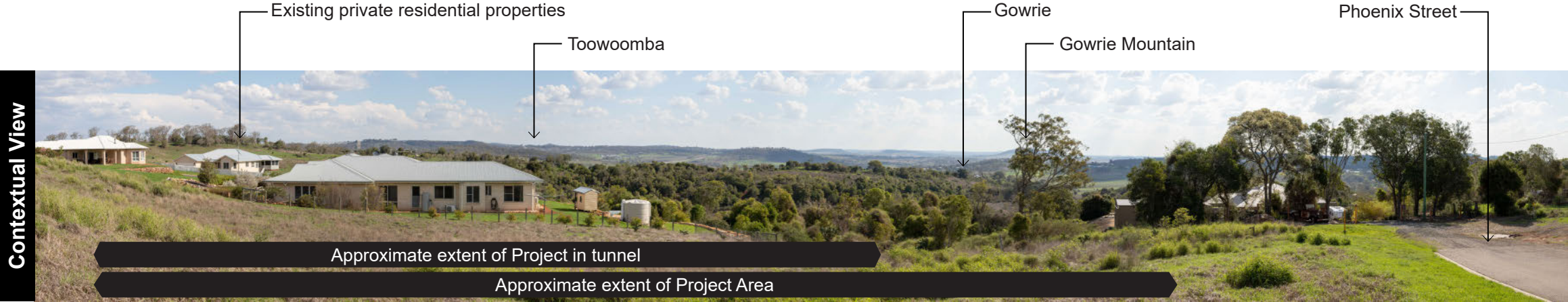
Visualisation of aerial view of Western tunnel portal

Figure 34: Viewpoint 8: Looking west from Boundary Street bridge over the Toowoomba Bypass



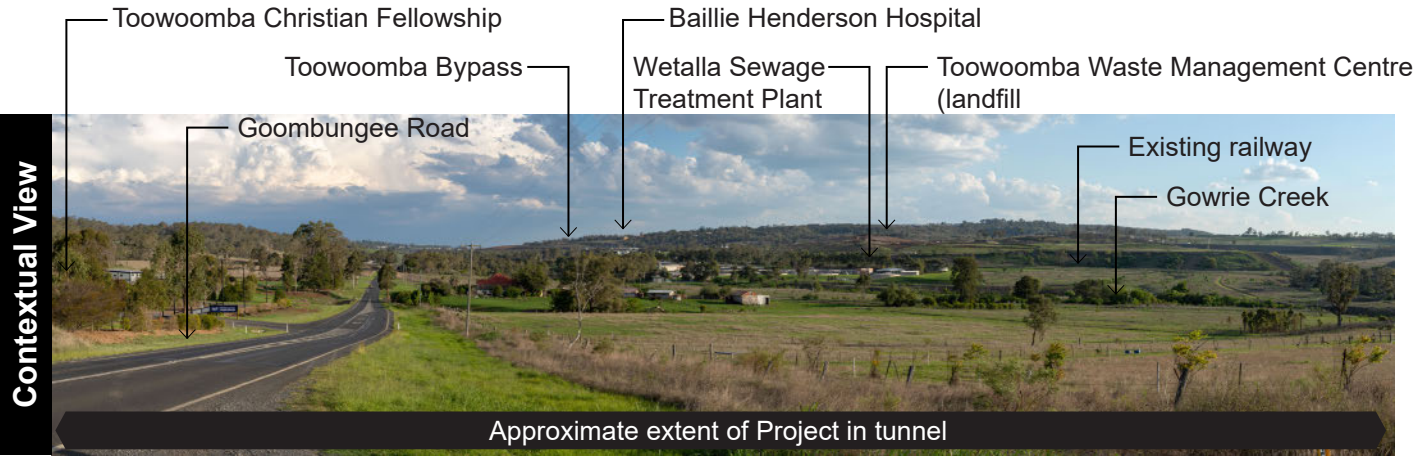
Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 35: Viewpoint 9: Phoenix Street, Highfields looking southwes



Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 36: Viewpoint 10: Goombungee Road, Birnam looking south towards Toowoomba



Inset Plan A



Inset Plan B



Figure 37: Viewpoint 11: Looking north from Baillie Henderson Hospital, Cranley

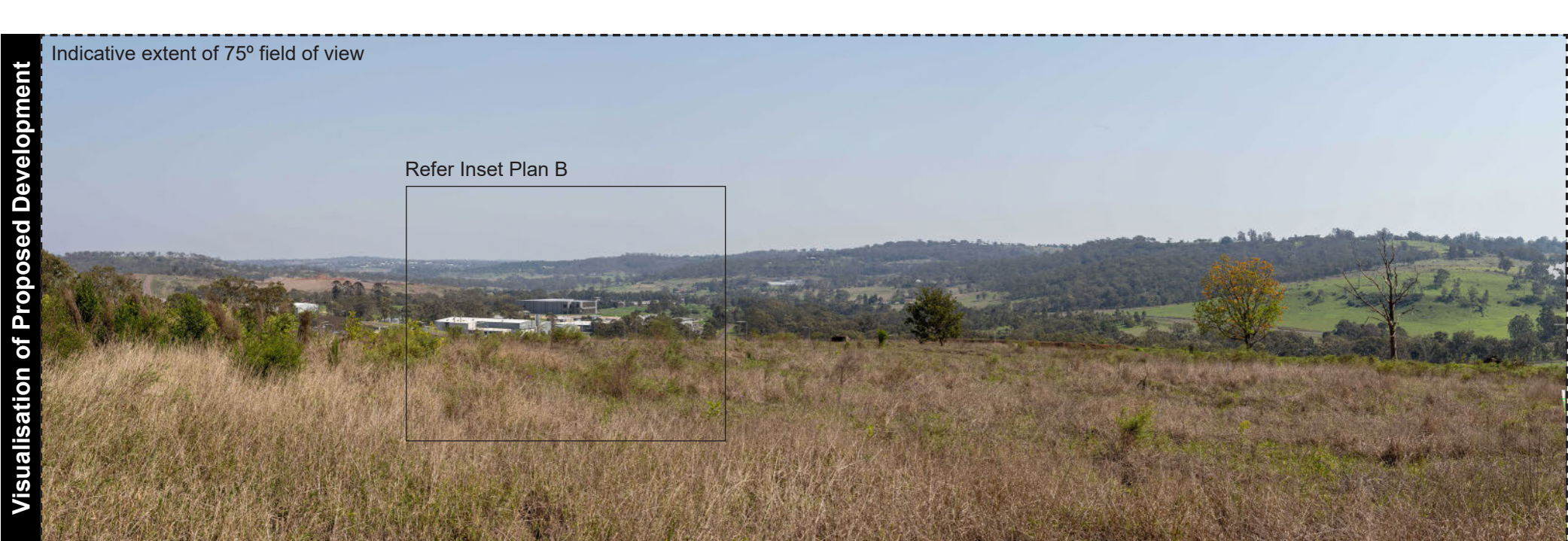
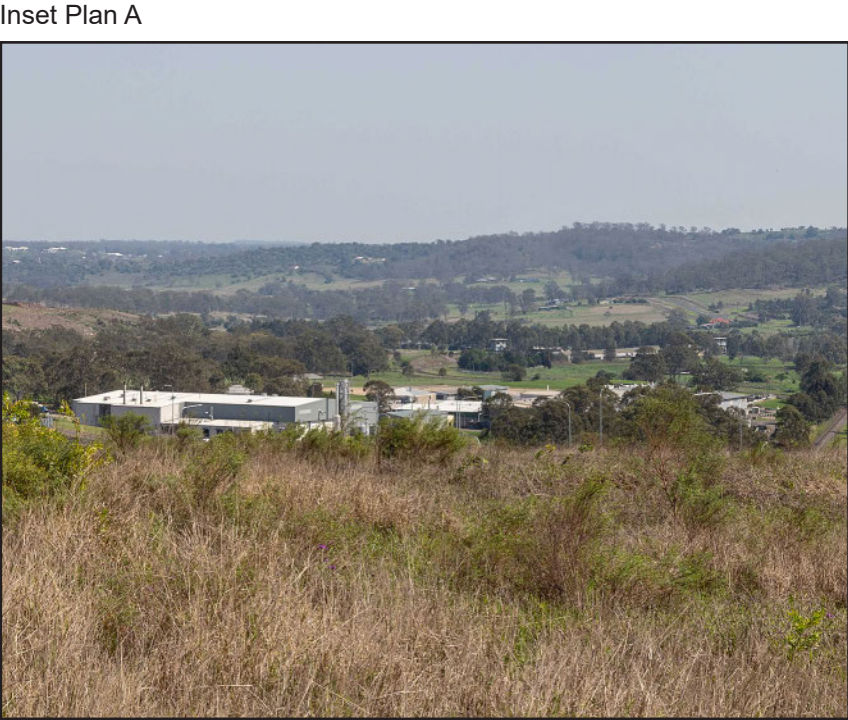
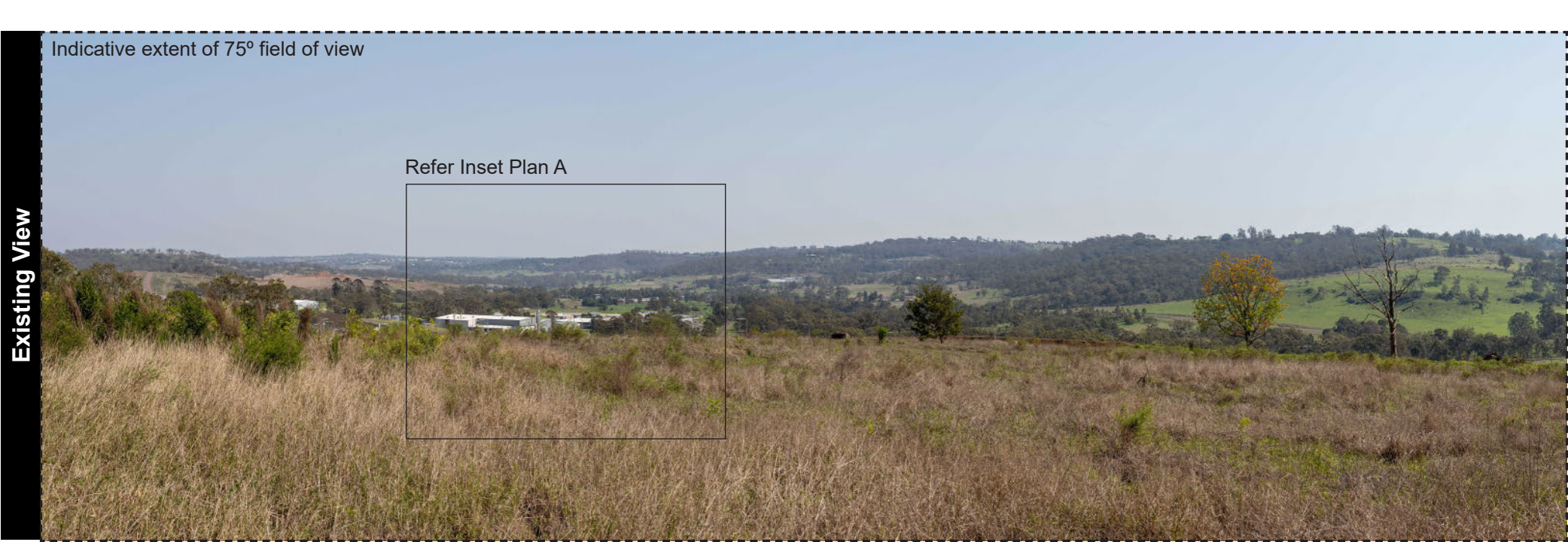


Figure 38: Viewpoint 12: Looking northeast from Hermitage Road, Cranley

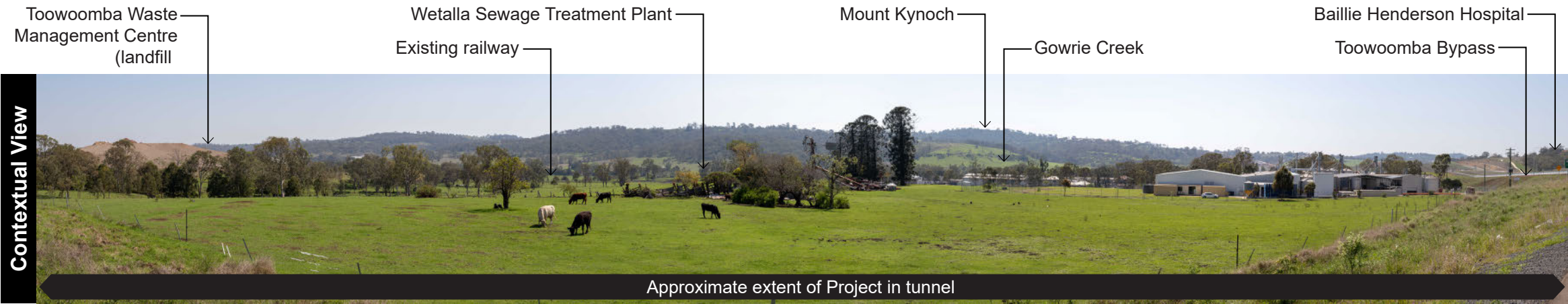
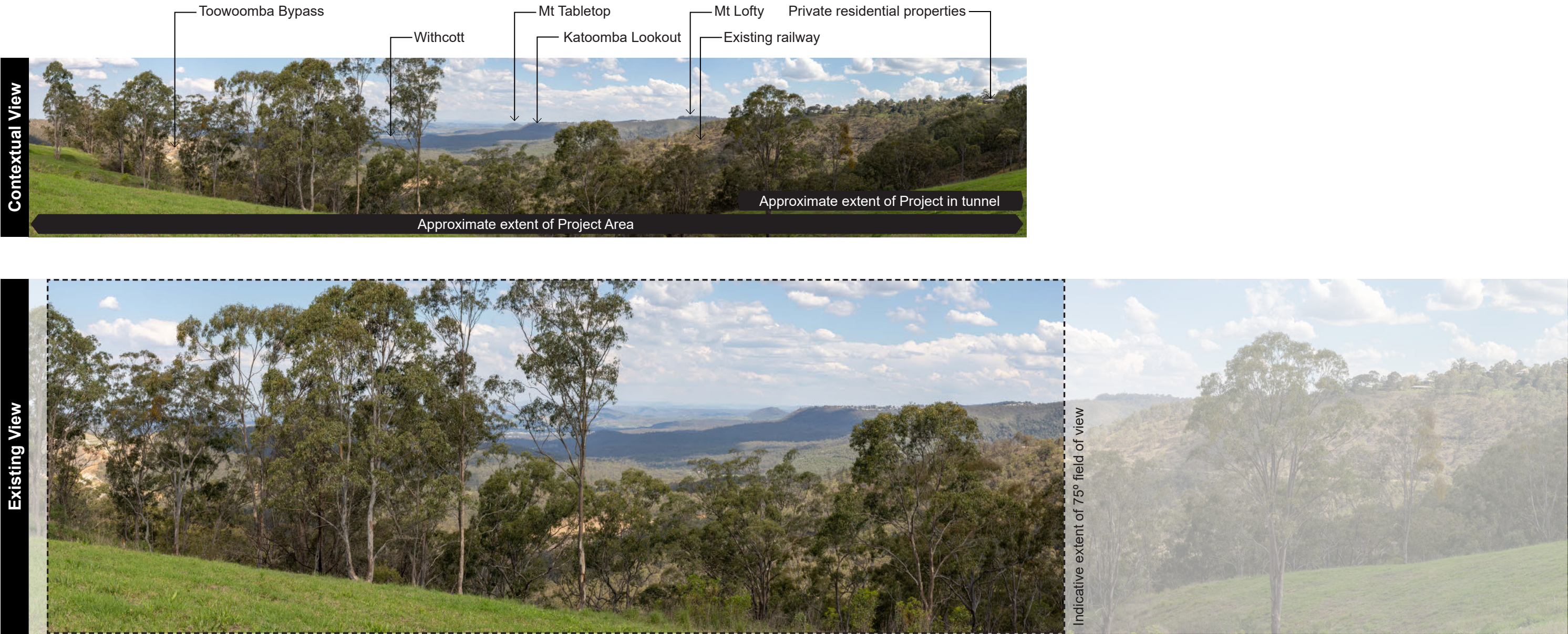


Figure 39: Viewpoint 13: Looking southeast from Keira Court, Blue Mountain Heights



Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 40: Eastern tunnel portal aerial view

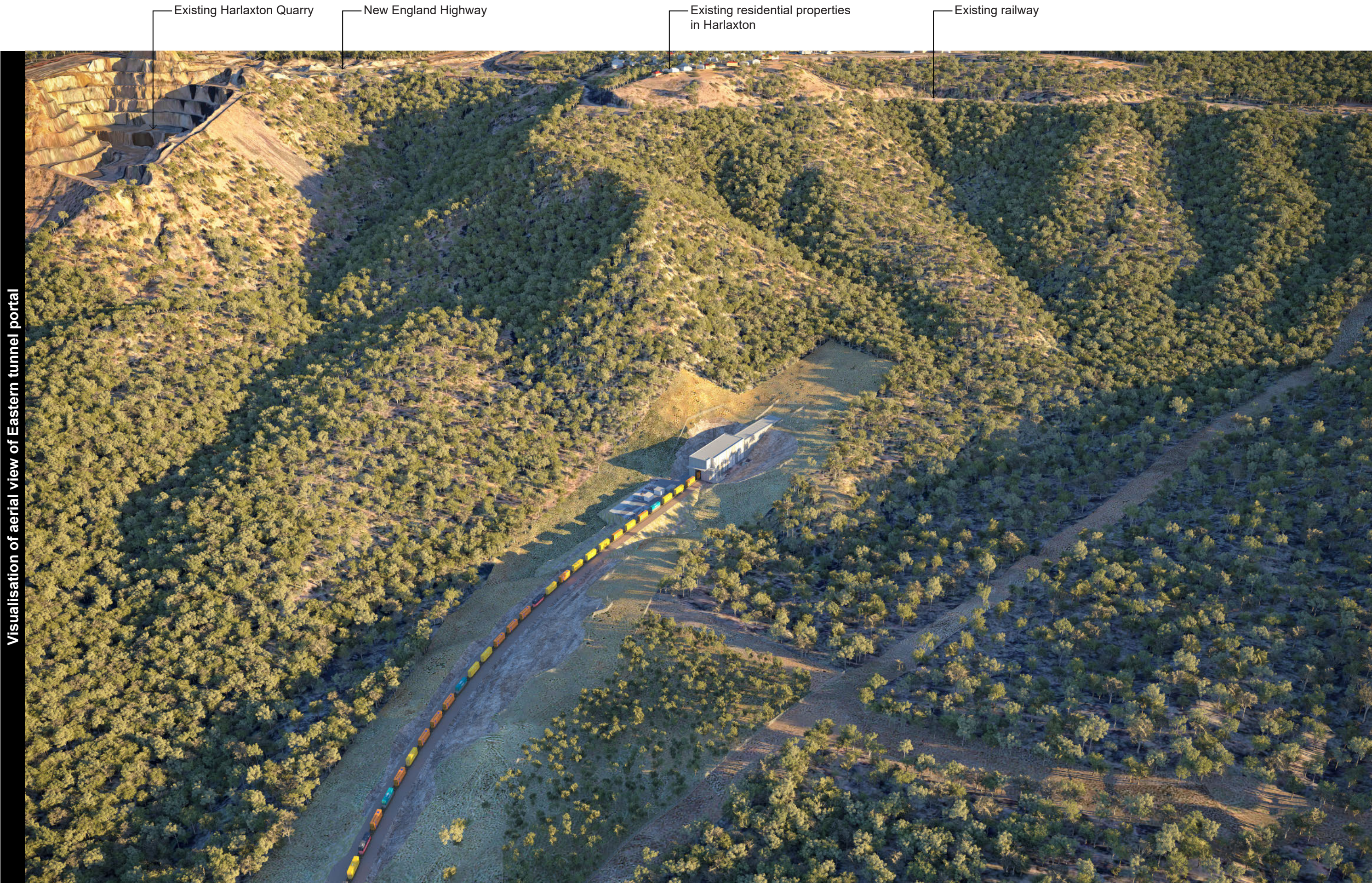
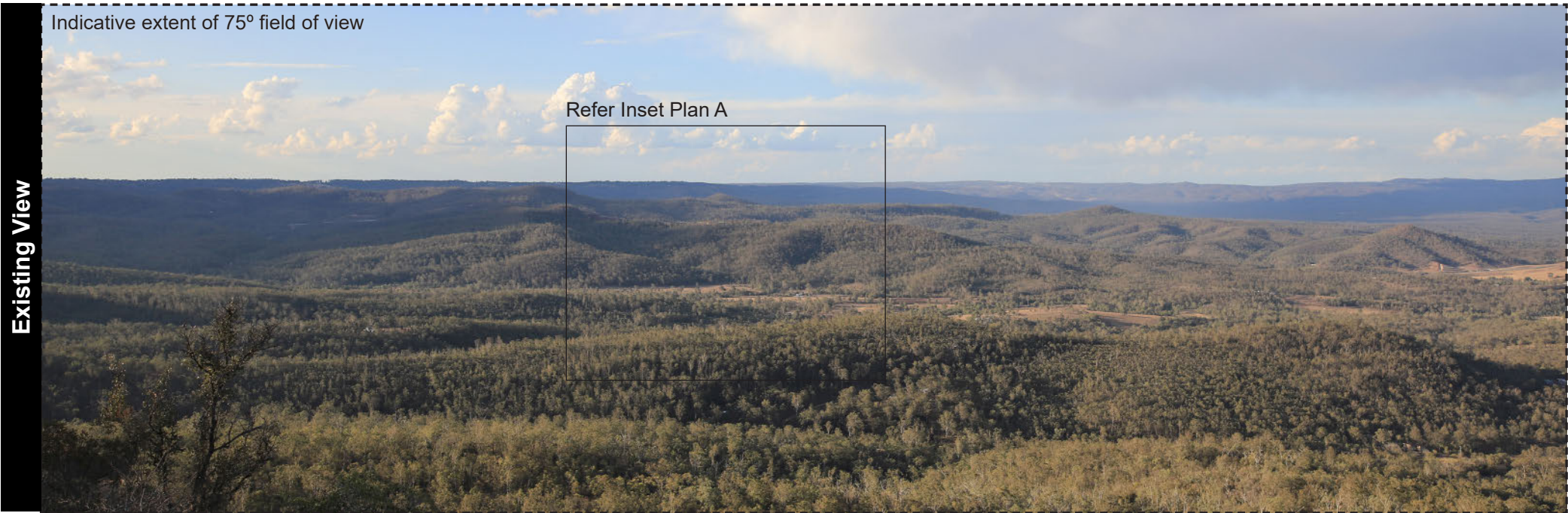
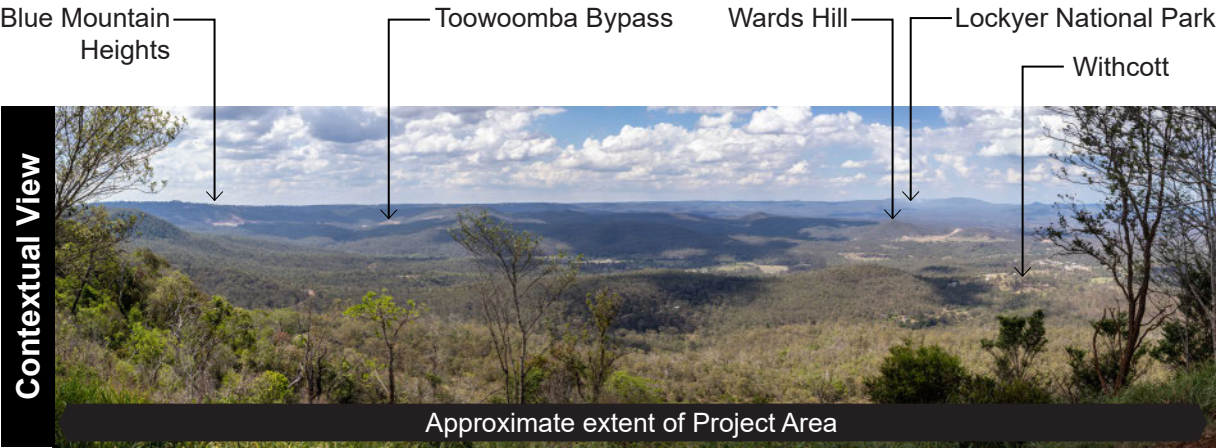
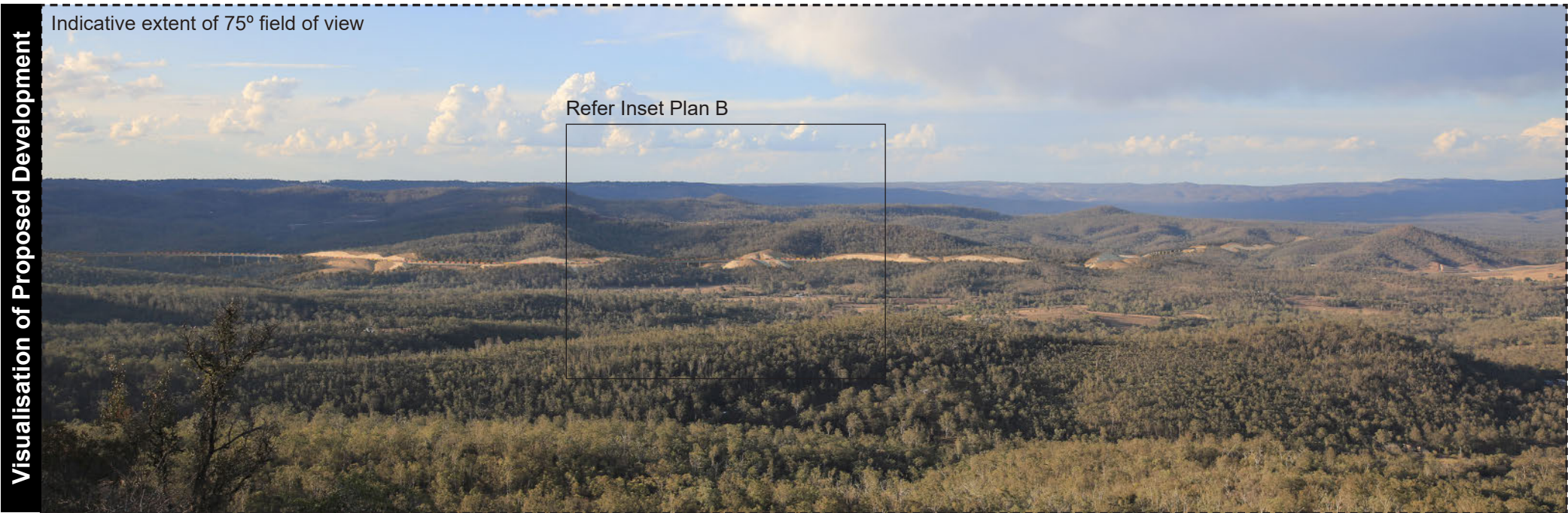


Figure 41: Viewpoint 14: Looking north from Katoomba Point Lookout on Prince Henry Drive, Prince Henry Heights



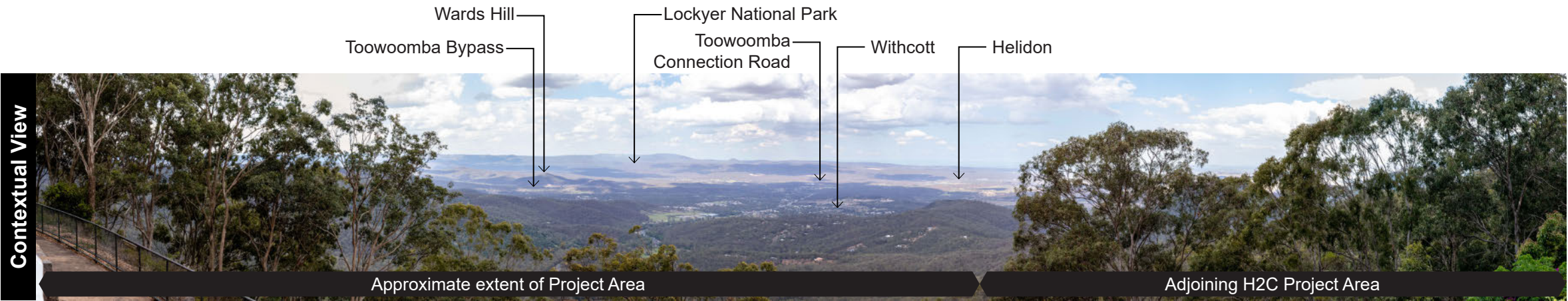
Inset Plan A



Inset Plan B



Figure 42: Viewpoint 15: Looking northeast from Picnic Point Lookout within Picnic Point Parklands, Rangeville



Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 43: Viewpoint 16: Near 102-114 Jones Road, Ballard, looking north



Note: Please note that no visualisation has been provided for this viewpoint, as discussed in Section 4.8: Visual Impact Assessment Methodology of the Landscape and Visual Impact Assessment Technical Report.

Figure 44: Viewpoint 17: Warrego Highway near Gittins Road, Postmans Ridge, looking west



Inset Plan A



Inset Plan B



Figure 45: Viewpoint 18: Murphys Creek Road near Toowoomba Bypass, looking north

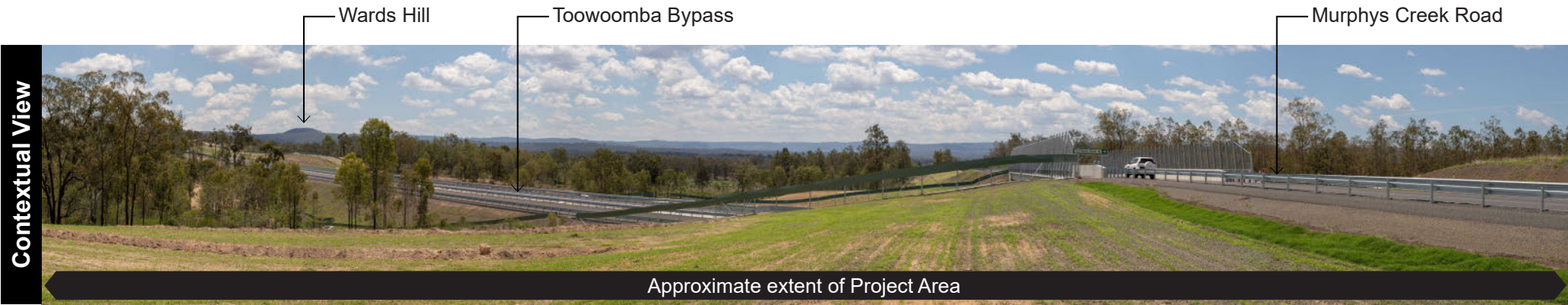


Figure 46: Viewpoint 19: Near 730-737 Ashlands Drive, Helidon Spa, looking north

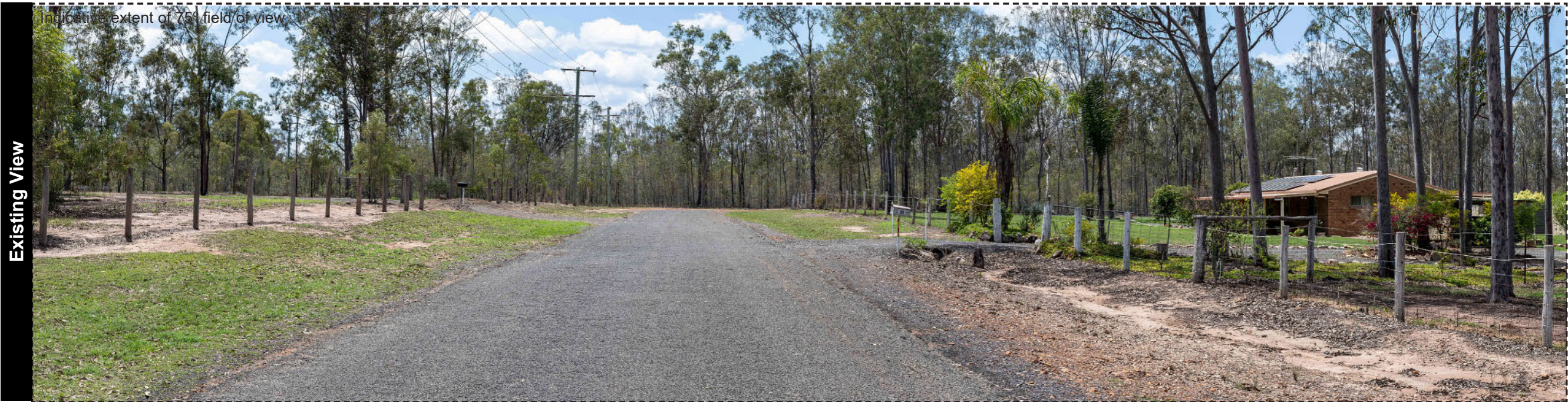
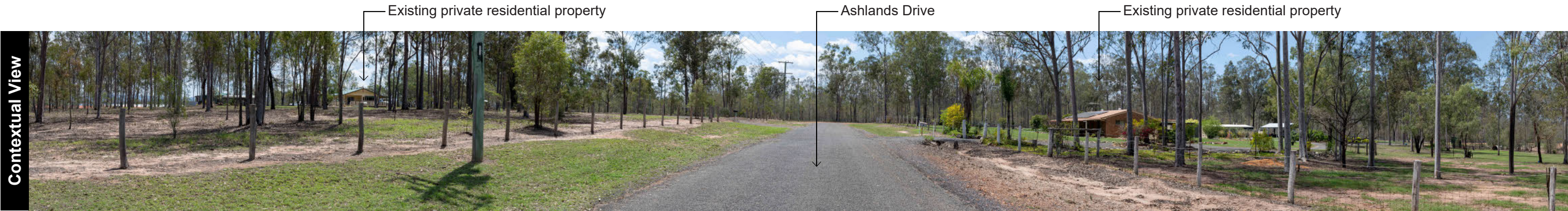


Figure 47: Viewpoint 20: Airforce Road, Helidon, looking west



Inset Plan A



Inset Plan B

